

Oncology Enabling Projects

Edinburgh Cancer Centre

Western General Hospital



NHS Lothian

Full Business Case

Project Lead: 

Project Owner: 

Project Sponsor: 

Date: 22nd July 2020

Version: 15

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1 Executive Summary

1.1. Purpose

The purpose of this Full Business Case (FBC) is to seek approval to upgrade the Oncology facilities at the Western General Hospital (WGH) in order to provide a safe and sustainable service in advance of the full re-provision of the Edinburgh Cancer Centre (Initial Agreement to be submitted to Scottish Government for approval in late 2020).

The content of this FBC has not changed from what was contained in the OBC that was submitted to the Scottish Government Capital Investment Group (SG CIG) in July 2019. The OBC received approval on 9th January 2020 following presentation at the SG CIG meeting on 11th December 2019.

The content of the OBC reflected the changes contained in the 'Addendum to the Oncology Bridging Projects Initial Agreement Submission' that was submitted to the Scottish Government Capital Investment Group on 22nd March 2018 outlining a reduced scope to address immediate service pressures and enable delivery of the longer term strategy of full re-provision of the Edinburgh Cancer Centre.

Based on the Stage 2 report, the indicative capital cost reported in the OBC was £18.3m. A market testing exercise has been completed and the Target Price agreement has reached a final capital cost of £20.6m.

The target price was built by market testing of the Linac/Admin project, and benchmarking the CAU, Wards and Ward 1 projects against the Linac returns. Inflation is then applied appropriately to these elements taking into account planned starts on site. As Ward 1 construction is not planned to start until late 2020 and CAU/Wards until a year later, any current market testing of these elements would have to be repeated once the projects come online, as the tender prices typically hold for 3-6 months only. Instead, the tender packages of these elements will be benchmarked against prices received for the Linac and other projects within the WGH Programme of Works and the market testing of Ward 1 and CAU will be carried out immediately before these projects come online.

Work is ongoing to identify and quantify the potential additional project costs (capital and revenue) that could arise as a consequence of the COVID-19 pandemic. Once quantified, these will be escalated through inclusion in the NHS Lothian mobilisation return to the Scottish Government. Governance and funding for these specific costs will be monitored and managed through this process and will be subject to verification by Health Facilities Scotland.

Following submission of the IA a substantial charitable donation was also received which allowed the Haematology upgrade and re-design to be funded and progressed independently from the four remaining projects. Approval was given for the Haematology FBC by the Scottish Government Capital Investment Group in September 2019 and project construction has now commenced with anticipated completion in early 2021.

It is recognised that the Edinburgh Cancer Centre as a whole does not meet modern standards and needs to be re-provided as a matter of priority. Four areas were prioritised as most in need of urgent upgrade to maintain safe service delivery until the opening of a new Cancer Centre:

The four identified priorities are:

- I. Upgrade of Systemic Anti Cancer Treatment (SACT) Service, Ward 1(including urgent upgrade of pharmacy aseptic unit)
- II. Improve HEI compliance in 3 inpatient wards (Wards 2, 3 and 4);
- III. Develop a new fit for purpose Cancer Assessment Unit (CAU, was previously OAA); and
- IV. Increase Linear Accelerator Bunker Capacity and Re-provide Administrative Offices

The strategic and economic cases for each of the four projects noted above are considered separately in the business case Sections 2 to 5 as the drivers for changes and investment objectives behind each vary. These are then brought together in the Financial, Commercial and Management case for the overarching project in sections 6 to 9.

1.2. Background and Strategic Context

The Western General Hospital site has undergone a significant Master Planning exercise with the centrepiece of development and campus modernisation being a re-provided Edinburgh Cancer Centre (ECC) for the South East of Scotland.

In view of uncertainty of agreement and a timescale for the development of a new Cancer Centre, four critical areas within the existing ECC were prioritised (as identified above).

Each of these areas has been reviewed separately to identify the key risks and issues for urgent attention. This has enabled the development of solutions required urgently to improve the health environment and maintain a safe clinical service. The review forecasts requirements to 2025 and the requirement for essential investment has been identified in all areas in order to provide a solution viable until that time.

The resulting four projects have been linked together as the 'Oncology Enabling Projects' (originally named 'Oncology Bridging Projects'). A single Initial Agreement and OBC were developed for progressing governance approval and the FBC also follows this format. To ensure focus and attention is applied to all aspects within each project, the document is split into sections with a section for each distinct project.

Each section focuses on relevant context as well as the background issues and pressures for each service. Separate Strategic Assessments and Option Appraisals were conducted as part of the IA to fully demonstrate the drivers and objectives of each project and ensure that the best value for money option was selected as the Preferred Option. The detail of these Strategic Assessments and Option Appraisals is not contained within this FBC however can be provided upon request.

One of the main issues that each individual project had to take account of was the increasing pressure on the service over time. The basis for these projects is that a re-provided Edinburgh Cancer Centre is not going to be available for use until 2025 at the earliest. With serious issues and concerns already being experienced in the project areas, the projects have been developed to address these immediate problems and mitigate risks associated with high annual growth in demand for Cancer Services which is expected to continue over the next 6 years.

This programme of work aligns with the aims of the National Cancer Strategy;

- To improve the experience of and outcomes for people affected by cancer across Scotland by improving service delivery and reducing health inequalities.

- To ensure that people with cancer have equity of access to sustainable, high quality, timely treatment.
- To reduce variation in practice/inequities in access to the most advanced treatments in accordance with individual clinical need and thereby improving outcomes.

It also works towards the ambitions of The Healthcare Quality Strategy for NHS Scotland, 2010:

- Person Centred
- Safe
- Effective
- Efficient
- Equitable
- Timely

These aspects will be addressed through an individual description of each project.

1.3. Need for Change

Individual Drivers for Change are described for each project below. A list of the shared drivers is below:

- Lack of space in clinical areas adversely impacting safety, quality and efficiency of care
- Lack of patient facilities (e.g. waiting areas and toilets)
- Lack of room to expand to meet rapidly growing service demand
- Lack of pharmacy preparation and storage space
- Inadequate accommodation impacting on staff morale and patient experience

1.4. Investment Objectives

Individual Investment Objectives are described for each project. A list of shared objectives is below:

- Re-design of service to significantly improve the care environment
- Improve service capacity
- Improve service performance and patient experience
- Improve facilities for staff
- Mitigate risks related to current non-HEI compliant facilities

1.5. The Preferred Option(s)

After extensive Option Appraisal the preferred option for each project is outlined below.

Table 1: Preferred Option

Area	Preferred Option
------	------------------

Area	Preferred Option
Systemic Anti Cancer Treatment, Ward 1	<p>Upgrade to Pharmacy area to deliver a safe and compliant aseptic unit</p> <p>Additional toilets and counselling room</p> <p>Upgraded patient waiting area</p> <p>Reduced density of treatment chairs per floor space</p>
Improved Inpatient Care Environment	<p>CAU moves out of Ward 2, inpatient wards spread over two floors (wards 2 and 4)</p> <p>Fire compartmentalisation and detection systems upgrades</p> <p>General flooring and building fabric works.</p>
New fit for purpose Cancer Assessment Unit	<p>The offices from the south end of the Oncology Admin Corridor move to a modular building in Car Park 3 (Above Linacs – see below).</p> <p>An “Acute” CAU with reduced office accommodation created in the south end of Admin Corridor</p>
Increasing Linear Accelerator Bunker Capacity and re-providing Administrative Offices	<p>New Building containing two Linac bunkers and associated accommodation constructed on Car park 3 with connection to main Edinburgh Cancer Centre</p>

The present indicative individual and overall capital costs of these projects are shown in the table below. The costing has been completed on the basis that these projects will be approved as one programme of work which will allow cost efficient decant of services when required. Therefore, if all the projects are not approved at the same time this assumption and exactly how these projects would be managed would have to be re-assessed.

Table 2: Indicative capital costs of preferred options

Project	Summary	Indicative Capital Cost of Project (incl. VAT) (£k)
1	Upgrade of Systemic Anti-Cancer Therapy (SACT) Service (Ward 1) including urgent upgrade of pharmacy aseptic unit	3,008
2	Environmental improvements in Inpatient Wards (Wards 2, 3 & 4)	2,142
3	New fit-for-purpose Cancer Assessment Unit	3,590
4	Increasing Linear Accelerator Bunker capacity and re-providing admin	11,886

Project	Summary	Indicative Capital Cost of Project
	offices	
	TOTAL	20,626

The incremental recurring revenue costs of £1.35m (excl depreciation) associated with the preferred option are noted below.

Table 3: Incremental Recurring Revenue Costs

Incremental Revenue Cost/year (£k)	Ward 1 SACT	Wards 2 and 4	CAU	Linac Capacity	Total Annual Revenue
Staffing	0	795	322	0	1,117
Facilities	27	10	80	40	157
Energy and Rates	0	0	0	65	65
eHealth	0	0	0	7	7
Total Annual Revenue Cost (excl. Depreciation)	27	805	402	112	1,346
Depreciation	301	214	359	1,189	2,063
Total Annual Incremental Revenue Cost	328	1,019	761	1,301	3,409

Work is ongoing to identify and quantify the potential additional project costs (capital and revenue) that could arise as a consequence of the COVID-19 pandemic. Once quantified, these will be escalated through inclusion in the NHS Lothian mobilisation return to the Scottish Government. Governance and funding for these specific costs will be monitored and managed through this process and will be subject to verification by Health Facilities Scotland.

Capital funding is to be from a specific allocation from the Scottish Government. Funding for depreciation (£2,063k) has been identified from the existing NHS Lothian depreciation budget. It was agreed at the SEAT Regional Directors of Finance Operational Group meeting in February 2020 that the revenue costs (excluding depreciation) will be split based on actual activity from each Board. The final figures presented below are consistent with those agreed through this process.

Table 4: Split of revenue costs between partner Boards

Board Share Of Staffing Costs	%	£K
Lothian	79.1%	1,065
Fife	8.0%	107.5
Borders	6.3%	84.5
Dumfries & Galloway	6.6%	89
Total	100%	1,346

As the investment is driven by growth, funding for NHS Lothian's share of £1.065m will come from the Financial Plan, supported by anticipated NRAC uplifts. In part, this Financial Plan investment is offset by

additional income of £300k, separately identified by the service from an increase in Gynae Brachytherapy procedures.

1.6. Decant Option

A decant solution identified as part of the Haematology Full Business Case of utilising Ward 15 as the decant/winter beds ward will also benefit this project, in particular during Ward 4 refurbishment. A temporary aseptic unit is also required to allow the Pharmacy expansion work to take place in Ward 1. The costs associated with the aseptic unit decant as well as the staffing costs for the Oncology decant (non-recurring) are included in this FBC.

1.7. Readiness to proceed

The procurement strategy is part of the wider WGH Programme of Works which amongst other projects includes the Haematology Project, Oncology Enabling Projects as detailed here and the drafting of the IA to support the new Cancer Centre.

RMF has been appointed as PSCP, along with Thomson Gray Partnership as Project Managers and Cost Advisors, under Frameworks Scotland 2. The PSCP will be responsible for all aspects of design and construction including the decants.

The Risk Register is attached as Appendix 3, and the contract option for the Linac element of the project is Option A: Priced Contract with Activity Schedule with monthly payments to PSCP and variations added by means of compensation events. The decision on the contract option for the remaining parts of the project will be made during their respective market testing processes.

The Project organisation and structure is defined in the Management Case. Project construction is planned to start in September 2020 and the projected completion date is November 2022.

A Benefits Register is available at Appendix 2.

1.8. Conclusion

The four service areas addressed within this FBC present the service with the most critical service pressures which must be urgently addressed to protect safe clinical delivery to patients. The Scottish Government is expecting an IA for a new Cancer Centre for consideration in 2020. This is in recognition that the current Cancer Centre cannot fully meet modern standards and requires full re-provision.

It is recognised that a re-provided Edinburgh Cancer Centre is not going to be available for use until 2025 at the earliest. This proposal therefore articulates enabling works required to safely provide cancer care within the Cancer Centre until 2025 and transformation work continues to be led by the Cancer Services Team to mitigate against the growth in demand that is anticipated within the next five years and beyond.

This FBC will outline the Strategic and Economic Case for each of the four projects separately as the drivers for change and investment objectives behind each vary. These are then brought together in the Financial, Commercial and Management case for the overarching project.

2 Expansion of the Day Case Systemic Anti-Cancer Therapy (SACT) Service (Ward 1)

2.1. The Strategic Case

The sections below set out the strategic case for the expansion of day case Systemic Anti-Cancer Therapy (SACT) Service.

There have been no changes to the strategic case driving this proposal since the Initial Agreement and Addendum were approved by the Scottish Government Capital Investment Group in 2016 and March 2018, respectively.

The pressure to deliver the service continues to rapidly grow in an already crowded facility. Indeed, SACT attendances have increased significantly since the approval of the original Initial Agreement in 2016. The Cancer Clinical Management Team is therefore implementing immediate strategies to mitigate deteriorating growth related risks until the completion of this project.

2.1.1. Existing Arrangements

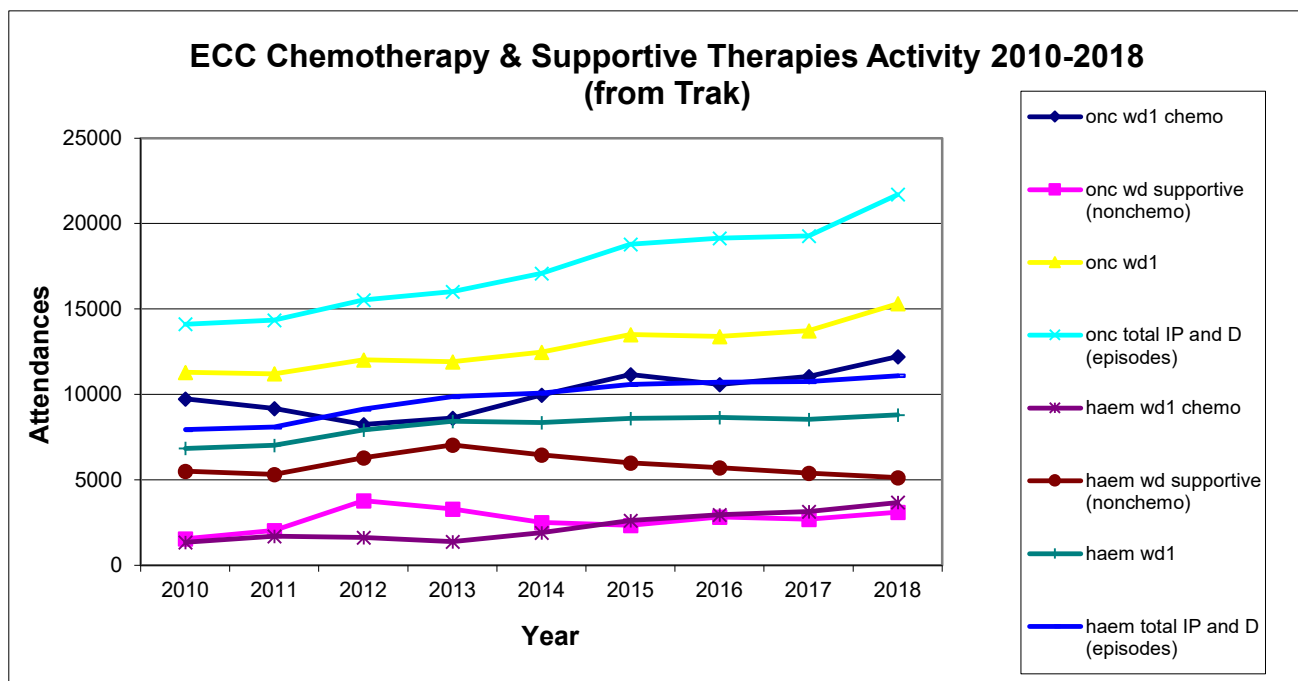
Day case SACT delivery in NHS Lothian is predominantly delivered in Ward 1 at the Western General Hospital, with a recently expanded satellite day case facility for a number of regimes at St John's Hospital in Livingston. SACT regimes are also delivered in the inpatient setting as necessary. Patients are predominantly from the Lothian area however patients also attend from Fife, Borders and Dumfries and Galloway if their SACT cannot be delivered locally (e.g. complex cases, regional service provision for selected less common cancers or capacity pressures)

The existing Ward 1 service provides:

- Day case SACT and supportive therapies for Oncology patients
- Day case SACT and supportive therapies for Haematology patients
- Pharmacy (aseptic and oral dispensing units and clinical verification area) for the above, and also for inpatients in the Oncology and Haematology wards, and as required for outpatients attending Oncology clinics, the Breast Unit and Rheumatology clinics.
- Day case SACT trials delivery

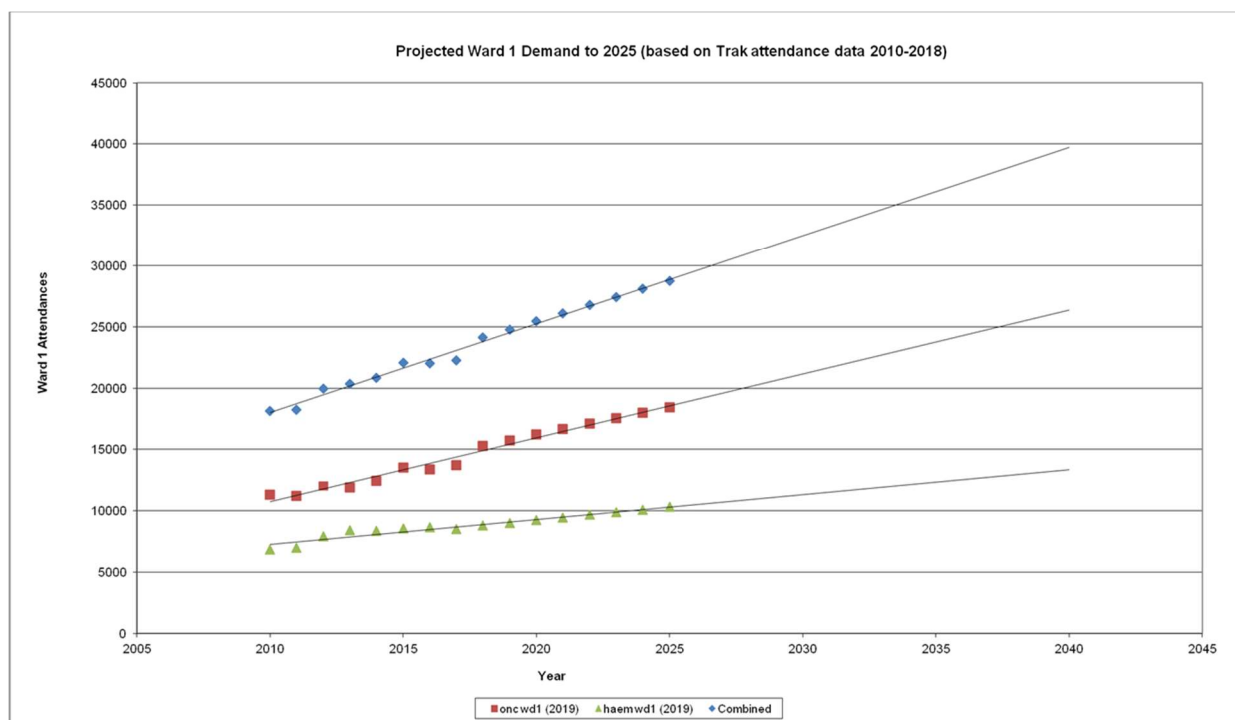
SACT activity has increased by 35.5% over the last eight years (from 2011-2018)

Figure 1: Ward 1 Chemotherapy & Supportive Therapies Activity 2010-2018



Demand for SACT services is forecast to continue to rise as demonstrated in Figure 2 below:

Figure 2: Forecast rise in demand for Ward 1 services to 2040¹



¹ TRAK Data March 2020

The Ward 1 area currently consists of:

Table 5: Ward 1 current utilisation

Treatment Area- Ground Floor	Pharmacy - Ground floor	Lower ground floor
<p>Area 1 – 10 Trials chairs</p> <p>Area 2 - 16 chairs for oncology patients</p> <p>Area 3 – 15 chairs, 2 beds and one isolation room (2 chairs may be used by Haematology)</p> <p>Area 4 – 16 chairs for Haematology patients (excluded from demand and capacity analysis as these chairs will be moving and will provide capacity for SACT trials)</p> <p>Haematology procedure room</p> <p>Pentamidine room</p> <p>Each area has a SACT preparation area and there are various staff offices for prescribers and nursing teams, a notes and scheduling office, a trials lab, toilets for staff and patients, and storage areas</p>	<p>Aseptic unit</p> <p>Oral dispensary</p> <p>Storage including cold-store</p> <p>Clinical verification room</p> <p>Staff Office</p>	<p>Offices for Trials Data Managers and Nurses</p> <p>Storage of Trials records</p> <p>Staff toilets and changing rooms</p>

There have been various service redesign efforts utilised over recent years to offset the underlying demographic pressures above, including repatriation of activity to peripheral Board SACT units, simplification and truncation of SACT regimes where this can be achieved without patient detriment and displacement of supportive activity to other areas including elective activity in the Cancer Assessment Unit (CAU).

There are a number of different accommodation pressures which are summarised below.

Table 6: Ward 1 - Existing Pressures

Pressure	Description
Chair Spacing	<p>Insufficient number of treatment chairs to meet current and future demand. Ward 1 currently has 58 chairs in a space designed for 44. Current chair spacing is circa 2.0m²/chair with the recommended chair area being 10m²/chair (Health Build note 02-01 Cancer treatment facilities). The lack of space and adequate chair numbers presents a continual “fire fighting” challenge for the multidisciplinary team. This also results in a poor patient experience illustrated by the fact that return patients are no longer permitted to bring a relative or friend for support due to space constraints.</p>
Service capacity	<p>Space constraints also present safety concerns: (e.g. following an incident whereby a patient was administered the wrong SACT, it was identified in the Datix investigation that space was a significant contributory factor).</p> <p>The capacity constraints also impose increasing challenges in delivering on 31 and 62 day CWT targets where SACT is first definitive treatment. This situation worsens as ‘upstream’ diagnostic pressures deteriorate. Ever more patients present for chemotherapy ever later in the pathway and there is ever less ability to flex capacity to prevent chemotherapy breaches.</p>
Infection Control	<p>Inadequate chair spacing presents infection control and safety concerns for this immunocompromised patient group.</p>
Pharmacy Space	<p>Essential Pharmacy support is at the limit of its capacity- evidenced by increased incidence reporting in the clinical area and in pharmacy.</p> <p>The pharmacy aseptic unit is no longer fit for purpose and is in need of full upgrade: the air handling unit in aseptic unit is now more than 20 years old and is frequently breaking down causing interruption to service; overall the current facility does not meet standards expected of a modern aseptic unit.</p>
Storage Space	<p>Inadequate storage for pharmacy, ward supplies and linen.</p>
Facilities	<p>Lack of facilities for relatives and patients e.g. waiting areas and toilets</p>

Pressure	Description
Clinical Rooms	Insufficient number of consulting, procedure and isolation rooms.
Toilets	Inadequate number of toilets built to a specification to meet patient needs.
Configuration	Not conducive to effective patient flow (e.g. no area for pre-assessment, new patient cohorting or chairs to accommodate delays), insufficient space for safe and efficient working practices within pharmacy.
Insufficient space to develop Clinical Trials	Reduced clinical trials recruitment limits revenue benefits to NHS Lothian both in lost commercial income and in lost drugs budget cost avoidance opportunities from commercial funded phase 3 studies. Also limits well evidenced clinical benefits of trials participation for all patients seen in the service.

2.1.2. Drivers for Change

The following section expands on the need for change as identified in the Strategic Assessment (included in Appendix 1) and describes the anticipated impact if nothing is done to address these needs and why action should be taken now through this proposal.

The table below confirms the need for change (as detailed in the Initial Agreement) is still valid.

Table 7: Summary of the Need for Change – Ward 1

What is the cause of the need for change?	What effect is it having, or likely to have, on the organisation?	Why action now?
Non-compliant treatment area, lack of isolation rooms, lack of space in treatment area	Increased risk of infection. Risk of errors in treatment. Delayed/deferred treatments	Facility is not fit for purpose with the potential for patient harm
Lack of patient facilities including DDA compliant toilets, adequate waiting areas. Privacy issues	Complaints from users	Likelihood of increasing stress in a group of 'high risk' patients
Pharmacy aseptic unit in need of urgent upgrade.	Aseptic unit breakdown – leading to inability to provide SACT	Provision of SACT service at risk if aseptic unit fails. Pharmacy may not be able to deliver a safe service in the immediate future, and will be unable to meet increased demand for SACT (including trials)

What is the cause of the need for change?	What effect is it having, or likely to have, on the organisation?	Why action now?
Lack of preparation and storage space in Pharmacy	Poor facilities with inadequate space to meet capacity demands leading to increased risk of errors	anticipated over next 10 years.
Future service demand is predicted to increase	Existing capacity is unable to cope with future projections of demand	Service sustainability will be at risk if this proposal isn't implemented now
Ineffective service arrangements because of inefficient configuration of department	Inefficient service performance Poor patient flow	Continuation of the existing service performance is unsustainable
Service arrangements not person centred	Service is not meeting current or future user requirements	A service that isn't meeting user requirements is unsustainable, even in the short term
Lack of space for expansion of Clinical Trials	Inability to offer new Trials to patients Potential income generation lost	Future of Trials Unit at risk with loss of the benefits to patients and the Service
Low staff morale	Challenges around recruitment and retention	To improve staff working environment, raise morale and retain staff

2.1.3. Investment Objectives

The assessment of the existing situation and the drivers for change have been used to identify what has to be achieved to deliver the changes required. These are defined as the investment objectives and are summarised in the table below. The investment objectives have been revalidated since the Initial Agreement taking cognisance of the continuing increased pressure on the service and remain valid for this proposal.

Table 8: Investment Objectives – Ward 1

Effect of the need for change on the organisation	What has to be achieved to deliver the necessary change? (Investment Objectives)
Existing facilities do not comply with recommended treatment chair spacing	Redesign of service to alleviate crowding and improve the patient environment

Existing space and pharmacy facilities not able to support forecast increases in demand	Improve facilities and service capacity to meet current demand and accommodate growth
Inefficient service performance. Current space is not conducive to supporting efficient patient flow.	Improve service performance and patient experience.
Service is not meeting current or future user requirements	Meet user requirements for service

2.1.4. Benefits

A Strategic Assessment (SA) was completed identifying the need for change, benefits of addressing these needs and their link to the Scottish Government (SG) five Strategic Investment Priorities below:

- Safe; Person-Centred; Effective Quality of Care; Health of Population; Efficient: Value and Sustainability

The above investment objectives and the Strategic Assessment (see Appendix 1) have informed the development of a Benefits Register and Benefits Realisation Plan (see Appendix 2) as per the Scottish Capital Investment Manual guidance.

A summary of the key benefits to be gained from the proposal are described below:

Table 9: Key benefits - Ward 1

Area	Benefit
Oncology Benefits	This proposal provides improved chair spacing. A redesigned environment will also support the proposal to redesign patient pathways to support efficient patient flow. The improved chair spacing will improve patient safety and experience by reducing overcrowding which will also improve staff experience.
Haematology Benefits	The Haematology proposal supports relocating the Haematology to the West Wing and the Break Through Laboratory on the Western General Hospital campus. This option enables co-location of the Haematology day case service with the Haematology in patient wards (wards 8 and 8 unit) which will release space within Ward 1 and allow the increased chair spacing referenced in 'Oncology Benefits' above.
Pharmacy Benefits	This proposal enables upgrade of the aseptic unit to address the deficiencies that have been noted in the last two external pharmacy audits, and ensure it can continue to meet service requirements for SACT and improve the standard of facility to enable improved compliance with the Quality Assurance of Aseptic Preparation Services and EU Guidelines to Good Manufacturing Practice. In addition the modernisation of the pharmacy aseptic unit and pharmacy oral

Area	Benefit
	<p>dispensary will ensure there is sufficient space to operate safely and will help to accommodate expected growth in demand.</p> <p>Pharmacy metrics: capacity to meet increased demands for SACT including clinical trials; improved storage leading to better flow and improved stock control</p>
Service provision	<p>Delivery of waiting times / treatment targets now and in the future for the various tumour groups.</p> <p>Reduction in delayed or deferred treatments; reduction in unnecessary inpatient admissions.</p> <p>Improved user feedback: surveys; appraisals; reduction in complaints.</p> <p>Reduction in SAE and Datix incidents</p> <p>Improved access to the most innovative cancer therapies by expanding capacity for clinical trials.</p>
Infection Control	Improved HAI and HBN guidance compliant accommodation
Finance	Improved ability to deliver clinical trials thereby improving financial efficiencies derived from drugs cost avoidance.

2.1.5. Strategic Risks

The table below highlights key strategic risks that may undermine the realisation of benefits and the achievement of the investment objectives. These are described thematically and potential safeguards and actions in place to prevent these:

Table 10: Strategic Risks - Ward 1

Theme	Risk	Safeguard
Scope	Increase in number and complexity of new SMC approved SACT regimes above predicted levels	Continue to progress proposal towards a new Cancer Centre to accommodate continued growth in demand
Workforce	<p>Shortage of specialist trained SACT nursing staff</p> <p>Shortage of pharmacy workforce – pharmacists and technicians</p>	Develop robust workforce plan and improve working environment to ensure retention of current specialist staff and develop enhanced training programme.

Theme	Risk	Safeguard
Funding	Capital funding not available Revenue funding not available	Provide robust case for funding through OBC and FBC Options identified to fund revenue costs
Regional	Peripheral Boards unable to repatriate patients due to lack of capacity	Continue to work with regional partners to develop sustainable single service model across South East Scotland
Capacity	Increase in patient numbers beyond forecast predicted levels over the next 10 years	Continue to progress proposal towards a new Cancer Centre to accommodate continued growth in demand

2.1.6. Constraints and Dependencies

The key constraints and dependencies of this proposal to be considered are:

- Availability of capital funding
- Other projects on the WGH site that interact with this proposal including Haematology, Clinical Trials and Renal re-provision.
- Decant requirements to enable works.
- Service must be able to be delivered safely during construction works.

2.1.7. Preferred Decant Option

The space released in Ward 1 as part of Haematology project will give opportunity for the service redesign, also aided by a separate project of relocating Clinical Trials Data Managers' offices from the lower ground floor of Ward 1. This will free up the space required for development of the pharmacy aseptic unit. As the service provided by the pharmacy requires to continue for the duration of the project, there is a need to hire a temporary aseptic unit, which is planned to be located in the car park immediately behind Ward 1. In addition, a pharmacy oral dispensary is planned to decant into the old renal dialysis unit, immediately adjacent to Ward 1, which is planned to relocate to its new facility in late 2020.

The costs in connection with decant of Ward 1 and other elements of the Enabling Project are detailed in the Financial Case of this FBC.

2.2. Economic Case

2.2.1. Do nothing/baseline

The table below defines the 'Do Nothing' option. This is based on the existing arrangements as outlined above.

Table 11: Do Nothing – Ward 1

Strategic Scope of Option	Do Nothing
Service provision: Continue to provide service from Ward 1, required to cope with increasing service demand until at least 2025	Increasingly overcrowded environment, insufficient for current and future service demands
Service arrangements: Continue to be delivered as a day service and likely to be extended to 7-day working	Inadequate service unable to provide required capacity with the potential difficulty of supporting service at weekends
Service provider and workforce arrangements: Local staff delivering service out of Ward 1, supported by the Satellite Pharmacy Aseptic Unit.	Internal Staff working in very poor, overcrowded environment leading to pressure and potential for errors
Supporting assets: Present Pharmacy Aseptic Unit	Pharmacy Aseptic Unit delivered from severely overcrowded and cramped facilities
Public & service user expectations: Safe delivery of prompt service in a suitable environment	Overcrowded environment leading to patient dissatisfaction and potential difficulty in delivering safe service with likely delays due to lack of capacity

2.2.2. Preferred Strategic/ Service Solution

As described in the Initial Agreement, a total of ten “long list” options were developed and appraised.

For this first stage in appraising the options, a list of Investment Objectives was drawn up that represented the aspirations of the service. The long list options were scored against their delivery of the Primary and Secondary Objectives allowing the list to be trimmed. The scores of the full ten options are shown in Appendix 6 and this step allowed a number of them to be eliminated. A Long List option had to score 75% or above to allow it to be short listed for further more detailed analysis.

This resulted in the full option appraisal being undertaken for the 4 options short listed from the Long List of options, including the “Do Nothing” and “Do Minimum” options. The other two chosen options were selected from the long range of options after scoring more than the 75% required. The resulting short listed options were then evaluated through the Option Appraisal in accordance Scottish Capital Investment Manual (SCIM) guidance on benefits, risks and costs.

Examination of the option appraisal process showed a single clear preferred option when the weighted benefits scores were taken account of however this was subsequently scaled down to fit within reduced financial parameters as detailed in the IA Addendum and OBC.

The preferred option is detailed below:

Table 12: Ward 1 - Preferred Option

Preferred Option	Benefits	Risks/ Constraints	Dependencies
Upgrade to Pharmacy area to deliver a safe and compliant aseptic	Creation of a fit for purpose & safe, reliable pharmacy aseptic unit able to meet	This option will see minimal improvements to	Assumes Haematology

Preferred Option	Benefits	Risks/ Constraints	Dependencies
unit	service demands for SACT	patient areas	moving
Additional toilets and counselling rooms		<i>(Note: Plans for Clinical Trials to vacate lower ground floor space will allow this space to be made available for Ward 1 staff-to be progressed and funded separately from this business case)</i>	Assumes decant of pharmacy to a temporary aseptic unit and oral dispensary
Upgraded patient waiting area			

2.2.3. Is the preferred Strategic Solution still valid?

The preferred Strategic and Service solution has been revisited to confirm that is still valid and delivers the investment objectives and benefits.

The 'new' preferred option detailed in this business case continues to focus upon using existing vacated or soon to be vacated areas in proximal locations to the existing Edinburgh Cancer Centre (ECC) rather than more expensive new build options. These options have been pursued to ensure that the preferred way forward maximises the benefits realisation in recognition that the upgraded facilities will only have a limited lifespan until a new Cancer Centre opens.

The table below details the changes in scope for the preferred solution identified through the IA and IA Addendum and that proposed in the OBC and this FBC.

Table 13: Ward 1 - Changes to Preferred Option

IA - Preferred Option	OBC/FBC - Preferred Option	Scope Changes and rationale
Refurbishment of Pentland Lodge to contain a new Clinical Trials Unit.	Upgrade to Pharmacy facilities to deliver a safe, reliable and compliant aseptic unit.	Scope was reduced in line with the reduced capital budget available for the Oncology Enabling projects.
Upgrade of the MRC West Wing, followed by the Breakthrough Lab to house new Haematology Unit and then refurbishment of the vacated space in Ward 1 to enhance Pharmacy and Oncology services.	Additional toilets and counselling rooms. Upgraded patient waiting area	The Pharmacy area within Ward 1 was identified as in greatest need of expansion and therefore funds have been allocated to this portion of the project. The relocation of Haematology patients from Ward 1 (as part of the Haematology project) will allow some space to be freed within treatment areas of Ward 1. Patients will also benefit from additional toilets and counselling

rooms as well as an upgraded patient waiting area.

2.2.4. Assessment of Non-Monetary costs and benefits

These are assessed as part of the programme Benefits Register attached as Appendix 2

2.2.5. Implementation options

The table in point 2.2.3 above identifies the current scope of works for the SACT element of the project. The preferred option contained in the Oncology Bridging Initial Agreement submitted to CIG in August 2016 had not achieved approval from the Scottish Government due to cost and affordability of the entire scheme. NHS Lothian was subsequently asked to prioritise the proposals and present an IA Addendum with reduced options. The Way Forward presented in this FBC was developed based on the scheme described in the IA addendum, which was approved in March 2018.

2.2.6. Assessment of NPV (Net Present Value) of costs

The table below details the indicative whole life costs associated with the preferred option, discounted over the life of the project to give a Net Present Value of Costs for the project.

- Whole life capital costs do not include VAT or inflation as these are required to be excluded per SCIM guidance.
- Incremental whole life revenue costs represent the recurring and non-recurring revenue costs (excluding depreciation as required by SCIM guidance) throughout the life of the project (assumed to be until delivery of a new cancer centre in 2025). It should be noted, however that these works will benefit the wider WGH site beyond the life of this project.
- All costs are discounted to give a Net Present Value of costs using a discount rate used of 3.5% in line with Treasury Green Book guidance.

Differences from the NPV included in the OBC represent updated revenue and capital costs and the life of the project to 2025.

Further details on the calculation of costs can be found in the Financial Case.

Table 14: Indicative Costs of Preferred Option – Ward 1

Cost (£k)	OBC - Preferred Option	FBC - Preferred Option	Difference
Whole life capital costs	2,271	2,607	336
Incremental whole life operating costs	120	120	0
Estimated Net Present Value (NPV) of Costs	2,391	2,727	336

2.2.7. Design Quality Objectives and Stakeholder Engagement

Design quality objectives and stakeholder engagement are included in the Management Case for all four projects included within this proposal.

3 Upgrade of Wards 2 and 4 (Oncology In-patient Wards)

3.1. Strategic Case

The sections below set out the strategic case for the Upgrade of Ward 4 (Oncology Inpatient ward) and Ward 2 (currently used for the Cancer Assessment Unit)

There have been no changes to the strategic case driving this proposal since the Initial Agreement and Addendum were approved by the Scottish Government Capital Investment Group in 2016 and March 2018, respectively.

The pressure to deliver the service continues to grow with bed occupancy across the Cancer Centre continuing to increase since the approval of the original Initial Agreement (by 5% from 2017/18 to 2018/19)

3.1.1. Existing Arrangements

Wards 3 and 4 provide inpatient care for patients receiving Radiotherapy or SACT chemotherapy and supportive care for patients with disease progression who may also require symptom control, and cannot be managed as outpatients. The wards will also occasionally accommodate patients from other specialities on the Western General Hospital Site.

Ward 3 provides 9 inpatient beds plus 4 Teenage Cancer Trust (TCT) beds and Ward 4 has 22 inpatient beds. There are a further two inpatient rooms with radiation protection in the ward below (ward 2) which are used for Radionuclide Therapy.

Ward 2 is currently the Cancer Assessment Unit which is the equivalent of the Medical and Surgical Acute Receiving Units at the Western General Hospital (WGH) and is for patients who have developed acute problems while on active cancer treatment or who have recently completed therapy.

The conditions and environment in wards 2 and 4 are well documented and have been the subject of critical HEI Reports. The key accommodation issues are summarised below:

- Inadequate toilet and shower facilities- unable to use hoist, lack of space for patients needing assistance
- Lack of en-suite facilities
- There are three rooms with two 4 bedded bays (8 patients) which share a single toilet and a single shower
- There are also five 4 bedded rooms which share a single toilet and shower between 4 patients.
- Six single rooms which provides a challenge with end of life care as well as segregation of infected patients
- Poor patient experience evidenced by feedback received
- Limited disposal/hold facilities
- The wards share some facilities with adjacent wards (3 & 6) which is not recommended or ideal
- The Radioactive Iodine (RAI) Room in Ward 2 is non-compliant and is under an HSE Improvement Notice
- Neither ward has mechanical ventilation nor sufficient natural ventilation
- Facilities are not compliant with the Disability Discrimination Act 1995 (DDA)
- There is a lack of isolation rooms

3.1.2. Drivers for Change

The following section expands on the need for change as identified in the Strategic Assessment (included in Appendix 1) and describes the anticipated impact if nothing is done to address these needs and why action should be taken now through this proposal.

The table below summarises the need for change, the impact it is having on present service delivery and why this needs to be actioned now. The table below confirms the need for change (as detailed in the Initial Agreement) is still valid.

Table 15: Summary of the Need for Change – Inpatient Wards

What is the cause of the need for change?	What effect is it having, or likely to have, on the organisation?	Why action now?
Non-compliant inpatient facilities – bed spaces inadequate, toilet and showers not DDA compliant, lack of enough single en-suite rooms	Increased risk of infection in vulnerable patient population Patient care compromised by lack of space and appropriate facilities	Risk of future unfavourable HEI report potentially leading to ward closure
Ineffective service arrangements in part due to poor ward layout and lack of facilities – waiting rooms, single rooms	Inefficient service performance	Continuation of the existing service performance is unsustainable
Service arrangements not person centred with poor patient experience, mixed toilet facilities, privacy issues	Service is not meeting current or future user requirements	A service that isn't meeting user requirements is unsustainable, even in the short term
Accommodation with high levels of backlog maintenance and poor functionality (see HEI report)	Increased safety risk from outstanding maintenance and inefficient service performance	Building condition, performance and associated risks will continue to deteriorate if action isn't taken now

3.1.3. Investment Objectives

Although a new Cancer Centre is an important cornerstone of the Master Planning development at the Western General Hospital, it is not expected to be available until 2025 at the earliest. Urgent redesign is therefore required to improve the health environment, provide a safer patient environment meet infection prevention standards until 2025.

The assessment of the existing situation and the drivers for change have been used to identify what has to be achieved to deliver the changes required. These are defined as the investment objectives and are summarised in the table below. The investment objectives have been revalidated since the Initial Agreement taking cognisance of the continuing increased pressure on the service and remain valid for this proposal.

Table 16: Investment Objectives - Inpatient Wards

Effect of the need for change on the organisation	What has to be achieved to deliver the necessary change? (Investment Objectives)
Existing inpatient facilities are non-compliant	Improve and upgrade ward facilities
Radioactive Iodine (RAI) Room is non-compliant and is under an HSE Improvement Notice	Create compliant facility
Inefficient service performance due to inadequate facilities	Improve service performance in improved environment
Service is not meeting current or future user requirements	Meet user requirements for service
Increased safety risk from outstanding maintenance and inefficient service performance	Improve safety and effectiveness of accommodation
Low staff morale	Staff and patient environment to be improved to raise morale and retain staff

3.1.4. Benefits

A Strategic Assessment (SA) was completed identifying the need for change, benefits of addressing these needs and their link to the Scottish Government (SG) five Strategic Investment Priorities below:

- Safe; Person-Centred; Effective Quality of Care; Health of Population; Efficient: Value and Sustainability

The above investment objectives and the Strategic Assessment (see Appendix 1) have informed the development of a Benefits Register and a Benefits Realisation Plan (see Appendix 2).

A summary of the key benefits to be gained from the proposal are described below:

- A reduction in incident reporting and Serious Adverse Events
- HAI and HBN guidance improved accommodation
- Improved patient feedback
- Improved staff experience
- Inpatient capacity to place oncology patients in an appropriate environment e.g. benefit from increased number of patients having access to single rooms where clinically required

3.1.5. Strategic Risks

The table below highlights key strategic risks that may undermine the realisation of benefits and the achievement of the investment objectives. These are described thematically and potential safeguards and actions in place to prevent these:

Table 17: Strategic Risks - inpatient wards

Theme	Risk	Safeguard
Capacity	<p>Future increase in service requirements greater than predicted</p> <p>Unpredicted increase in user population over the next 5 years</p> <p>Delay in opening of new Cancer Centre leading to lack of space beyond 2025</p>	<p>Deliver an IA to the Scottish Government for a modern fit for purpose specialist Cancer Centre in 2020.</p>
Scope	<p>The space constraints will mean that there will continue to be some derogations and whilst this is an improvement there is a risk that not all of the issues described will be fully addressed.</p>	<p>As above</p>

3.1.6. Constraints and Dependencies

The key constraints to be considered are:

- Availability of capital funding
- Other projects on the same site that interact with this proposal including the other projects within this programme plus the Haematology and Renal reprovisions.
- Derogations not accepted by SG
- Decant requirements to enable works.
- Service must be able to be delivered safely during construction works.

The key dependencies to be considered are:

- Ward 15 to be used a decant facility
- Proposed new Cancer Centre completion date if agreed

3.1.7. Preferred Decant Option

As part of the inpatient Wards element of the Oncology Enabling project the space in Ward 2, freed up by the relocation of the Cancer Assessment Unit, will be refurbished as described above. This means reduction of the number of beds in Ward 2 and as a consequence Ward 4 not being able to decant fully into Ward 2 after completion. Ward 4 requires therefore to decant elsewhere; and for this Ward 15, refurbished as part of the Haematology project decant strategy, will be used. As a result there is no requirement for capital funds for decant of inpatient Wards element. There will be non-recurring staffing revenue funding required for decant of Ward 4 and this is included in the Financial Case of this FBC.

3.2. Economic Case

3.2.1. Do nothing/baseline

The table below defines the 'Do Nothing' option. This is based on the existing arrangements as outlined above.

Table 18: Do Nothing – Inpatient Wards

Strategic Scope of Option	Do Nothing
Service provision	Continuing to deliver inpatients wards service from current location in Oncology Wards 3 & 4
Service arrangements	Would leave the Oncology wards vulnerable to closure with related risk of closure of the South East Scotland specialist Oncology centre.
Service provider and workforce arrangements	Staff would continue to provide service in inadequate facilities, if facilities are permitted to remain open.
Supporting assets	Healthcare would continue to be delivered in poor and inappropriate environment.-Infection and falls risks would continue to be considerable
Public & service user expectations	Safe delivery of prompt service in a suitable environment. Current layout leaves patients vulnerable

3.2.2. Preferred Strategic/ Service Solution

As part of the Initial Agreement a "long list" of fourteen options were drafted with each option tested against primary and secondary objectives specific to the service requirement. All of these fourteen options took cognisance of displacement and impact on adjacent services, both existing and proposed and this context formed an integral part of each proposal.

Once tested and scored, the process identified three favoured planning options, in addition to the "Do Nothing" and "Do minimum" options each with the same resulting layout but delivered using different strategies.

The proposed solution in all three of the favoured cases seeks to provide two In-Patient Wards located on the first and second floors in place of existing Wards 2 / 3 and 4. The extended footprint would be possible through a relocation of the CAU service. Both floors would be stripped back to their shell and rebuilt to provide a modern template. Building services, common to both floors would be reviewed and replaced as required as part of the upgrading.

The options were then further developed and a proposal of a rebuilt CAU situated on the ground floor was introduced. This work was used to generate firm budget costings and the resulting data was then subject to a second option appraisal.

The second CAU option appraisal favoured the development of the ground floor admin corridor for a new CAU department. This proposal would be facilitated through the temporary decanting of the Oncology Wards and ground floor office space being re-provided in a purpose built building.

Due to financial constraints, following approval of the IA this proposal was reduced. The preferred option as included in the IA Addendum and OBC is detailed below:

Table 19: Inpatient Wards - Preferred Option

Proposed Upgrade	Benefits	Risks/ Constraints	Dependencies
CAU moves out of Ward 2, inpatient wards spread over two floors (wards 2 and 3/4)	Increased number of toilets, improved bed spacing	Bed spacing would still require derogations as limited footprint Inpatient Wards over 2 floors, increase in revenue costs	This option can only be possible if CAU moves out to an alternative location
General flooring and decoration works.	Improvements to bed spacing	Decant option also needs to be considered	

3.2.3. Is the preferred Strategic Solution still valid?

As part of the FBC the preferred Strategic and Service solution was revisited to confirm that it was still valid and would deliver the investment objectives and benefits.

The preferred solution remains to provide reconfigured and much improved ward space over the first and second floors of the Oncology block. The sister proposal to locate a new CAU into the ground floor of the Oncology block now allows clarity of decant options and presents a clear direction - the full decant of the Oncology block and a full single phase building programme.

This proposal brings both preferred solutions, for Wards 2 and 4 and for CAU together with clear economic and logistical advantages to be gained in delivering both as a common project.

Although the scope of the work was reduced in line with the reduced capital budget available for the Oncology Enabling projects the preferred option above still remains the preferred solution.

3.2.4. Assessment of Non-Monetary costs and benefits

These are assessed as part of the programme Benefits Register attached as Appendix 2

3.2.5. Implementation options

The table in point 3.2.3 above identifies the current scope of works for the Inpatient Wards element of the project. The preferred option contained in the Oncology Bridging Initial Agreement submitted to CIG

in August 2016 had not achieved approval from the Scottish Government due to cost and affordability of the entire scheme. NHS Lothian was subsequently asked to prioritise the proposals and present an IA Addendum with reduced options. The way forward presented in the OBC and in this FBC was developed based on the scheme described in the IA addendum, which was approved in March 2018.

3.2.6. Assessment of NPV (Net Present Value) of costs

The table below details the indicative whole life costs associated with the preferred option, discounted over the life of the project to give a Net Present Value of Costs for the project.

- Whole life capital costs do not include VAT or inflation as these are required to be excluded as per SCIM guidance.
- Incremental whole life revenue costs represent the recurring and non-recurring revenue costs (excluding depreciation as required by SCIM guidance) throughout the life of the project (assumed to be until delivery of a new cancer centre in 2025). It should be noted, however that these works will benefit the wider WGH site beyond the life of this project.
- All costs are discounted to give a Net Present Value of costs using a discount rate used of 3.5% in line with Treasury Green Book guidance.

Differences from the NPV included in the OBC represent updated revenue and capital costs and the life of the project to 2025.

Further details on the calculation of costs can be found in the Financial Case.

Table 20: Indicative Costs of Preferred Option- Inpatient Wards

Cost (£k)	OBC - Preferred Option	FBC - Preferred Option	Difference
Whole life capital costs	2,002	1,856	(146)
Incremental whole life operating costs	4,062	3,834	(228)
Estimated Net Present Value (NPV) of Costs	6,064	5,690	(374)

3.2.7. Design Quality Objectives and Stakeholder Engagement

Design quality objectives and stakeholder engagement are included in the Management Case for all four projects included within this proposal.

4 Redesign of the Cancer Assessment Unit (CAU)

4.1. The Strategic Case

The sections below set out the strategic case for the redesign of the Cancer Assessment Unit (CAU)

There have been no changes to the strategic case driving this proposal since the Initial Agreement and Addendum were approved by the Scottish Government Capital Investment Group in 2016 and March 2018, respectively.

4.1.1. Existing Arrangements

In line with other acute assessment areas on the WGH campus, 'OAA' was re-branded to the Cancer Assessment Unit (CAU) in 2018. The Cancer Assessment Unit (CAU) is the Cancer Services equivalent of the Medical and Surgical Acute Receiving Unit at the Western General Hospital (WGH) and is for patients who have developed acute problems while on active cancer treatment or who have recently completed therapy.

Patients are referred in from across the SCAN region although, if they self-refer through the Cancer Treatment Helpline (CTH), they may be asked to attend a hospital closer to home rather than WGH if appropriate. Other routes of referral into CAU include; patients from the treatment floors and the outpatient clinics, by GP's and also from other departments and hospitals, or self-refer through a dedicated phone line (CTH). Referrals are received into CAU both in and out of hours. The patients are triaged, assessed and then treated and discharged, or admitted as appropriate.

It is a service which has evolved and expanded over several years and is still being developed. Over a six year period CAU has expanded from an area accommodating 3 trolleys to occupying the space of a full inpatient ward. This growth is related to the overall increase in demand and activity in oncology; 2016 Cancer Strategy describes that cancer diagnoses have increase by 12% in a decade. The increased demand is reflective of a number of key drivers:

- An aging population
- An increasing population
- Increased cancer incidence
- Improved diagnostics
- Increased screening and detection
- The increasing number of effective treatment options that have been licensed and SMC approved and increasing use of multiple lines of SACT mean that it is foreseeable that demand for acute oncology will also increase.

Specifically for CAU the introduction of the CTH has also contributed to the increase in demand, whilst providing a safer and more efficient service which reduces the demand on Primary Care. Due to capacity pressures in Ward 1 a proportion of supportive therapies have been displaced to CAU. If the proposal for Ward 1 is supported this would enable repatriation of selective supportive therapies to a more appropriate ambulatory environment.

In addition to the different flows of patients through CAU it is also used as "flexible capacity" to accommodate patients when the inpatient demand exceeds the bed footprint within ECC.

Previously urgent cancer patients were referred through the Acute Receiving Unit at the WGH. When this arrangement was in place the 4 hour HEAT standard for 98 per cent of patients to wait less than 4 hours from arrival to admission, discharge or transfer for acute treatment was applicable. Following the

creation of CAU this standard is no longer applicable for oncology and haematology patients. However prompt assessment and treatment of the most acutely unwell oncology patients remains a service priority to ensure a safe and quality service.

The current CAU accommodation is not configured to safely provide all three workstreams of urgent triage and assessment, ambulatory supportive therapies AND short stay in patient care. CAU currently comprises of:

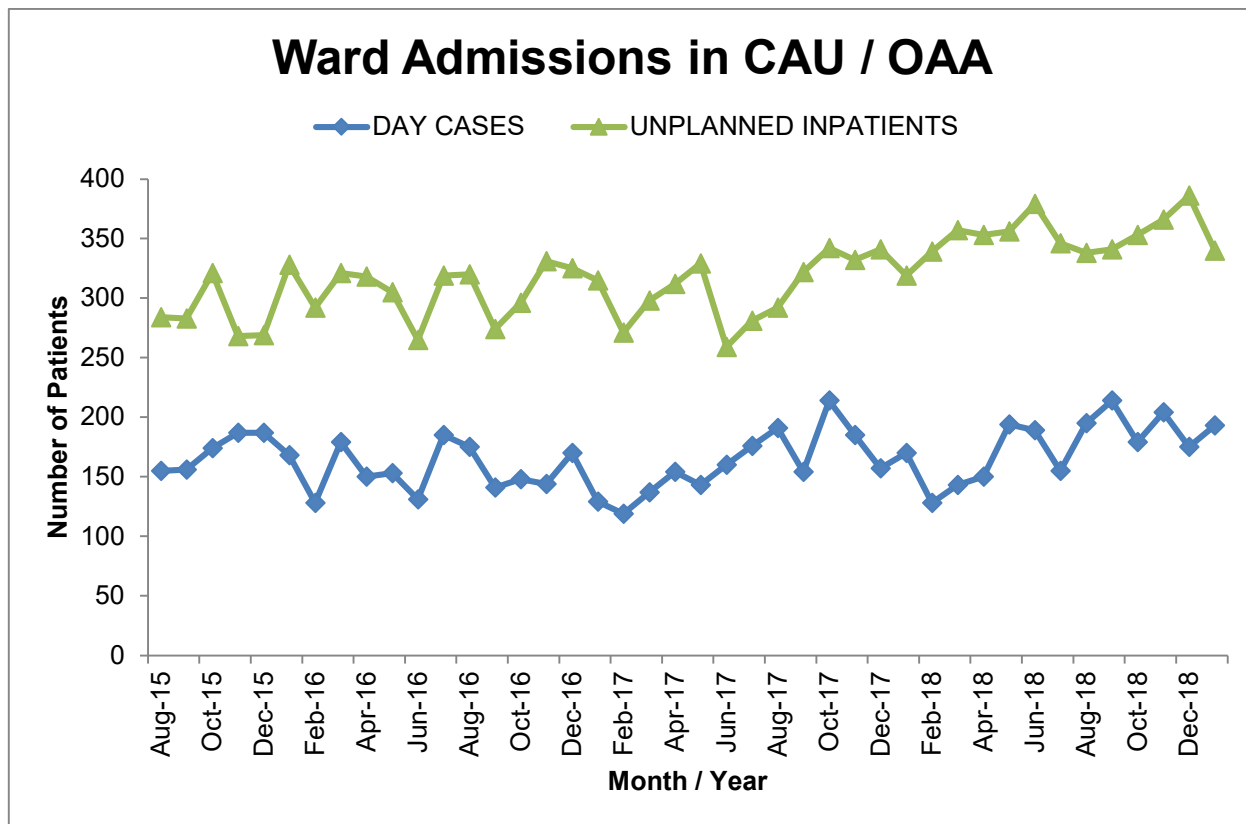
- One Radioactive Iodine (RAI) room
- 9 trolleys
- Ambulatory chair spaces
- 6 Single rooms
- Triage area
- Clinical Hub

CAU has been in its current form since 2015, with data demonstrating an increase in both planned and unplanned attendances from 2015-2019.

Work is also ongoing to understand the admission profile in order to develop a predictor for planning the workload through CAU.

The graph below shows planned and unplanned admissions between August 2015 and December 2018.

Figure 3: Ward Admissions in CAU/OAA 2015-2018



As already set out there are a number of issues with the current configuration and quality of the CAU accommodation. The key issues are:

- the layout is not conducive to efficient patient management and results in poor patient flow
- the ward layout does not allow for close observation of patients

- a lack of enough single rooms with en suite facilities (to allow isolation)
- inadequate waiting room space
- non-DDA compliant toilets
- Radioactive Iodine (RAI) Room requiring urgent upgrade work

The rate of growth in demand for oncology services means that redesign must feature as an essential part of service delivery. Increased demand is a consequence of positive developments for patients in cancer care. However this presents the service with a challenge to continually evolve an infrastructure at a rate to support it. Physical space is and will continue to be the critical constraint until the region’s cancer centre is re-provided in full. This issue is compounded by the financial position across NHS Scotland. Current redesign projects and service change proposals underway are detailed below.

A quality improvement project has been initiated to review the different flows of patients through CAU with a view to stratifying the patient pathways. A key component of this work is developing an understanding of key performance measures e.g. developing predictor tool to assess other ways to plan admissions and reviewing performance against time from referral, admission and assessment. There is also a requirement to evolve an understanding of the impact on admission rates in the context of increasing demand and activity.

In the context of increasing cancer incidence and increasing patient activity the need for acute oncology will expand. The Oncology Service will need to further develop the acute oncology model of care to further enhance coordination of care and early decision making.

4.1.2. Drivers for Change

The following section expands on the need for change as identified in the Strategic Assessment (included in Appendix 1). This includes a description of the anticipated impact if nothing is done to address these needs and why action should be taken now.

The table below confirms the need for change as detailed in the Initial Agreement is still valid.

Table 21: Summary of the Need for Change - CAU

What is the cause of the need for change?	What effect is it having, or likely to have, on the organisation?	Why action now?
Inadequate facilities including lack of enough isolation rooms with en-suite facilities	Increased risk of infection and adverse events	Facilities are non-compliant
Physical space constraints and poor environment- not able to safely observe patients	Adverse impact on quality and safety of patient care and staff morale	Could lead to loss of trained staff due to working conditions
Future service demand will continue to rapidly increase	Existing capacity is unable to cope with future projections of demand. Safety risks related to lack of space continue to deteriorate in direct relation to demand growth	Regional specialist service sustainability will be at risk in the future if this proposal isn’t implemented now
Inefficient layout of Unit,	Inefficient service	Continuation of the existing

inadequate waiting rooms Ineffective service arrangements	performance. Poor patient flow.	service performance is unsustainable
Service arrangements not person centred – Non-DDA compliant toilets, lack of privacy and patient space	Service is not meeting current or future user requirements	A service that isn't meeting user requirements is unsustainable, even in the short term
Accommodation with high levels of backlog maintenance and poor functionality	Increased safety risk from outstanding maintenance and inefficient service performance	Building condition, performance and associated risks will continue to deteriorate if action isn't taken now

4.1.3. Investment Objectives

The assessment of the existing situation and the drivers for change have been used to identify what has to be achieved to deliver the changes required. These are defined as the investment objectives and are summarised in the table below. The investment objectives have been revalidated since the Initial Agreement taking cognisance of the continuing increased pressure on the service and remain valid for this proposal.

Table 22: Investment Objectives - CAU

Effect of the need for change on the organisation	What has to be achieved to deliver the necessary change? (Investment Objectives)
Increased risk of infection and adverse events	Upgrade facilities to produce compliant accommodation
Inefficient service performance and poor patient flow	Improve service performance by redesign of layout of Unit
Existing capacity is unable to cope with future projections of demand	Improve and expand service capacity
Service is not meeting current or future user requirements	Meet user requirements for service by improving the patient experience through upgrade of facilities
Poor staff morale	Improve the working environment and reduce pressures through improved patient care Raise morale, retain staff

4.1.4. Benefits

A Strategic Assessment (SA) was completed identifying the need for change, benefits of addressing these needs and their link to the Scottish Government (SG) five Strategic Investment Priorities below:

- Safe; Person-Centred; Effective Quality of Care; Health of Population; Efficient: Value and Sustainability

The above investment objectives and the Strategic Assessment (see Appendix 1) have informed the development of a Benefits Register and Benefits Realisation Plan (see Appendix 2) as per the Scottish Capital Investment Manual guidance.

A summary of the key benefits to be gained from the proposal are described below:

- Reduction in incident reporting and significant adverse events
- Much improved accommodation will support safe and efficient patient flows. This will help ensure that patients are treated in the right place at the right time by the right people. Improving the accommodation will facilitate improvements in the patient pathway and performance time between referral, admission and assessment.
- Improvement in patient feedback and reduction in complaints
- Improvement against HEI and HBN standards
- Improved staff experience
- CTH performance measures will be improved

4.1.5. Strategic Risks

The table below highlights key strategic risks that may undermine the realisation of benefits and the achievement of the investment objectives. These are described thematically and potential safeguards and actions in place to prevent these:

Table 23: Strategic Risks - CAU

Theme	Risk	Safeguard
Capacity	Future increase in service requirements greater than predicted	Deliver an IA to the Scottish Government for a modern fit for purpose specialist Cancer Centre
Scope	Delay in opening of new Cancer Centre leading to lack of space beyond 2025	As above.

4.1.6. Constraints and Dependencies

The key constraints and dependencies to be considered are:

- Derogations on space around chairs or trolleys not accepted by SG
- Capital cost of new Unit
- Revenue implications of redesigned Unit
- Disruption to adjacent areas during project
- Date of completion for preceding projects within this programme delayed
- Date for completion of proposed new Cancer Centre delayed

4.1.7. Preferred Decant Option

There is no decant required for the CAU element of the Oncology Enabling project as the CAU currently located in Ward 2 will move directly to its newly created facility in the ground floor of the Oncology Building, previously vacated by the admin offices relocated to the Linac/admin building.

4.2. Economic Case

4.2.1. Do nothing/baseline

The table below defines the 'Do Nothing' option. This is based on the existing arrangements as outlined above.

Table 24: Do Nothing - CAU

Strategic Scope of Option	Do Nothing
Service provision	Continuing to deliver CAU from its current location in Ward 2
Service arrangements	Would leave the area vulnerable to closure due to non-compliance with HEI regulations
Service provider and workforce arrangements	Staff would continue to provide service in inadequate facilities
Supporting assets	Healthcare would continue to be delivered in poor and inappropriate environment. Infection risks would continue to be considerable
Public & service user expectations	Safe delivery of prompt service in a suitable environment would continue to be compromised - current layout leaves patients vulnerable

4.2.2. Preferred Strategic/ Service Solution

A Long List of fourteen options was identified for re-provision of the CAU with each option tested against primary and secondary objectives specific to the service requirements. All of these fourteen options took cognisance of displacement and impact on adjacent services, both existing and proposed. This context formed an integral part of each proposal.

These Long List options were scored against their delivery of the Primary and Secondary Objectives allowing the list to be reduced to 5 viable options.

The full Option Appraisal process was then undertaken for the 5 options short listed from the Long List of Options. This was done in accordance with the guidance detailed in the revised Scottish Capital Investment Manual (SCIM) including scoring benefits, risks and costs.

The options were re assessed and developed to allow better understanding of the impact within context of the proposed sites. This work allowed a refinement of the budget costs attached to each option. On completion of this exercise a second option appraisal was conducted to assess three planning alternatives.

Due to financial constraints, as part of the IA Addendum this proposal was reduced to the following:

Table 25: Preferred Option - CAU

Proposed Option	Benefits	Risks/ Constraints	Dependencies
The offices from the south end of the Oncology Admin Corridor move to a modular building in Car Park 3 (Admin/Linac project). An “Acute” purpose-built CAU with reduced office accommodation will be created in the south end of the Admin Corridor (including six short stay assessment beds)	Much improved facility for acute service	Service redesign required Assumes reduction of car park spaces- solution to be identified for this	Creation of office accommodation in a modular build required before works can start

4.2.3. Is the preferred Strategic Solution still valid?

As part of the FBC the preferred Strategic and Service solution was revisited to confirm that it was still valid and would deliver the investment objectives and benefits.

The table below details the changes in scope for the preferred solution identified through the IA and IA Addendum, proposed in the OBC and in this FBC:

Table 26: Changes to Preferred Option - CAU

IA - Preferred Option	OBC/FBC - Preferred Option	Scope Changes and rationale
To reconfigure Ward 15 to office accommodation and allow relocation of the Oncology ground floor Admin offices to this space.	The offices from the south end of the Oncology Admin Corridor move to a modular building in Car Park 3 (Linac/Admin project)	This proposal was changed when it became apparent that an admin floor on the Linac building was a more practical option than using Ward 15.
The vacated ground floor Admin corridor would then be developed as a dedicated	An “Acute” CAU with reduced accommodation being created in	The outcome for CAU remains the same – a much improved acute

IA - Preferred Option	OBC/FBC - Preferred Option	Scope Changes and rationale
front door CAU Department.	the south end of Admin Corridor	assessment area.

4.2.4. Assessment of Non-Monetary costs and benefits

These are assessed as part of the programme Benefits Register attached as Appendix 2

4.2.5. Implementation options

The table in point 4.2.3 above identifies the current scope of works for the CAU element of the project. (OBC/FBC – Preferred Option). The preferred option contained in the Oncology Bridging Initial Agreement submitted to CIG in August 2016 had not achieved approval from the Scottish Government due to cost and affordability of the entire scheme. NHS Lothian was subsequently asked to prioritise the proposals and present an IA Addendum with reduced options. The way forward presented in the OBC and in this FBC was developed based on the scheme described in the IA addendum, which was approved in March 2018.

4.2.6. Assessment of NPV (Net Present Value) of costs

The table below details the indicative whole life costs associated with the preferred option, discounted over the life of the project to give a Net Present Value of Costs for the project.

- Whole life capital costs do not include VAT or inflation as these are required to be excluded per SCIM guidance.
- Incremental whole life revenue costs represent the recurring and non-recurring revenue costs (excluding depreciation as required by SCIM guidance) throughout the life of the project (assumed to be until delivery of a new cancer centre in 2025). It should be noted, however that these works will benefit the wider WGH site beyond the life of this project.
- All costs are discounted to give a Net Present Value of costs using a discount rate used of 3.5% in line with Treasury Green Book guidance.

Differences from the NPV included in the OBC represent updated revenue and capital costs and the life of the project to 2025.

Further details on the calculation of costs can be found in the Financial Case.

Table 27: Indicative Costs of Preferred Option – CAU

Cost (£m)	OBC - Preferred Option	FBC - Preferred Option	Difference
Whole life capital costs	2,774	3,054	280
Incremental whole life operating costs	1,924	1,814	(110)
Estimated Net Present Value (NPV) of Costs	4,698	4,868	170

4.2.7. Design Quality Objectives and Stakeholder Engagement

Design quality objectives and stakeholder engagement are included in the Management Case for all four projects included within this proposal.

5 Linear Accelerator (Linac) Capacity Development and Administrative Offices

5.1. The Strategic Case

The sections below set out the strategic case for the construction of a new build facility housing two Linac bunkers and associated clinical accommodation on the ground floor and office accommodation on the first floor for the oncology offices displaced by the creation of the Cancer Assessment Unit.

There have been no changes to the strategic case driving this proposal since the Initial Agreement and Addendum were approved by the Scottish Government Capital Investment Group in 2016 and March 2018, respectively.

5.1.1. Existing Arrangements

The Radiotherapy Department at the Western General Hospital is an integral part of Edinburgh Cancer Centre serving a catchment population of approximately 2 million from across South and East Scotland. Intracranial stereotactic radiotherapy is also provided as a national service.

This provision is changing rapidly, and demand for radiotherapy is set to grow significantly over the next decade, and beyond.

The Radiotherapy department has seen a substantial increase in patient numbers over the past five years and saw over 5,700 new patients in 2018.

Table 28: Radiotherapy patient numbers

YEAR	PATIENTS
2014	4,634
2016	5,518
2018	5,749

Following referral, patients are clinically assessed to establish if radiotherapy is the optimal choice for them. Subsequently, patients are prescribed courses of radiotherapy treatment which require detailed multi-disciplinary based preparation (scanning and planning). Delivery of external beam radiotherapy is given in fractions (of the total course). Completing treatment courses therefore requires multiple appointment visits over time to the department.

As well as external beam radiotherapy, brachytherapy (a procedure that involves placing radioactive material inside the body) is provided. Additionally, many patients are treated with concurrent chemo-radiotherapy, and radiotherapy synchronised with surgery (requiring specific scheduling in the patient pathway for radiotherapy delivery pre or post the surgical procedure) and indeed synchronised brachytherapy with external beam radiotherapy for some gynaecological cancers. Overall, in recent years, the department has been continually improving, developing and modernising its approach to radiotherapy delivery, particularly through the use of intensity modulated radiotherapy (IMRT), and image guided radiotherapy (IGRT).

Linear Accelerator (Linac) and bunker capacity

Currently the department has an operational funded establishment of six Linacs. These operate for 8.25hrs per day, 5 days a week, with 10 service days and 6 public holidays.

The Linacs are housed within specially-constructed and radiation shielded bunkers. The department has seven bunkers, and all have Linacs in situ (however one is a non-operational ‘mothballed’ machine). At least one spare bunker is required to be able to efficiently manage an ongoing Linac Capital Equipment Replacement Programme. This enables the service to avoid an undue disruptive affect on the rest of the radiotherapy service whilst machines are being replaced.

The seven current bunkers are comprised of 3 low energy bunkers built in the mid 1950’s (relatively small facilities), 2 high energy bunkers built in the 1970’s (again small facilities), and 2 medium energy bunkers built in the early 2000’s (modern rooms suitable for modern RT).

Key constraints – The bunker problem, complexity / throughput, and staffing

The combination and number of low, medium and high energy bunkers in the department does not always support the Linac Capital Equipment Replacement Programme requirement and allow the department to operate all of its six Linacs at all times. Wherever possible ‘out-of-room’ swaps are undertaken to replace Linacs, whereby the machine being replaced is left in the bunker it occupies whilst the new machine is being installed and commissioned in the ‘spare’ (7th) bunker in the department.

Occasionally, due to the limitations of current bunker provision (principally a radiation shielding level / machine energy mismatch) an ‘in-room’ swap is required. When this is necessary the department may be forced to operate with 5 operational Linacs for the period of installation and commissioning (6-9 months) Limited contingencies, such as running the operational machines for longer, are used to compensate in part for the reduction in capacity. These contingencies were used to replace LA6 in 2018 as the ‘spare’ bunker was not suitable for the machine being replaced.

Due to bunker incompatibility, of every 7 Capital Equipment Replacement Programme (CERP) Linac replacements, 4 will require in-room swaps (in red) and will bring the ECC down to a 5 machine department (each time for approx. 6 months) – the timeline of in-room swaps over the next decade is as follows:

Figure 4: Linac replacement timetable

2017			2018			2019			2020			2021			2022			2023		2024		2025	
			LA6												LA7			LA2	LA4			LA5	

Linac servicing and breakdowns are increasing issues as machines age. Overall, the total number of bunkers available will be unable to support the projected requirement to grow the capacity of the department over the next ten years and beyond.

Historically the department has treated approximately 5 patients per hour, but with increasing complexity of delivery it is important to also optimise the accuracy of treatment using on-board imaging (IGRT) – this adds to the time for each fraction delivered and therefore it is nationally agreed that 4.5 fractions per hour is a reasonable throughput. Capacity planning work in the South East of Scotland has accepted and

used this assumption. However, as complexity increases, the number of fractions per hour is predicted to decrease further.

Constraints associated with Linacs, bunkers, throughput and rising complexity (with the associated need for significantly greater verification imaging, and quality assurance checks), have been compounded by training and staffing constraints.

Changing practice

Radiotherapy is a dynamic and rapidly developing field of medicine and clinical trials currently underway, once reported, may potentially change practice in the first half of the next decade (2020 – 2025). Whilst the impact of this work cannot yet be anticipated, and it would be unwise to plan services based on such estimated changes at this time, we are aware of the main areas of potential change and these are in high volume pathways.

For breast cancer, there is a potential reduction in the optimal radiotherapy rate and a potential reduction in the number of fractions per course for selected patients; for prostate cancer there is a potential increase in the optimal radiotherapy rate however developments in both external beam radiotherapy and brachytherapy may in time reduce the number of fractions required for selected patients; and for lung cancer there may be a possible increase in the optimal referral rate associated with increasing capabilities to treat early stage disease potentially as an alternative to surgery. Reducing the number of fractions will not necessarily linearly decrease the overall time required on the Linacs due to the often increased complexity in delivering these treatments – this is captured in the throughput of fractions per hour.

We know that our existing radiotherapy capacity will be increasingly unable to cope with future projected demand. In the shorter term the constraints of the current premises also threaten the department’s ability to maintain full machine capacity. Particularly when managing the planned replacement of Linacs.

The provision of additional bunker capacity is a critical part of Western General Hospital campus masterplanning and development. This workstream is a key part of the emerging Lothian Hospitals Plan, and in particular work which is being commissioned regarding the development of a re-provided Edinburgh Cancer Centre.

Population Projections

Over the next decade the population in SE Scotland is expected to increase by 8.2%, principally in the over 65 age group, as outlined the table below.

Table 29: Predicted change in population by age

Population Projections 2015 to 2025								
Age Years								
Year	0-14	15-29	30-49	50-64	65-74	75-84	85+	Total
2015	242,322	300,478	407,699	294,255	152,240	90,118	35,708	1,522,820
2020	255,558	286,821	412,723	314,389	162,635	99,698	42,504	1,574,328
2025	259,016	284,671	427,907	312,253	168,449	119,143	51,419	1,622,858
Numeric Change 2013 to 2025	21,039	-17,557	20,015	25,651	23,614	32,130	17,851	122,743
% Change	8.8%	-5.8%	4.9%	9.0%	16.3%	36.9%	53.2%	8.2%

2013 to 2025								
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¹Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T. "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" (2003) Statistics in medicine, 22:2751-2766

As many cancers are age-related the incidence of cancers is predicted to increase by 27.2% (see table below). The main tumour sites which are likely to increase are Breast 23.4% (from 2013 to 2025) Colon 39.3%, Head and Neck cancers 23.4%, Lung cancer 17.5%, melanoma 50.5%, Non-Hodgkin's Lymphoma 23.4%, rectum 26.0% and prostate 46.9%. In all cases the main increase is seen in the over 75 age group due to increasing longevity.

Table 30: Forecast numeric change over coming decade for all cancers in SE Scotland

Age	2011	2013	2015	2020	2025	Forecast Numeric Change 2013 to 2025	Forecast % change 2013 to 2025
0-14	30	32	33	34	35	3	9.5%
15-29	92	119	124	129	129	10	8.7%
30-49	778	772	779	795	844	73	9.4%
50-64	2,187	2,141	2,187	2,356	2,465	324	15.1%
65-74	2,281	2,447	2,573	2,773	2,829	382	15.6%
75-84	1,936	2,026	2,128	2,455	2,913	887	43.8%
85+	790	863	930	1,117	1,366	503	58.3%
Total	8,832	9,249	9,657	10,703	11,765	2,516	27.2%
Weighting		1.00	1.04	1.16	1.27		

2011 = recorded cases (2012 data is released but some cases come in late so 2011 is more complete) 2013-2025 = predicted

The greater number of people diagnosed with cancer will require increasing resources for diagnosis and staging (radiology, pathology, and secondary care physicians) and also treatment modalities such as surgery, radiotherapy and chemotherapy.

What are the problems with the current arrangements?

Our existing operational capacity will be increasingly unable to cope with future projected demand. In the shorter term the constraints of the current premises also threaten the department's ability to maintain full machine capacity, particularly when managing the planned replacement of Linacs.

Modelling demand and our capacity requirement

In order to examine in detail the projected demand for radiotherapy in the South East of Scotland the region has worked with Information Services Division (ISD), commissioning a bespoke project from them to support our service capacity planning work. ISD utilised the NORDPRED software to analyse cancer

incidence dating back to 1982. This software used age-period-cohort (APC) models for projecting future rates of cancer incidence, deriving the relevant parameters from the past observations.

Working with this demand forecast, in order to estimate the potential future requirements we developed several models examining current and optimal use of treatment over the coming decade. This involved making an assessment of the number of people who will need a course of radiotherapy each year, the number of fractions that would need to be delivered in future years, and estimating the resources required to deliver this number of courses and fractions. A full report outlining the various models examined, and the conclusions reached, is available. To utilise the modelling work and apply it to service planning and radiotherapy department operational management, a method of displaying and summarising output was developed. This is based on the selection of a derived mid-range model (from the various models examined), planned machine utilisation levels, and the use of a traffic-lights system to indicate the degree of anticipated capacity utilisation over time. The modelling work has subsequently incorporated actual activity data for recent years as this has become available, to allow a comparison of forecast and actual, and to help sharpen the use of the model. As actual activity has been at variance (under) the predicted level over the last year approximately (in the context of actual and predicted activity levels being in close agreement before this), demand estimates fed into the summary model have been reduced by 10% to compensate. This brings the model more in line with the actual department activity across 2015 and 2016 to date, and a mechanism is in place to monitor trends monthly. The summary model is shown below.

Figure 5: Modelling of capacity requirement

NHS Lothian current and future linac capacity modelling - Updated using more recent fractions per course data. 10% reduction in demand compared to predicted.

Model A

	Baseline Year					Actual Attendances								Forecasted Attendances				
	51,354	54,190	50,499	47,164	47,851	49,215	50,691	52,212	53,778	55,391	56,730	57,053	58,672					
linacs\Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025					
5	106%	114%	109%	104%	106%	108%	111%	114%	118%	122%	125%	125%	129%					
6	88%	95%	91%	86%	88%	90%	93%	96%	99%	102%	104%	104%	108%					
7	76%	81%	78%	74%	75%	77%	80%	82%	84%	87%	89%	89%	92%					
8	66%	71%	68%	65%	66%	68%	70%	71%	74%	76%	78%	78%	81%					
9	59%	63%	60%	58%	59%	60%	62%	64%	66%	68%	70%	69%	72%					

Productivity Assumptions

No. of fractions per hour	4.8	4.7	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
No. of operating hours per day	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
No. of operating days per week	5	5	5	5	5	5	5	5	5	5	5	5	5
No. of PH per year	6	6	6	6	6	6	6	6	6	6	6	6	6
No. of Service days per year	10	10	10	10	10	10	10	10	10	10	10	10	10
No. of operating days per year	245	245	245	245	244	245	245	246	245	244	244	246	245
Anticipated no. of fractions available per year per machine	9,702	9,500	9,298	9,096	9,059	9,096	9,096	9,133	9,096	9,059	9,059	9,133	9,096

The model uses a traffic light summary to indicate estimated Linac utilisation levels.

- Green status is up to 90% capacity utilisation (90% is the upper limit adopted, allowing 10% operational headroom to allow for variation and general departmental capacity and flow management. Ideally an 85% utilisation level would be planned for longer term).
- Amber status indicates 90% to 95% capacity utilisation
- Red status indicates over 95% capacity utilisation.

As illustrated in the model, with an operational machine capacity of 6 Linacs the department was at 90% capacity utilisation in 2018 and was projected to be at 93% capacity in 2019 (for comparative reference, the Beatson Cancer Centre Satellite development was triggered by the Beatson operating at 93%)

In the longer term the Capital Equipment Replacement Programme (CERP) picks up again from 2022 with a Linac replacement scheduled each year for the next number of years thereafter. Without additional bunkers this cannot be managed.

Additionally, if no longer term solution is available (i.e. full reprovision of the Cancer Centre) then Linac 7 would likely need to be commissioned in the period 2021 – 2022.

A new build department would be comfortably operating within the 85% utilisation level recommended – if equipped with a minimum of 9 high energy bunkers (with 10 or expansion space potentially advised), and 8 operational Linacs, operating a standard working day of 8.25hrs pd. Strategic options to extend operating hours would bring further future proofing, as would potentially adding a further operational Linac 9, with due consideration to the acceptable parameters for departmental size. The recommended maximum size for radiotherapy centres is 8 Linacs (NRAG productivity subgroup).

5.1.2. Drivers for Change

The following section expands on the need for change as identified in the Strategic Assessment (included in Appendix 1) and describes the anticipated impact if nothing is done to address these needs and why action should be taken now through this proposal.

The table below summarises the need for change, the impact it is having on present service delivery and why this needs to be actioned now. The table below confirms the need for change as detailed in the Initial Agreement is still valid.

Table 31: Summary of the Need for Change - Linacs and Admin

What is the cause of the need for change?	What effect is it having, or likely to have, on the organisation?	Why action now?
Our existing operational capacity will be increasingly unable to cope with future projected demand	Unable to meet Cancer Waiting Time Targets and provide an efficient service for patients	A solution is required to allow the service to meet demand until 2025 until a new Cancer Centre is built.
Administrative offices require to be re-provided to allow an adequate footprint for CAU	CAU is currently in space vacated by an inpatient ward, unsuitable accommodation for an assessment unit (as described in project section above)	As above

5.1.3. Investment Objectives

The assessment of the existing situation and the drivers for change have been used to identify what has to be achieved to deliver the changes required. These are defined as the investment objectives and are summarised in the table below. The investment objectives have been revalidated since the Initial Agreement taking cognisance of the continuing increased pressure on the service and remain valid.

Table 32: Investment Objectives – Linacs and Admin

Effect of the need for change on the organisation	What has to be achieved to deliver the necessary change? (Investment Objectives)
Our existing operational capacity will be increasingly unable to cope with future projected demand	Provide bunker and Linac capacity in a way which allows demand and capacity to be matched over the next 6 years until the full reprovision of the Cancer Centre.
In the shorter term the constraints of the current premises threaten the department's ability to maintain full machine capacity	Provide additional bunker capacity to allow a) Linac replacement and b) Linac expansion as required by the service
Increasingly the current department arrangements are limited in both pre-treatment imaging and the growing need for adaptive radiotherapy (intra-treatment imaging and re-planning)	Provide bunker and Linac capacity in a way which supports safe, high-quality, and sustainable service delivery
Risk that the radiotherapy department is developed in a way that is not integrated to the wider department, and supports WGH campus development	Fit with the emerging masterplan for the Western General Hospital, supporting a transition to a new ECC. Provide capacity in a way which fits with the operational constraints both clinical and non-clinical services work within

5.1.4. Benefits

A Strategic Assessment (SA) was completed identifying the need for change, benefits of addressing these needs and their link to the Scottish Government (SG) five Strategic Investment Priorities below:

- Safe; Person-Centred; Effective Quality of Care; Health of Population; Efficient: Value and Sustainability

The above investment objectives and the Strategic Assessment have informed the development of a Benefits Register and Benefits Realisation Plan (see Appendix 2).

A summary of the key benefits to be gained from the proposal are described below:

- Enables the service to maintain 6 treatment machines for patient treatments, even when one is being replaced.
- Enables the service to accommodate a 7th treatment machine (with capital funding coming from CERP) to expand capacity in line with predicted need before the new cancer centre is provided.

- Bunker provision in proximity to and directly linked to the main Radiotherapy department removes the requirement for additional workforce and capital investment to support ongoing quality assurance, repair and preventative maintenance.
- Supports safe and sustainable service delivery
- Supports the transition to a new Cancer Centre
- Allows administrative offices to be re-provided to enable a new fit for purpose CAU to be built

5.1.5. Strategic Risks

The table below highlights key strategic risks that may undermine the realisation of benefits and the achievement of the investment objectives. These are described thematically and potential safeguards and actions in place to prevent these:

Table 33: Strategic Risks - Linacs and Admin

Theme	Risk	Safeguard
Workforce	Lack of specialist skills for service that is delivered	Develop robust workforce plan including retention of specialist staff and training programme
Funding	Capital funding not available	Provide robust case for funding through OBC and FBC
Capacity	Future demand exceeds the projected forecast	Continue to progress proposal towards a new Cancer Centre to accommodate continued growth in demand

5.1.6. Constraints and Dependencies

There is a real key risk that the project will not be delivered in time to support the necessary replacement of LA7 without requiring an in-room swap. This risk needs to be managed alongside departmental management of the extended working day option to create capacity, and also the potential to revise the Linac replacement programme within acceptable risk parameters.

- LA7 is one of only two Linacs at ECC which are used to deliver intra-cranial stereotactic treatments including those provided as a National Service for benign conditions. If LA7 has to be taken out of service for an in-room swap, there is a risk of disruption/delay to the national service, and no redundancy for the one remaining Linac delivering these treatments.
- The extended working day is possible to implement, however comes with its' own risks and constraints
- Replacement: Linacs machine replacements may be required more frequently if machines are run for longer
- Impact of breakdowns: if a machine's workload is increased then it is important to have capacity in the other Linacs to accommodate more breakdowns
- Out-of-hours servicing: Much servicing already takes place at weekend and after hours. However, if all servicing were moved to the weekends this would require the manufacturers and

couriers to also be available at weekend and spare parts to be available. One approach recommended is for departments to have a spare Linac for service days and breakdowns

- Patient specific quality assurance: for complex radiotherapy it is important to perform individual plan QA. It is important to also factor in access for dosimetry staff to the Linacs at reasonable times of the day (usually early evening)
- Staff availability: working longer hours may make the job less attractive to an already sparse workforce.
- Patient acceptance: Surveys suggest that sufficient patients would accept treatment in early evening and over weekends but in order for departments to open longer hours and /or seven days a week it is important that the ‘whole service’ is also available – not just treating staff. For example, Oncologists, other clinical teams, clinical support services e.g. radiology, laboratories, administrative staff, porters, café services, and transport.
- Research and development: It is recommended this is at least 3% of capacity.
- Capacity to avoid waiting times: maintaining operational headroom of 15% of capacity available is recommended to ensure that waiting times do not lengthen.

Other key constraints include the further development and approval timescale for a new Cancer Centre on the Western General Hospital campus. Investment in radiotherapy department development at this stage needs to assist with the transition and development of the full re-provision of the Cancer Centre.

5.1.7. Preferred Decant Option

The new building requires to retain a internal connection to the rest of the oncology outpatients facility. A suitable location for the link corridor has been identified between the clinics and HEBA centre. Minor works to the clinics will be required in order to retain clinical flows in a safe setup. As a result, the clinics will have to decant short-term whilst these works are ongoing. The proposed decant solution is to temporarily move the clinic to Ward 4 vacated awaiting its refurbishment as part of the Inpatient Wards element of the project. The preferred option does not involve capital expenditure and any non-recurring revenue implications have been included in the Financial Case of this FBC.

No other decant is planned as part of this element of the project.

5.2. Economic Case

5.2.1. Do nothing/baseline

The table below defines the ‘Do Nothing’ option. This is based on the existing arrangements as outlined above.

Table 34: Do Nothing – Linacs and Admin

Strategic Scope of Option	Do Nothing
Service provision:	Continue with current number of Linacs and accept increasing number of neoadjuvant radiotherapy cancer waiting time breaches
Service arrangements:	Continue to be delivered as a five day per week service - unable to expand the service to provide increased capacity
Service provider and workforce arrangements;	Current workforce, remains unchanged. Limited capacity to extend the working day without increase in workforce.

Public & service user expectations;	Safe delivery of prompt service under threat and waiting times likely to extend
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5.2.2. Preferred Strategic/ Service Option

The Western General Masterplan recognises that significant capacity implications are present if a longer-term solution is not found by 2022. As rehearsed above, a 7th Linac may be required at this stage, as well as increasing capacity by extended-day working meantime.

An update on the masterplanning work was brought to NHS Lothian's Strategic Planning Committee in August 2015. This update flagged up the requirement for additional bunker capacity, and Strategic Planning Committee asked for an option appraisal to be carried out. In discussion at committee, two conceptual solutions were raised:

- A "pragmatic" solution of 2 bunkers, co-located to the current ECC buildings;
- A "more ambitious" solution, whereby a suite of 8-10 Linac bunkers would be constructed on the cleared site of the Department of Clinical Neurosciences, when this service left the site (due to happen in 2017)

A non-financial options appraisal workshop was undertaken on 23rd October 2015, with a broad invitation list from across disciplines and including the participation of stakeholders from across SEAT. The workshop considered a short-list of 6 options including the do-nothing option. Four of these options were short-term options for a 2-bunker solution, and one was the option of a full Linac suite on the cleared site of DCN. Following appraisal, the workshop agreed that the preferred option was for a 2-bunker modular build on the car-park directly outside ECC.

In recognition of the above, at its meeting of the 21st of January 2016, the Strategic Planning Committee duly requested the development of an initial agreement, which would see the preferred option outlined as a step on the road to delivering the full "DCN option".

Progressing the 'Oncology Enabling Projects' and the Linacs expansion as one Business Case ensures that the Cancer Centre continues to be developed on a properly managed and phased basis for ongoing business continuity and operational effectiveness, and in a way which minimises disruption and inconvenience to staff, patients and visitors.

The following was identified as the preferred option:

Table 35: Preferred Option - Linacs and Admin

Proposed Option	Benefits	Risks/ Constraints	Dependencies
New build facility housing two Linac bunkers and associated clinical accommodation on the ground floor and office accommodation on the first floor	Increase in Linac capacity to meet demand until new cancer Centre is built	Timing is crucial as project must align with Linac replacement programme to avoid capacity issues when current Linac needs replaced	Dependent on capital Funding
	Accommodation for		

administrative
staff displaced
by the
relocation of
CAU

5.2.3. Is the preferred Strategic option still valid?

As part of the OBC the preferred Strategic and Service solution was revisited to confirm that it was still valid and deliver the investment objectives and benefits.

The OBC confirmed that the proposed strategic solution is still valid and therefore the options outlined above remain the preferred solution for this FBC.

5.2.4. Assessment of Non-Monetary costs and benefits

These are assessed as part of the programme Benefits Register attached as Appendix 2

5.2.5. Implementation options

The table in point 5.2.3 above identifies the current scope of works for the Linac element of the project. The preferred option contained in the Oncology Bridging Initial Agreement submitted to CIG in August 2016 had not achieved approval from the Scottish Government due to cost and affordability of the entire scheme. NHS Lothian was subsequently asked to prioritise the proposals and present an IA Addendum with reduced options. The way forward presented in the OBC was developed based on the scheme described in the IA addendum, which was approved in March 2018 and has not changed in this FBC.

5.2.6. Assessment of NPV (Net Present Value) of costs

The table below details the indicative whole life costs associated with the preferred option, discounted over the life of the project to give a Net Present Value of Costs for the project.

- Whole life capital costs do not include VAT or inflation as these are required to be excluded per SCIM guidance.
- Incremental whole life revenue costs represent the recurring and non-recurring revenue costs (excluding depreciation as required by SCIM guidance) throughout the life of the project (assumed to be until delivery of a new cancer centre in 2025). It should be noted, however that these works will benefit the wider WGH site beyond the life of this project.
- All costs are discounted to give a Net Present Value of costs using a discount rate used of 3.5% in line with Treasury Green Book guidance.

Differences from the NPV included in the OBC represent updated revenue and capital costs and the life of the project to 2025.

Further details on the calculation of costs can be found in the Financial Case.

Table 36: Indicative Costs of Preferred Option

Cost (£k)	OBC - Preferred Option	FBC - Preferred Option	Difference
Whole life capital costs	8,501	10,012	1,511
Incremental whole life operating costs	182	183	1

Estimated Net Present Value (NPV) of Costs	8,683	10,195	1,512
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5.2.7. Design Quality Objectives and Stakeholder Engagement

Design quality objectives and stakeholder engagement and included in the Management Case for all four projects included within this proposal.

6 Summary of confirmed options

The table below summarises the preferred strategic and implementation options for each of the four individual cancer enabling projects and the costs associated with each (capital and revenue).

Table 37: Summary of confirmed options

Project	Preferred Option Description	Capital Cost (£k)	Recurring Revenue Cost excl depreciation (£k)	Decant Cost (Capital £k)	Decant Cost (Revenue £k)	NPV all costs (£k)
SACT Expansion (Ward 1)	Upgrade Pharmacy area to deliver a safe and compliant aseptic unit Reprovision of stores & offices displaced by pharmacy work Additional toilets and counselling rooms Upgraded patient waiting area	3,008	27	0	0	2,727
In-Patient Wards	Inpatient wards spread over two floors (wards 2 and 4) Upgrade of Medical Gas and Fire Alarm systems General flooring and decoration works.	2,142	805	0	202	5,690
Cancer Assessment Unit	An "Acute" CAU with reduced accommodation being created in the south end of vacated Admin Corridor	3,590	402	0	0	4,868
Linacs and Admin	Two storey Modular building constructed in Car Park 3 for Linacs and admin staff	11,886	112	0	0	10,195
Total Cost		20,626	1,346	0	202	23,480

7 The Commercial Case

This Commercial Case outlines the proposed commercial arrangements and implications for this proposed project, by responding to a series of questions set out in the SCIM Full Business Case guidance.

7.1. Introduction

The capital cost for the project is **£20.6m** including VAT. Cost certainty was achieved through target price negotiations following market testing exercise. The market testing was carried out for packages in the Linac/Admin element only as the other parts of the scheme are not due to start until 2021 and tender prices are typically held for 3 – 6 months. The packages for Ward 1, CAU and Inpatient Wards were then benchmarked against the tender prices received for Linac packages, as well as other recent Western General Hospital projects, including Haematology. Once these projects are heading towards their construction stages, the packages will be fully tendered in order to produce a robust construction cost.

NHS Scotland has established national procurement routes for major asset investment which have been fully developed within the EU public sector procurement regulation framework. It is a requirement for all NHS projects above £1m threshold to be procured under the NHS Scotland Frameworks Scotland 2 (FS2) arrangements. As the estimated capital cost at this stage is in excess of £1m, this route has been selected for the procurement of the project. This means the contract will be run in a design and build approach, this being the only available option under Frameworks Scotland 2. This procurement route appoints a single contractor to act as sole point of responsibility for the management and delivery of an integrated design and construction project.

Frameworks Scotland has been used successfully by NHS Lothian for a number of years and there is a clear organisational understanding of the process for appointment of PSCP (Contractor) and any relevant consultants that may be required.

7.2. Procurement Strategy

The procurement of the project has been led by members of the Cancer Services CMT and the Estates Department with support from Capital Finance on behalf of NHS Lothian and with assistance from Health Facilities Scotland in terms of Principal Supply Chain Partner (PSCP) and Professional Services Consultants (PSC).

The procurement of the PSCP for the project has been subject to competitive tender made under the umbrella of a wider WGH Programme of Works incorporating, apart from the Oncology Enabling project:

- Haematology
- Renal Services Reprovision
- WGH Infrastructure
- WGH Demolitions*
- IA Support to new Cancer Centre
- Backlog Maintenance*

The appointment for *marked projects was made subject to availability of capital funding and other potential factors.

Although the appointments under Frameworks Scotland 2 for the entire WGH programme of works have been combined, each project within the programme is treated separately and is procured as a separate scheme contract.

The selection process for the PSCP started in December 2017 and concluded in March 2018 with the appointment of RMF Health as the Principal Supply Chain Partner for the WGH programme of works. The selection was based on the quality against cost ratio and involved assessment of written submissions, evaluation of priced activity schedules and interviews. [REDACTED] PSCP companies on FS2 have participated in the process giving NHS Lothian a wide choice and ensuring healthy level of competition. The NHS Lothian Selection panel consisted of representatives from the Estates, Capital Planning and Finance departments, senior members of the Hospital Management Team, Haematology and Oncology service representatives and HFS.

Thomson Gray Partnership has been appointed as the Project Managers, Cost Advisors and Supervisor under the auspices of the Lead Advisor appointment for the WGH Masterplanning. Doig+Smith have been appointed the CDM coordinator for the Programme of Works, procured via the HFS CDM Advisor Framework. The Principal Designer duties are carried out by the PSCP. Additional advisory consultants, including Radiation Protection Advisor, have also been appointed in order to support project delivery.

7.3. Scope of Works and Services

The PSCP is responsible for providing all aspects of design and construction, including decants, and procurement of group 1 equipment throughout the course of the project.

The construction works will involve:

- Ward 1: upgrade and extension to the pharmacy areas housing the satellite Pharmacy Aseptic unit, reprovision of stores and offices displaced by the pharmacy works, additional toilets and upgraded patient waiting area.
- Inpatient Wards: Minor works consisting mainly of changes to bedhead services in order to improve bed spacing, increased number of toilets and ensuite bathrooms, localised firestopping works, and flooring and decoration works. These works will be possible only because the Cancer Assessment Unit currently located in Ward 2 will relocate (discussed below), freeing up ward accommodation for inpatients.
- Cancer Assessment Unit: This element involves creation of a purpose-build acute assessment facility in the current Oncology admin accommodation on the ground floor of the Oncology Building.
- Linear Accelerator: Construction of a new build facility housing two Linac bunkers and associated clinical accommodation on the ground floor and office accommodation on the first floor for the oncology offices displaced by the creation of the Cancer Assessment Unit

The construction works will be carried out in a live hospital environment with patient care being delivered on all 6 sides, the project team will therefore be tasked with ensuring safe operation and business continuity at all times.

NHS Lothian will remain as the owner of the buildings throughout the term and will be responsible for the procurement of group 2-4 equipment, IT & Telecoms equipment, as well as provide Estates support to the project in terms of services isolations and shut-downs.

7.4. Commercial Arrangements

As part of Frameworks Scotland 2 the contract is let on a Design and Build basis under NEC3 form of contract, with the PSCP responsible for providing all aspects of design and construction, including decants, and procurement of group 1 equipment throughout the course of the project.

All projects submitted to the SG CIG for approval are now subject to an assessment of design quality and functionality, including technical and sustainability standards. As part of the NHSScotland Design Assessment Process (NDAP) the project team has created a project brief providing context in respect to the requirements and a design statement giving examples of what success might look like for the patients, staff and visitors. Following from that The Achieving Excellence Design Evaluation Toolkit (AEDET) has been started in respect to the existing facilities and scoring of the “benchmark”. The interior design workshops have also been set up, which include service users (patients and staff). They are helping to shape the facilities in line with design statement and AEDET benchmarks.

The NDAP process results have passed on to HFS for their review and opinion, which is expected to be received in advance of this FBC being considered by SGCIG.

The elements of the project are also subject to BIM level 2, in particular the Linac/Admin building. As the CAU and Wards projects are done in an existing building with existing services running across and only a minor level of refurbishment to the inpatient wards, it was agreed that these elements will not benefit from a full BIM as modelling of existing spaces present low value for Money. The results of the BIM process for the Linac element are going to be recorded throughout the life of the capital project and are planned to be included within the Post Project Evaluation.

7.5. Contractual Arrangements and Payment Structure

Frameworks Scotland 2 embraces the principles of ‘collaborative working’ to ensure that teams within and between the public and private sectors work together effectively. Collaborative working is defined as a relationship between purchasers and providers of goods and services throughout the supply chain, based on mutual objectives, maximising the effectiveness of each participant resource while continually seeking continuous improvement. This approach is designed to deliver ongoing tangible performance improvements due to repeat work being undertaken by the supply chains.

Under NHS Scotland Frameworks Scotland 2 PSCPs are appointed under the Frameworks Scotland 2 NEC3 Engineering and Construction Contract (ECC) form of contract. The contract option chosen for the Linac element of the project is Option A: Priced Contract with Activity Schedule. The decision on the contract option for the remaining parts of the project will be made during their respective market testing processes.

NEC 3 Contract Option A involves activity schedule which relates to a programme where each activity is allocated a price and interim payments are made against the completion of each activity. The risk of carrying out the works at the agreed price is largely put on the contractor in this type of contract. Payments will be made in line with the NHSL Standing Financial Instructions (SFIs).

Each project element: Linac/Admin, CAU/Wards and Ward 1 will be treated as separate WorkTask orders under one overarching contract. This is due to the different Client brief requirements, different user groups and a detailed phasing process of these works.

7.6. Timetable

A detailed Project Plan has been produced for the FBC and contained in Appendix 5. At this stage the table below shows the proposed timetable for the progression of the business case and project delivery milestones:

Table 38: Project Timetable

Key Milestone	Date
Initial Agreement approved	March 2018
Appointment of Principal Supply Chain Partner (PCSP)	March 2018
Appointment of Construction, Design and Management (CDM Advisor)	April 2019
Outline Business Case approved	December 2019
Planning permission in principle obtained	February 2020
Full Business Case approved	August 2020
Construction start:	
Linacs/Admin	September 2020
Ward 1	October 2021
CAU & inpatient Wards	February 2022
Construction complete	November 2022

The programme is indicative and will be informed by phasing of the particular elements within the WGH Programme of Works, including other projects ongoing on the WGH site.

In addition, the current COVID-19 pandemic is likely to further affect the construction dates, dependent on the situation at the time, Scottish Government guidance and future availability of resources and materials.

7.7. Design Quality Objectives/ Design Assessment Process

The project has used the Achieving Excellent Design Evaluation Toolkit (AEDET) to assess design quality throughout the procurement and design process and as part of the Post Project Evaluation. AEDET is designed as a tool for evaluating the quality of design in healthcare buildings. It delivers a profile that indicates the strengths and weaknesses of a design, or an existing building, at a particular stage/ time.

Under the mandatory NHSScotland Design Assessment Process (NDAP) Guidance, all NHS Project Teams are required to set their AEDET target (and benchmark if the facility is existing) at Initial Agreement stage and submit this part of the FBC NDAP submission prior to the Scottish Government Health and Social Care Department (SGHSCD) Capital Investment Group (CIG) meeting.

It has been agreed between NHS Lothian and HFS that a single AEDET assessment covering all elements of the Oncology Enabling Projects would be produced.

An initial AEDET workshop was undertaken on the 28th November 2018 with key stakeholders from clinical and supporting departments in attendance. This was followed by further workshops with the FBC stage one being held on 8th October 2019.

The objectives of the workshop were to:

- Review the existing building against the benchmark score and the OBC score set at previous meetings under 3 main areas – Functionality, Build Quality & Impact split into 10 sections
- For each of the 10 sections to identify priority statements which need to be addressed as a priority as the design develops
- Generate scores for each section

A summary of the benchmark and FBC scores as well as the design statement are included in Appendix 4.

7.8. Risk allocation

As part of the Frameworks Scotland 2 process and NEC3 form of contract the risk allocation is split appropriately between NHS Lothian and PSCP. The costed and allocated risk register forms part of the Target Price agreement. The FBC risk register is included in the Appendix 3. As this is a live document, it will continue to be updated as the project progressed with some risks either being realised or closed.

8 The Financial Case

8.1. Introduction

The Financial Case considers the affordability of the scheme. This section sets out all associated capital and revenue costs, assesses the affordability of the preferred option and considers the impact on NHS Lothian's finances. In order to make this assessment an overall financial model has been developed covering all aspects of projected costs, including estimates for:

- Capital costs (including construction and equipment).
- Incremental non-recurring revenue costs associated with the project.
- Incremental recurring revenue costs (pay and non-pay) associated with the project.

8.2. Capital Affordability

The estimated capital cost associated with the preferred option for each of the four projects is detailed in the table below. They comprise the construction cost plus all other project costs directly related to the development. Construction costs are based on the completed design and market testing process for the Linac/Admin element and benchmarking for Ward 1, CAU and Inpatient Wards projects.

Table 39: Capital Costs

Capital Cost (£k)	Ward 1 SACT	Wards 2 and 4	Cancer Assessment Unit	Linac Capacity	Total Costs
Total Capital Cost	3,008	2,142	3,590	11,886	20,626

The assumptions made in the calculation of the capital costs are:

- Contingency has been included at ■ of construction costs
- VAT has been included at 20% on all costs. Some VAT recovery has been assumed and will be further assessed by our VAT advisors.
- The costs do not include any costs in connection with COVID-19 pandemic. It is anticipated that there may be an increase in, particularly, the preliminary costs due to greater social distancing required and therefore its implications on the programme and construction. Work is ongoing to identify and quantify the potential additional project costs (capital and revenue) that could arise as a consequence of the COVID-19 pandemic. Once quantified, these will be escalated through inclusion in the NHS Lothian mobilisation return to the Scottish Government. Governance and funding for these specific costs will be monitored and managed through this process and will be subject to verification by Health Facilities Scotland.

Capital costs are proposed to be funded from a specific allocation from the Scottish Government.

8.3. Revenue Affordability

The estimated recurring incremental revenue costs associated with each of the preferred options are detailed in the table below. These represent the additional revenue costs when compared to the 'Do Nothing' option.

Table 40: Incremental Revenue Costs

Incremental Revenue Cost/year (£k)	Ward 1 SACT	Wards 2 and 4	Oncology Assessment Area	Linac Capacity	Total Annual Revenue
Staffing	0	795	322	0	1,117
Facilities	27	10	80	40	157
Energy and Rates	0	0	0	65	65
eHealth	0	0	0	7	7
Total Annual Revenue Cost (excl. Depreciation)	27	805	402	112	1,346
Depreciation	301	214	359	1,189	2,063
Total Annual Revenue Cost	328	1,019	761	1,301	3,409

The assumptions made in the calculation of the revenue costs are:

- Facilities staffing costs (domestics and portering) are based on an increased footprint and increased numbers of single rooms. The proposed staffing model is included in **Error! Reference source not found.**
- Clinical staffing costs are based on the staffing models included in **Error! Reference source not found.**
- Incremental facilities (energy and rates) costs are included based on the additional footprint of the Linac/ Admin building.
- eHealth costs are the additional requirement for the new Linac/ Admin building.
- Depreciation is based on an average useful life of 10 years.
- Costings have been completed on the basis that these projects will be approved as one programme of work which will allow cost efficient decant of services when required. Therefore, if all the projects are not approved at the same time this assumption and exactly how these projects would be managed would have to be re-assessed.

Additional to the costs outlined above are one-off non-recurring revenue costs associated with the required decant of the inpatient wards. These represent the revenue costs for decant and total £202k. All other costs associated with decant were included within the Haematology business case due to inextricable linkages.

Work is ongoing to identify and quantify the potential additional project costs (capital and revenue) that could arise as a consequence of the COVID-19 pandemic. Once quantified, these will be escalated through inclusion in the NHS Lothian mobilisation return to the Scottish Government. Governance and

funding for these specific costs will be monitored and managed through this process and will be subject to verification by Health Facilities Scotland.

Funding for the increase in revenue costs is proposed from the following sources:

- Depreciation (£2,063k) – to be funded from the existing NHS Lothian depreciation allocation.
- Recurring staffing and facilities (£1,346k) - It was agreed at the SEAT Regional Directors of Finance Operational Group meeting in February 2020 that the remaining staffing and facilities costs would be split based on actual activity from each Board. The final figures in below are consistent with those agreed through this process.

Table 41: Split of revenue costs between partner Boards

Board Share Of Staffing Costs	%	£K
Lothian	79.1%	1,065
Fife	8.0%	107.5
Borders	6.3%	84.5
Dumfries & Galloway	6.6%	89
Total	100%	1,346

- As the investment is driven by growth, funding will come from the Financial Plan supported by anticipated NRAC uplifts. In part, this Financial Plan investment is offset by additional income of £300k, separately identified by the service from an increase in Gynae Brachytherapy procedures.
- Non-recurring decant revenue (£202k) has funding identified from service savings.

8.4. Change in costs from OBC to FBC

The changes to both revenue and capital costs from the OBC are detailed below and the drivers behind these discuss after the table.

Table 42: Changes in costs through business case process

Cost	IA Addendum (£k)	OBC (£k)	FBC (£k)	Change OBC to FBC (£k)
Capital Costs				
Ward 1 SACT	2,000	2,632	3,008	376
Wards 2 and 4	2,011	2,314	2,142	(172)
Oncology Assessment Area	2,890	3,273	3,590	317
Linac Capacity	8,428	10,077	11,886	1,809
Total Capital Costs	15,329	18,296	20,626	2,330
Revenue Costs (excl. Depreciation)				
Ward 1 SACT	0	22	27	5
Wards 2 and 4	0	728	805	77

Cost	IA Addendum (£k)	OBC (£k)	FBC (£k)	Change OBC to FBC (£k)
Oncology Assessment Area	0	361	402	41
Linac Capacity	0	34	112	78
Total Revenue Costs (p.a.)	0	1,145	1,346	201

The drivers behind the increase in capital costs of £2.3m are:

- the price of concrete
- further development of the groundworks package and associated logistics plan on the already congested WGH site.

The drivers behind the increase in revenue costs of £201k are:

- Staffing pay uplifts (£129k)
- Energy and rates costs for the new Linac/ Admin block (£65k)
- eHealth costs for the new Linac/ Admin block (£7k)

8.5. Overall Affordability

The capital costs detailed above are anticipated to be funded through traditional capital funding and it is anticipated this will be provided by a specific allocation from the Scottish Government

This project has been prioritised by NHS Lothian and the estimated costs noted above will be included in the NHS Lothian Property and Asset Five Year Investment Plan.

Increased revenue funding will be required in phases from 2022. Once fully operational in 2023, there will be an incremental revenue cost (excluding depreciation) of £1,346k. It was agreed at the SEAT Regional Directors of Finance Operational Group meeting in February 2020 that the revenue costs (excluding depreciation) will be split based on actual activity from each Board. The final figures in the attached FBC are consistent with those agreed through this process.

As the investment is driven by growth, funding will come from the Financial Plan supported by anticipated NRAC uplifts. In part, this Financial Plan investment is offset by additional income of £300k, separately identified by the service from an increase in Gynae Brachytherapy procedures.

Additionally there are non-recurring decant costs of £202k which revenue savings have been identified to fund.

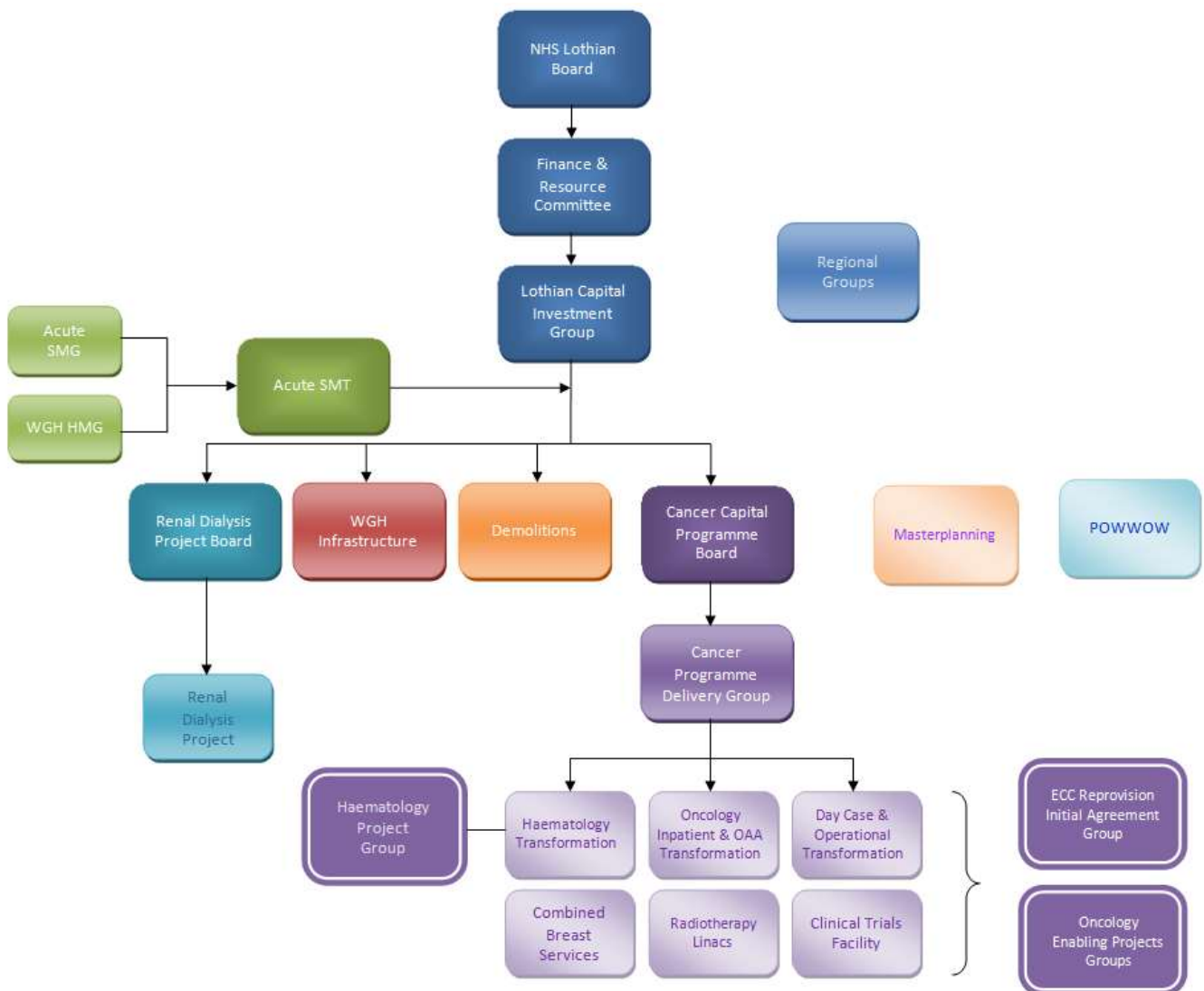
9 The Management Case

This section of the business case addresses the achievability of the scheme in terms of NHS Lothian's readiness and ability to proceed to contract award and project implementation. It builds on the arrangements described in the OBC by setting out in more detail the actions that will be required to ensure the successful delivery of the scheme in accordance with best practice.

9.1. Project Management

9.1.1. Governance arrangements

The diagram below shows the organisational governance and reporting structure that is in place to take forward the proposed solution, as part of the wider Cancer Transformation Programme.



The table below notes the project team who will be responsible for taking the project forward including details of the capabilities and previous experience.

The project will be governed by the Cancer Capital Programme Board which oversees the full Cancer Transformation Programme of works.

Table 43: Project Management Structure

Role	Individual	Capability and Experience
Executive Lead	Jim Crombie, Deputy Chief Executive	
Project Sponsor	[REDACTED]	Senior NHS manager with 25 years experience in acute hospital management roles in NHS Scotland and NHS England. Experience of a variety of capital projects and service transformation and quality improvement programmes.
Project Owner(s)	[REDACTED] [REDACTED]	Senior NHS Manager with 16 years experience in acute hospitals management roles in NHS England and NHS Scotland. 7 years experience of managing Specialist Regional Cancer and Palliative Care Services. Experience of leading development of wide range of cancer facilities.
Project Lead	[REDACTED]	MSP Qualified Programme Manager with several years of operational management experience and project delivery on the WGH site
Project Director	[REDACTED]	APM Qualified Estates Programme Manager with 10 years of experience in managing NHS Capital Projects of similar size. BEng (Hons), MSc in Building Services Engineering
Project Manager	[REDACTED]	Project Manager with over 7 years of Project Management Consultancy and Technical Advisory experience on major healthcare infrastructure projects across Scotland.
Project Co-ordinator	[REDACTED]	Oncologist with a special interest in healthcare build environment, having assisted in delivery of several projects on WGH site over last 10 years

Role	Individual	Capability and Experience
Project Clinical Leads	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p>Clinical Nurse Manager with 12+ years experience. Involvement in 2 major reprovion projects (new RIE and RHSC/DCN) and other smaller projects.</p> <p>Medical Physicist with over 10 years experience of clinical and technical input into radiotherapy capital equipment and infrastructure projects.</p> <p>Operational Service Manager involved in agreeing client brief and maintaining operational service delivery. Some previous experience with smaller scale capital project within NHS setting.</p>
Project Medical Advisors	[REDACTED]	Clinical Oncologist at ECC for 25 years with clinical ward management responsibilities for the last 2-3 years.
Capital Finance Support	[REDACTED]	Finance professional with several years experience. Provides support to WGH projects.
Revenue Finance Support	[REDACTED]	Finance professional with over 20 years of experience. Background in analysis and evaluation of large projects.
Infection Control Support	[REDACTED]	
Estates Liaison Officer	[REDACTED]	Over 30 years' experience in Estates with extensive knowledge of M&E services on this site.
eHealth Advisor	[REDACTED]	25 Years IT & Telecomms experience in NHS, 12 years prior to that in BT also in Telecomms & IT.

Legal advice for the project (if required) will be obtained from the Central Legal Office. RMF have been appointed as specialist external advisors. The table below lists the project's external advisors:

Table 44: External Advisors

Role	Organisation & Named Lead
Project Managers	Thomson Gray – [REDACTED]
Cost Advisor	Thomson Gray – [REDACTED]
Principal Supply Chain Partner	RMF – [REDACTED]

Role	Organisation & Named Lead
Principal Designer	Thomson Gray (RMF Partner) - [REDACTED]
CDM Co-ordinator	Doig + Smith – [REDACTED]
Supervisor	XBuro (Thomson Gray Partner) – [REDACTED]

The roles and responsibilities of each of the project team members, together with other project stakeholders, are detailed in the Project Execution Plan document which has been developed in collaboration with the PSCP team and set out the Project Management arrangements required for the Construction Stage.

A detailed Construction Phase Plan will be developed by the PSCP as part of the Construction Phase Health & Safety Plans prior to Construction start. The plan will focus on the construction processes including health & safety, infection control, traffic management and access arrangements, communication links, risk management and quality inspections.

9.2. Engagement with Stakeholders

The table below summarises the stakeholders impacted by this proposal and the details of the engagement that has taken place with them to date and notes their support for this proposal.

Table 45: Engagement with Stakeholders

Stakeholder Group	Engagement that has taken place	Confirmed support for the proposal
Patients/service users	Patients and service users affected by this proposal include cancer services patients their families and carers. Their involvement in its development includes communication through public events and feedback given during stakeholder interviews.	Feedback from these events and interviews has been considered as proposals have developed.
General public	The general public will be affected by this proposal by disruption during building works onsite however the outcome of the proposal will be better public facilities. This has thus not required a wide range of public consultation events, however a public event was held in November 2018 to communicate changes across the WGH site. Information continues to be updated on the NHSL website, with targeted information for patients also available in all outpatient areas	Feedback from the public consultation events has been taken into account when planning the logistics of these projects. The level of support from the general public for this proposal is good as the outcome of the proposal will be better public facilities and there is a recognition of the necessity of works being carried out.
Staff/Resources	Staff affected by this proposal include staff across cancer services. Their involvement in its development includes participation in discussions of project plans and staffing arrangements. There is likely to be some service disruption while wards are decanted however there will be ongoing communication and planning to keep this to a minimum. The general environment for staff will be improved both within decant facilities and once enabling is complete having a positive impact.	Feedback from staff has been incorporated in project plans as they have developed.

Other key stakeholders and partners	Other key stakeholders identified for this proposal have been included in discussions as plans have progressed with opportunities for changes to be made at various stages in the process.	Confirmed support for this proposal has been gained through wide communication of plans and recognition of necessity of works being carried out.
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9.3. Change Management

In order to avoid scope creep and overspend and to ensure project success, change control mechanisms have been developed. The Project Owner and Director will be responsible for maintaining strict control of the project and managing changes as they arise.

In the delivery and commissioning stages of the project, the established design parameters will not be changed without the prior consent of NHS Lothian via the Project Director, Project Manager and the Project Team. The NEC3 Form of Contract has a prescribed method of managing variations through the system of Early Warnings and Compensation Events.

Fortnightly Project Group meetings have been established for the day to day project operations and continuous communication with the Cancer Clinical Management Team members is also maintained in order to respond to key escalated issues and proposed changes in a timely manner. In addition, monthly WGH Programme of Works meetings including the Project Director, Project Manager and the Hospital Management Team have been established in order to support the project delivery in a site – wide context.

Any changes to the project not impacting on the service delivery, programme, time or cost will be decided on by the Project Director and the Project Group. Otherwise, all project change requests will be referred to the Cancer Capital Programme Board.

9.4. Benefits Realisation

The benefits criteria and beneficiaries of the scheme are intrinsically linked to the investment objectives originally set out in the IA and OBC. The baseline measurement and targets are identified in a Benefits Register that is attached as Appendix 2. The Benefits Realisation Plan (also attached at Appendix 2) sets out timelines and parties responsible for the delivery of specific benefits and how they will be delivered.

Further detail on the benefits to be achieved for each project is included in sections 2 to 5.

9.5. Project Risk Register

Risks are managed consistently across the project via a risk management strategy that is in line with the HFS Framework requirements, industry best practice and learning from recent and ongoing projects.

NHS Lothian and the project team recognises that all projects involve risk that needs to be identified and pro-actively managed to ensure that the project successfully meets its objectives, and that these risks are heightened when undertaking refurbishment works within a live acute hospital environment.

Project risk is managed within the project team and led by the Project Director. A risk work stream has been established to identify, evaluate, manage, and monitor risks throughout the life of the project. A project risk register is used to record and manage all risks associated with the project and it is a key part of the project's control processes. It is maintained as a live document which is referred to by all members of the project team and continually updated by the Project Manager. Risks are managed by a named risk owner and risk review workshops will take place regularly to ensure the risk register remains relevant and remove those as these expire. The Risk Register is consistent with the HFS guidance and adopts a "traffic light scoring system". Risk updates are planned to be reported regularly in the Project Director's monthly report and this will continue for the duration of the project.

The project Risk Register is included in Appendix 3. The risks have been quantified in cost terms where possible based on their likelihood and impact, appropriated between NHSL and the PSCP and included within the overall Target Cost.

9.6. Compliance

The PSCP and the project team have a duty of care to develop the scheme within the NHS Scotland, healthcare and other guidelines. A large number of internal and external advisers (e.g. Fire Safety, H&S, Infection Control, RPA and Authorising Engineers) have been involved in the project from the start supporting the development and the decision-making. In order to ensure compliance and transparency of the design, the lists of derogations were developed for each area detailing any diversions from the current guidance. These lists have been accepted by a wide group of stakeholders, including the aforementioned advisers as well as the Directors of Facilities, Capital Planning and Executive.

The appointment of the Supervisor includes for the Clerk of Works as well as the review of the Design Reports in accordance with compliance and is intended to further increase the robustness and suitability of the design prior to and during construction.

9.7. Commissioning

The commissioning process will be managed by NHS Lothian Estates Department. [REDACTED], a Sector Estates manager dedicated fully to the Western General Hospital Programme of Works will be responsible for leading on this aspect of the project, ensuring that commissioning is delivered in accordance with the NHSScotland Commissioning process. The appointed Project Supervisor, [REDACTED] of Xburo will also support the commissioning process.

A Commissioning Master Plan has been developed and is included in Appendix 8 of this FBC. A full, detailed Commissioning Programme will be prepared by agreement of the project parties during construction into a Final Commissioning Programme. This will ensure that each party is able to access the site to verify that all items function correctly together prior to the completion date. The intention is to have separate detailed Commissioning Plans for each of the areas of the project separately.

9.8. Project Monitoring and Evaluation

The Project Director will be supported by the Users and the Project Team in managing and monitoring the projects' progress against the agreed programme, quality of the works against the agreed specification and plans and delivery of the project to the approved Business case target cost and overall budget.

The elements of the Oncology Enabling project are going to be monitored separately, as defined by the Worktask Orders within the contract, namely:

- Linac/Admin facility
- CAU/Inpatient Wards
- Ward 1

This is grouped by location and service group and creates a logical separation and phasing between each element of the wider project. The Project Director will bring all the elements together and ensure smooth phasing and management of the interdependencies.

The Project Director will submit monthly reports to Project Owner and quarterly reports to the Cancer Capital Programme Board to prove governance and project delivery.

The report will provide the sections:

- Executive summary headlines for the following key issues
- Health and safety issues
- List of key activities past/next month
- Programme and performance
- Financial issues
- Risk and issues requiring escalation

Monthly progress meetings in addition to more frequent project meetings have already been established, enabling the project director and the project team to review the project in a wider WGH Programme of Works context and to identify any constraints or dependencies affecting the project. Quarterly Project Steering group meetings have also been organised with the senior stakeholders from NHS Lothian and the PSCP in order to maintain communication and give opportunity to voice any concerns on a senior level.

The project progress will be evaluated in stages:

- ***Design Process Evaluation***

An evaluation of the design process and outputs has been continuously undertaken during the FBC stage to assess the effectiveness of the procurement process in meeting the project objectives. This has given opportunity to assess the project against the budget and programme and take appropriate measures as required.

- ***Monitoring Construction***

During the construction period progress will be monitored to ensure delivery of the project to time, cost, and quality to identify issues and actions arising. On completion of the construction phase the actual project outputs achieved will be reviewed and assessed against requirements, to ensure these match the project's intended outputs and deliver its objectives.

- ***Post Project Evaluation of the Construction Project and Service Outcomes***

This will be undertaken 12 months after the facility has been commissioned. The objective is to determine the success of the commissioning phase and the transfer of services into the new facilities and what lessons may be learned from the process.

NHS Lothian is committed to ensuring that a thorough and robust Post-Project Evaluation is undertaken to ensure that lessons can be learnt from the project and taken forward into the future. The Post Project Evaluation Report will review the success of the project against its original objectives, its performance in terms of time, cost and quality outcomes and whether it has delivered value for money. It will also provide information on key performance indicators. This review will be undertaken by senior member of

the Project Board. The Post Project Evaluation Report will be submitted to the Finance and Resource Board for its review and dissemination.

10 Conclusion

The strategic assessments for each project contained in this proposal are included in Appendix 1.

The proposal has been prioritised by the relevant governance groups and identified as a priority for NHS Lothian.

The programme of work detailed in this FBC represents critical upgrades required to address immediate pressures experienced by the service and to ensure safe service delivery to patients until a new Cancer Centre is developed.

This paper has demonstrated that the growth across all Cancer Services presents a continual challenge for the service to evolve and maintain an infrastructure to support quality patient centred service delivery. The current oncology estate on the Western General Hospital Campus has significant capacity and HEI compliance issues that present material risks and cannot be addressed without capital investment.

It is recommended that NHS Lothian and Scottish Government support the programme of work outlined in this paper.