Full Business Case: January 2024

new Velindre Cancer Centre

Strategic Case

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Approvals:

Forum	Date	Version
TCS Programme Scrutiny Sub-Committee	01/02/2024	V1.0D
Trust Board	07/01/2024	V1.0D

1 INTRODUCTION AND PURPOSE

Introduction

1.1 The new Velindre Cancer Centre (nVCC) Project is part of the Velindre University NHS Trust's (VUNHST or 'the Trust') wider Transforming Cancer Services (TCS) Programme. The Programme aims to implement a high quality, safe and sustainable model of care for tertiary non-surgical oncology services for the south east Wales region. This model will meet the predicted demand for services and improve patient outcomes.

Scope of this Business Case

1.2 This nVCC Full Business Case (FBC) covers the following:

(i) Replacing the existing cancer centre with a new Velindre Cancer Centre that will deliver the majority of tertiary non-surgical oncology services for the population of south east Wales contributing to the regional Clinical Operating Model for cancer services

(ii) The provision of new equipment where it is not possible or economically viable to transfer from the existing Velindre Cancer Centre (VCC)

Out of Scope of this Business Case

1.3 The following areas are outside of the scope of this FBC:

(i) Site Decommissioning of the existing Velindre Cancer Centre (VCC) is not part of this FBC and will be subject to separate Business Case

(ii) The Integrated Radiotherapy Solution (IRS) and the Radiotherapy Satellite Centre (RSC) are also not in scope and have been approved separately

(iii) Any matters relating to the acquisition, maintenance, security, and disposal of the Whitchurch Hospital site are not included in the FBC and will form part of another Business Case submission

(iv) The development of Outreach Facilities embedded within University Health Boards is not within scope. This is being addressed through the Trust's Velindre Futures Programme

(v) The Clinical Operating Model (which is a TCS programme deliverable) does not form part of this FBC. Therefore, benefits, risks and costs associated with the wider clinical operating model are not included

(vi) Staffing and future workforce costs are not part of this FBC and are out of scope. These, along with other clinical developments, will be managed as part of the Trust's normal commissioning arrangements and Long-Term Agreement

Prior Approvals and Procurement Update

1.4 On the 19th of March 2021, the Welsh Government announced its approval of the nVCC Outline Business Case (OBC). This approval enabled the formal procurement of the nVCC to commence via a competitive dialogue procedure.

1.5 The outcome of the nVCC procurement is nearing Financial Close (FC) allowing for the completion of this FBC which is aligned to the Successful Participant's (ACORN) tender.

1.6 The nVCC OBC revisited the project's earlier Strategic Outline Case assumptions and identified a preferred way forward. This FBC also revisits those assumptions and confirms strategic alignment, value for money and a means to implement the preferred solution.

1.7 The construction plan for the nVCC currently shows the first patient being treated on 14th April 2027.

Purpose

1.8 The purpose of this FBC, is to:

(i) Identify the marketplace opportunity which offers optimum Value for Money (VfM)

(ii) Set out the commercial and contractual arrangements for the negotiated deal

(iii) Confirm the "Deal" is still affordable

(iv) Put in place the detailed management arrangements for the successful delivery, monitoring and evaluation of the scheme

1.9 This FBC provides assurance on the points outlined above to the Trust Board and Welsh Government. Trust commissioners approved the revenue consequences of this FBC between March and May 2023.

1.10 Letters from commissioners confirming their support for this FBC can be found in **Appendix FBC/SC1**.

2 STRATEGIC CASE STRUCTURE AND CONTENTS

Context of Proposed Investment

2.1 The Trust and its University Health Board partners are committed to providing safe, efficient, and effective care to all our patients. To achieve this, it is essential that a nVCC is implemented. The key drivers supporting the case for investment are:

(i) The Welsh Government's health and cancer policies, *A Healthier Wales: Long Term Plan for Health and Social Care*[1]*; The Quality Statement for Cancer*[2] and *A Cancer Improvement Plan for NHS Wales 2023 – 2026*[3]*,* to improve the quality of cancer treatment and care, to further improve the experience of care, and patient outcomes

(ii) Continuing growth in the incidence of cancer and the demand for cancer services across Wales; with incidences expected to grow at approximately 2% per annum (far higher in some cancer sites)

(iii) The role of Velindre Cancer Services in the south east Wales region as being the sole provider of highly specialist non-surgical tertiary oncology for the patient population

(iv) The need to keep pace with the advances in treatments and technology which support the provision of modern cancer care that achieves the required clinical standards and expected outcomes

2.2 The heart of the Trust's ambition to develop a new cancer centre is rooted in the need to improve cancer patients' and their carers' experiences and outcomes. This ambition is aligned not only with the Welsh Government's *Cancer Quality Statement* and the *Cancer Improvement Plan for NHS Wales*, but also our University Health Board partners, wider NHS Wales and everyone contributing to the Welsh cancer care community.

2.3 There are significant limitations relating to the fabric and functionality of the existing main building of VCC, which was built in 1956. These include:

[1] A healthier Wales: our plan for health and social care (Welsh Government, 2018). Updated 2022.
[2] The Quality Statement for Cancer (Welsh Government, 2023). Updated 2022.
[3] A Cancer Improvement Plan for NHS Wales 2023 – 2026 (Wales Cancer Network, 2023)

(i) The existing VCC has insufficient space and if built on a 'like for like' basis, and in line with current Health Building Notes (HBNs), it would have a footprint of circa 28,000m2 compared to the existing building footprint of 17,777m2

(ii) There is very limited expansion space on the existing VCC site. It is also unlikely that any future expansion proposals would be granted planning permission on the current site. This severely limits the Trust's ability to expand its footprint to meet the increasing demand for its cancer services across a range of specialities / departments

(iii) A high proportion of accommodation at the existing VCC is non-compliant with statutory requirements and creates challenges in maintaining important levels of patient safety and confidentiality

(iv) The existing patient environment at the VCC is sub-optimal in promoting patient dignity, experience, and well-being

(v) The existing VCC has limitations in its ability to provide the most up-to-date treatments for patients to support improved outcomes and quality of life

(vi) There is insufficient car parking at the existing VCC

2.4 Therefore, it is clear that the existing VCC is significantly inhibiting the Trust's ability to both maintain and progress its clinical services. Conversely, the nVCC project is critical to the successful delivery of the Trust's long-term Cancer Strategy and the delivery of the benefits set out within the Trust's Transforming Cancer Services in south east Wales Programme (TCS).

TCS Programme Scope

2.5 The nVCC FBC sits within the wider TCS Programme which has seven interdependent projects aimed at delivering the Trust's approved ambition for its cancer service as described within its strategies and Clinical Operating Model. The projects are led by a number of defined Boards within the Trust. These arrangements are set out in more detail in the Management Case.

2.6 The TCS Programme was developed primarily to deliver a number of aspects of the Welsh Government's strategic health, and specifically, cancer policies (*A Healthier Wales* and *The Quality Statement for Cancer*) alongside the Velindre Cancer Services Strategy *Shaping our Future Together 2016 – 2026*.

2.7 However, the Programme is being delivered in a way which is aligned with other policy areas such as the *Well-being of Future Generations (Wales) Act 2015*; and sustainability agenda (*NHS Wales Decarbonisation Strategic Delivery Plan*) as a central tenet.

2.8 The seven TCS Projects are briefly described in Table S1 below:

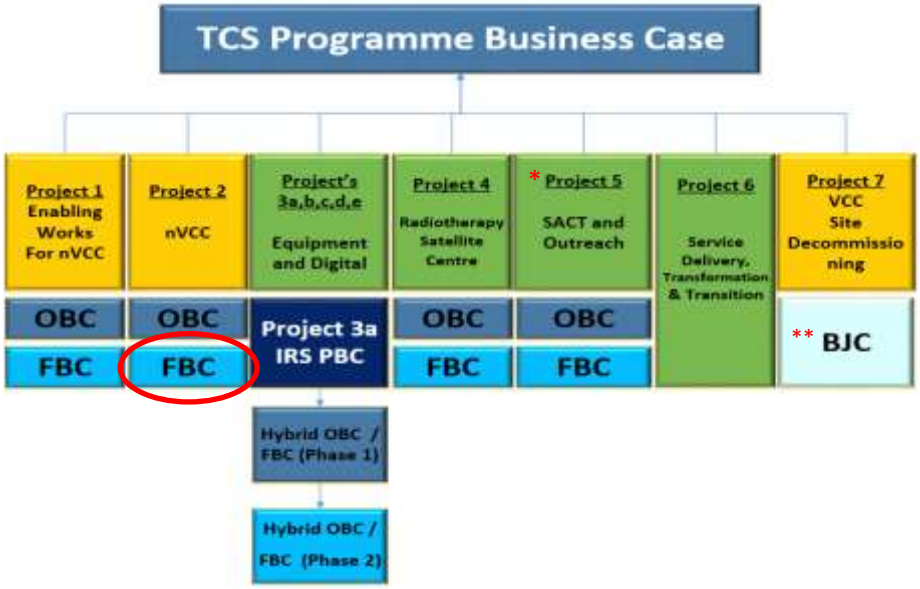
Table - S1 – TCS Projects Described

Project Number / Name		Description
1	**Enabling Works**	All enabling works needed to provide primary and secondary access to the new Velindre Cancer Centre Site, including the provision of utilities.
2	**New Velindre Cancer Centre**	The development of a new Velindre Cancer Centre in Whitchurch, Cardiff.
3	**Digital and Equipment**	The provision of integrated Digital Information and Equipment Services across the TCS Programme. This Project oversees the Integrated Radiotherapy Solution (IRS) Project.
4	**Radiotherapy Satellite Centre**	The provision of a Radiotherapy Satellite Centre at Nevill Hall Hospital.
5	**SACT and Outreach**	The provision of Systemic Anti-Cancer Therapy (SACT) and Outpatient services embedded in University Health Boards.
6	**Service Delivery Transition and Transformation**	Establishing and transforming all service delivery functions across the clinical model. It is also responsible for planning and implementing the transition between the old and new cancer centre.
7	**Site Decommissioning**	The decommissioning of the old Velindre Cancer Centre.

2.9 As described within the TCS Programme Business Case (PBC), each project within the Programme requires its own Business Case. It is important that these Business Cases are considered both individually and as a collective.

2.10 Figure S1 sets out the TCS Programmes Business Case Framework and how it aligns to the seven defined projects.

Figure S1 - TCS Programme Business Case Framework



**please note that the capital requirement for project 5 is not yet determined and as such the planned Business Case approach may vary. Similar to Project 4 the Business Case may be the responsibility to the host health board.*

***Business Justification Case (BJC)*

2.11 This FBC seeks investment for the nVCC Project (Project 2 circled above). Some Business Cases within the TCS Programme have been approved and an update is set out in the Table S2 below:

Table S2 – TCS Programme Business Cases Status

Project Number / Name		Approval Status
1	Enabling Works	Full Business Case Approved
2	new Velindre Cancer Centre (nVCC)	OBC approved and Full Business Case Complete The Trust's Commissioners formally approved the revenue consequences of this FBC between March and May 2023
3	Digital and Equipment	Integrated Radiotherapy Solution (Project 3a) – Full Business Case approved
4	Radiotherapy Satellite Centre (Lead by Aneurin Bevan University Health Board -ABUHB)	Full Business Case Approved
5	SACT and Outreach	*Business Case Process not yet commenced and may vary depending on requirements
6	Service Delivery, Transformation & Transition	No Business Case Required – Transition costs included within nVCC Full Business Case. Recurring revenue costs relating to service delivery form part of the Long Term Agreement (LTA) arrangements
7	Site Decommissioning	Business Justification Case (BJC) will be commenced following this FBC submission

Business Case Approvals and Timeline

2.12 The approval process for this FBC is outlined in the Table S3 below.

Table S3 – nVCC Full Business Case Timeline

Approval Step	Purpose	Submission Target Date	Status
Phase 1: FBC excl. Commercial Case to the Trust Board	For review	March 2023	Achieved
Phase 1: FBC excl. Commercial Case to the Trust Commissioners and Welsh Government (enough revenue certainty for Health Boards to consider approval)	For review	March 2023 > May 2023	Achieved
Phase 2: Updated FBC incl. draft Commercial Case to Trust Board *(prior to Financial Close)*	For approval	June 2023	Achieved
Phase 3: Final FBC to Trust Board	For approval	January 2024	Pending
Phase 3: Final FBC to Welsh Government	For approval	January 2024	Pending
Phase 4: Welsh Government Scrutiny of FBC commences	For approval	January 2024	Pending
Phase 5: Final FBC incl. Commercial Case to Trust Board *(post Financial Close)*	For approval	March 2024	Pending
Financial Close achieved and Contract Executed	For approval	March 2024	Pending

Structure and content of FBC

2.13 The FBC has been prepared in accordance with HMT Green Book and Welsh Government Better Business Case Project Specific guidance. Table S4 below outlines the approach that has been applied to the Five Case model.

Table S4 – nVCC Full Business Case Structure and Content

Chapter	
Strategic Case	Sets out the strategic context and the case for change, together with the supporting investment objectives for the project.
Economic Case	Completes an economic appraisal that outlines the main benefits of shortlisted options. Appraises the economic costs, benefits and risks for the short-listed options based on the results of the procurement process. Demonstrates the preferred option continues to meet the needs of the service and optimises value for money.

Chapter	
Commercial Case	Describes the procurement process adopted and outlines the content and structure of proposed contract and associated contractual arrangements. Provides the results of the procurement process and final proposed contractual arrangements.
Financial Case	Sets out the financial implications of the preferred option based on the results of the procurement process. Confirms funding arrangements and affordability and explains any Balance Sheet impact.
Management Case	Demonstrates that the project is achievable and can be delivered successfully to cost, time, and quality.

Strategic context of proposed investment

2.14 This section of the FBC summarises the strategic context for the development of a nVCC project by explaining how the nVCC project supports the delivery of local, regional, and national policy goals.

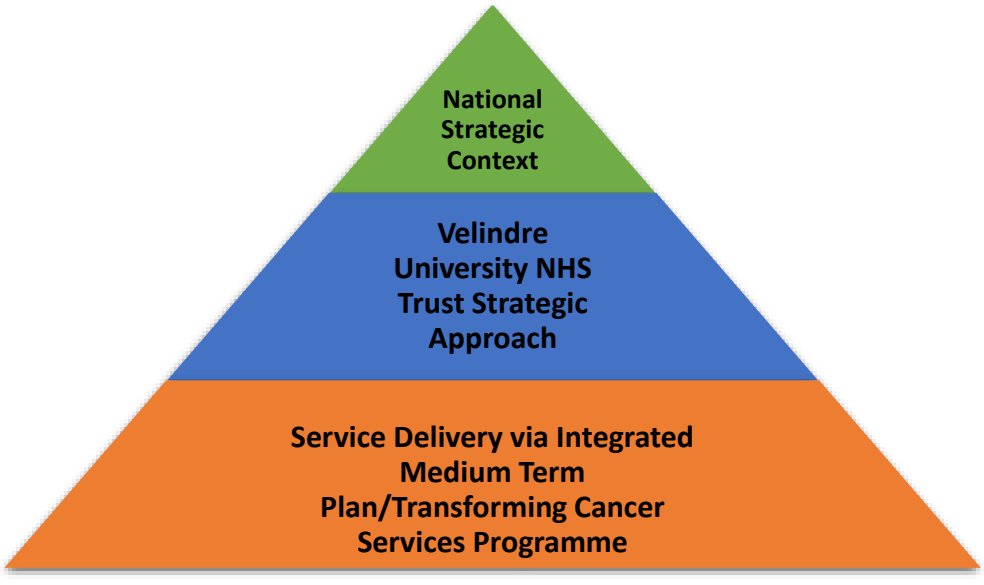
2.15 Specifically, in Figure S2 below it considers the fundamental drivers behind this proposal which includes:

(i) Links to national strategy and policy

(ii) VUNHST's enabling Strategies and Programme Arrangements linked to the above national drivers

(iii) The Service Delivery / Business as Usual needs: the need to maintain business as usual activities and to routinely replace major medical equipment

Figure S2 - Fundamental Policy Drivers



2.16 Figure S3 below summarises the main national strategic drivers linked to this FBC.

Figure S3 - Strategic Context in Wales for Health Services

National Context

Statutory Duties and Key Policies

- A Healthier Wales (2018)
- Wellbeing of Future Generations Act 2015
- WG Quality Statement for Cancer (2021) NHS Wales Cancer Improvement Plan (2023)
- Health and Social Care (Quality and Engagement (Wales) Act 2020
- Public Health Wales Act 2017
- Social Services and Well-being Act 2014
- Nurse Levels (Wales) Act 2016
- Equalities Act 2010
- Welsh Language (Wales) Measure 2011
- Equality Act 2010
- Health & Safety at Work Act 1974
- Socio-economic Duty 2021
- De-carbonisation Strategy (2021)
- WG Digital Strategy (2022)
- National Clinical Plan and National Clinical Framework (2021)
- Prudent Health Care/Value Based Health Care
- Working Differently - Working Together

Velindre University NHS Trust's Strategic Response

2.17 In response to the local, regional, and national policy drivers the Trust has developed its *Destination 2033* strategy which sets out a new purpose, vision and set of strategic goals for the Trust. The approach is set out in Figure S4 below:

Figure S4 – The Trust's Purpose, Vision and Goals

2.18 In support of the Trust's purpose, vision, and goals that make up *Destination 2033*, the following divisional service strategies have been developed:

i. *Welsh Blood Service Strategy 2022 – 2027*

ii. Velindre Cancer Strategy *Shaping our Future Together 2016- 2026*

2.19 These are also supported by a range of refreshed enabling strategies / frameworks which are available upon request:

(i) Quality and Safety Framework

(ii) Clinical and Scientific Strategy (under development)

(iii) Sustainability Strategy 2022 – 2032

(iv) Workforce Strategy 2022 – 2032

(v) Digital Strategy 2022 – 2032

(vi) Estates Strategy 2022 – 2032

Alignment with Velindre Cancer Services Strategy *Shaping our Future Together 2016 – 2026* and the Transforming Cancer Services Programme

2.20 The Velindre Cancer Service strategy *Shaping our Future Together 2016 – 2026* sets out five strategic priorities. These support the wider strategic goals described in Destination 2033 and are set out in Table S5 below.

Table S5 – The Five Strategic Priorities and Aims of "Shaping our Future Together 2016 -2026" nVCC Full Business Case Structure and Content

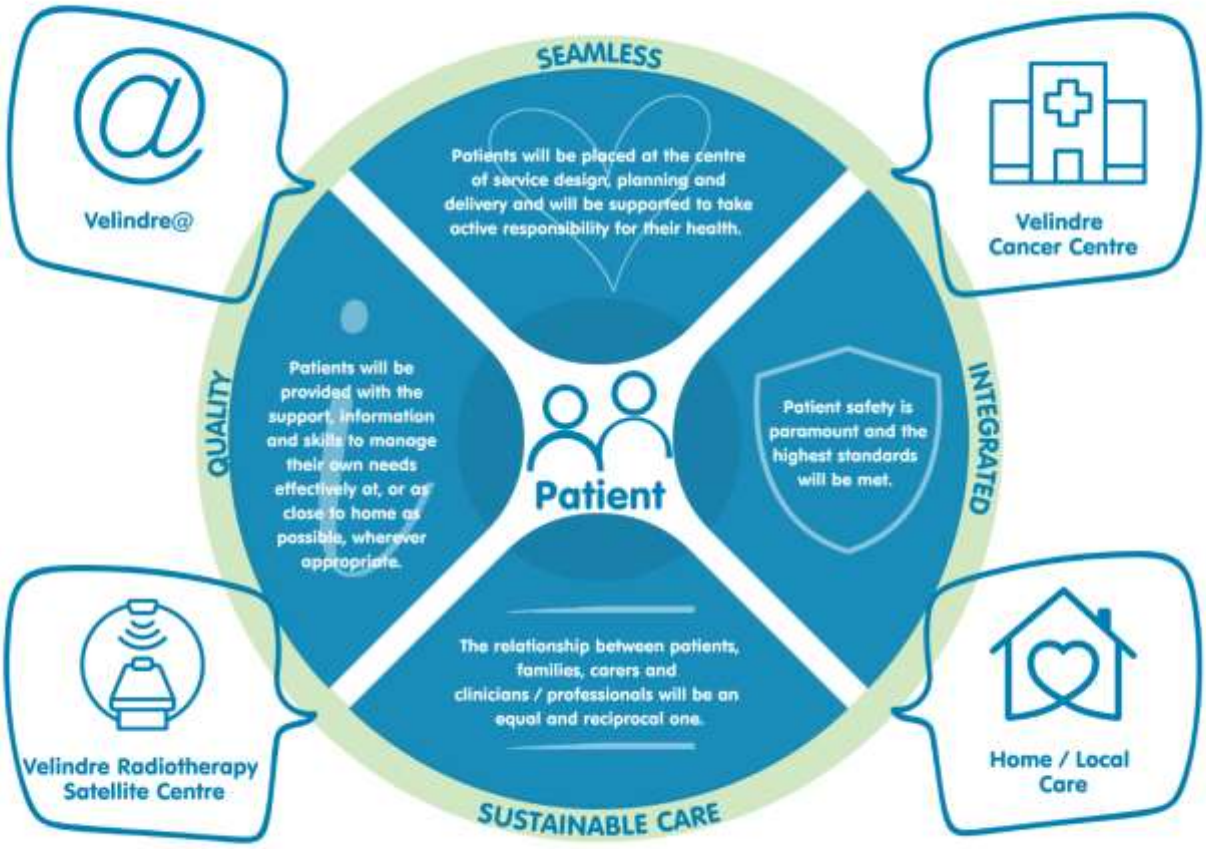
Priority	Aim
Strategic Priority 1:	Equitable and consistent care, no matter where; meeting increasing demand.
Strategic Priority 2:	Access to state-of-the-art, world-class, evidence-based treatments.
Strategic Priority 3:	Improving care and support for patients to live well through and beyond cancer.
Strategic Priority 4:	To be an international leader in research, development, innovation, and education.
Strategic Priority 5:	To work in partnership with stakeholders to improve prevention and early detection of cancer.

2.21 VUNHST's range of strategies, together with the Velindre Cancer Service strategy *Shaping our Future Together 2016 – 2026*, are directly aligned to the Welsh Governments range of strategic policy goals and requirements. The delivery of these strategies (priority; timelines) are managed through the Integrated Medium-Term Planning (IMTP) process with delivery managed and monitored via VUNHST's established performance management and governance arrangements.

Translating Strategic Plans into the delivery of improved quality of care: the Clinical Operating Model

2.22 The TCS Programme used the Velindre Cancer Service strategy *Shaping our Future Together 2016 – 2026* to support the development of a Clinical Operating Model. This was facilitated through workshops/events/meetings involving more than 400 people – professionals, patients and public from a range of organisations including Health Boards, Third Sector and Llais. The Clinical Operating Model is set out in Figure S5 below:

Figure S5 – Approved Clinical Operating Model



2.23 The Clinical Operating Model within the TCS Programme Business Case describes how services will be delivered in the future. The founding principles are as follows:

(i) The service model seeks to promote a new set of relationships which work in partnership to improve the way we collectively design and deliver tertiary non-surgical cancer services around patients' needs and to achieve these improvements in a truly sustainable way

(ii) Patients are central to our plans with an integrated network of services organised around them. The organising principle seeks to 'pull' high quality care towards the patient, that is accessible in their preferred location and supports them achieving their personal goals during treatment and subsequently as they live with the impact of cancer

(iii) Patient safety is paramount, and the highest standards will always be met

(iv) The relationship between patients / families / carers and clinicians / professionals will be an equal and reciprocal one

(v) Patients will be provided with the support, information, and skills to manage their own needs effectively at, or as close to, home as possible wherever appropriate

(vi) Optimising information technology, quality improvement systems, patient involvement, education and embracing innovative approaches to healthcare will all be essential to achieve high levels of service quality in a sustainable way

2.24 The Clinical Operating Model will see more care delivered within patients' homes; and locally through the development of a number of Velindre@ facilities on University Health Board sites across south east Wales (where clinically appropriate), providing chemotherapy, outpatient, and support services; a Radiotherapy Satellite Centre (RSC) at Nevill Hall Hospital, Abergavenny; and a new Velindre Cancer Centre in Whitchurch, Cardiff.

2.25 To deliver the principles of the new Clinical Operating Model, care will be delivered differently and at different locations. This will require a number of infrastructure, technology, and service change projects to be established and delivered.

2.26 The key elements of the model and their functions are described briefly as:

(i) **Home**

Where possible, we will increase the number of patients capable of having their treatment safely at home by utilising digital technology implemented during the COVID-19 pandemic.

(ii) **Health Boards**

A range of cancer care occurs within the University Health Boards, with a proportion of patients having all their care delivered by their local teams. For other patients who need non-surgical tertiary treatment, their care needs to be seamlessly planned with the non-surgical aspects of the treatment pathway, as patient care can often transition from one team to another. The implementation of the Clinical Operating Model, which includes outreach facilities and collaborative working, will support this approach.

(iii) **Velindre Outreach Centres**

These outreach facilities will provide SACT (if clinically appropriate), outpatient services, education and information provision and ambulatory care procedures within Health Boards.

(iv) **Velindre Radiotherapy Satellite Centre (RSC)**

The Radiotherapy (RT) Satellite Centre (RSC) at Nevill Hall has recently had its Full Business Case approved. The centre, once implemented, will provide radiotherapy treatment for approximately 20% of our RT patients provided by two new Radiotherapy treatment machines and one Computerised Tomography Simulator (CT Sim).

The benefits of the RSC investment include better access and reduced travel for patients and less use of transport services. This will mean that fewer patients need to travel to the VCC for their radiotherapy and some patients who may have previously not elected for RT may decide to have beneficial treatment.

(v) **New Velindre Cancer Centre**

The nVCC will provide specialist and complex cancer treatment including SACT, radiotherapy (including brachytherapy and unsealed sources) and specialist palliative care, inpatient facilities (being open for admission 24 hours/day, 7 days/week), a specialist acute oncology assessment unit and outpatient services, radiology, and nuclear medicine.

Assurance of the Clinical Operating Model and its ability to deliver high quality, safe services which meet the expectations of patients and families

External advice from the Nuffield Trust

2.27 In late summer of 2020, a number of concerns were raised regarding VUNHST's proposed Clinical Operating Model to achieve the range of expected benefits. The proposed regional networked model of care is the current model used and one which is routinely used in cancer services elsewhere across the United Kingdom. The focus of the concerns primarily related to the preferred location of the nVCC and it not being co-located on an acute hospital site as this Business Case proposes.

2.28 In recognition of the concerns raised, the Trust commissioned an independent health think tank, the Nuffield Trust, to provide advice on the proposed regionally networked model of non-surgical tertiary oncology services for south east Wales. This advice also considered the risks inherent in the proposed model relating to the location of the main elective specialist cancer centre (nVCC) on an NHS owned site in Whitchurch, known as the 'Northern Meadows', in terms of managing the acute care interfaces and the quality and acuity of clinical support for cancer services across all networked sites.

2.29 The Terms of Reference for the advice was jointly agreed between the Trust and University Health Board partners. The Nuffield Trust published its conclusions in December 2020 in a paper entitled *'Advice on the proposed model for non-surgical tertiary oncology services in south east Wales'* which can be found appended to this Business Case at **Appendix FBC/SC2**. The Nuffield Trust's independent advice was made publicly available and was considered by the Trust Board and University Health Board partners who accepted the report in full, together with all of its recommendations.

2.30 The Nuffield recommendations cover the wider cancer system in south east Wales and not simply the non-surgical tertiary oncology elements of it. The south east Wales Collaborative Cancer Leadership Group (CCLG) have provided the regional leadership to deliver the recommendations.

2.31 The Welsh Government considered the Nuffield Trust report as part of the approval of the Outline Business Case for the nVCC in March 2021. It has also been considered as part of additional assurance measures including Gateway and Commercial Approval Point (CAP) Reviews.

2.32 The CCLG, University Health Boards and the Trust continue to make progress against the Nuffield recommendations in support of the proposed Clinical Operating Model. Progress made and the current position is set out in **Appendix FBC/SC3**.

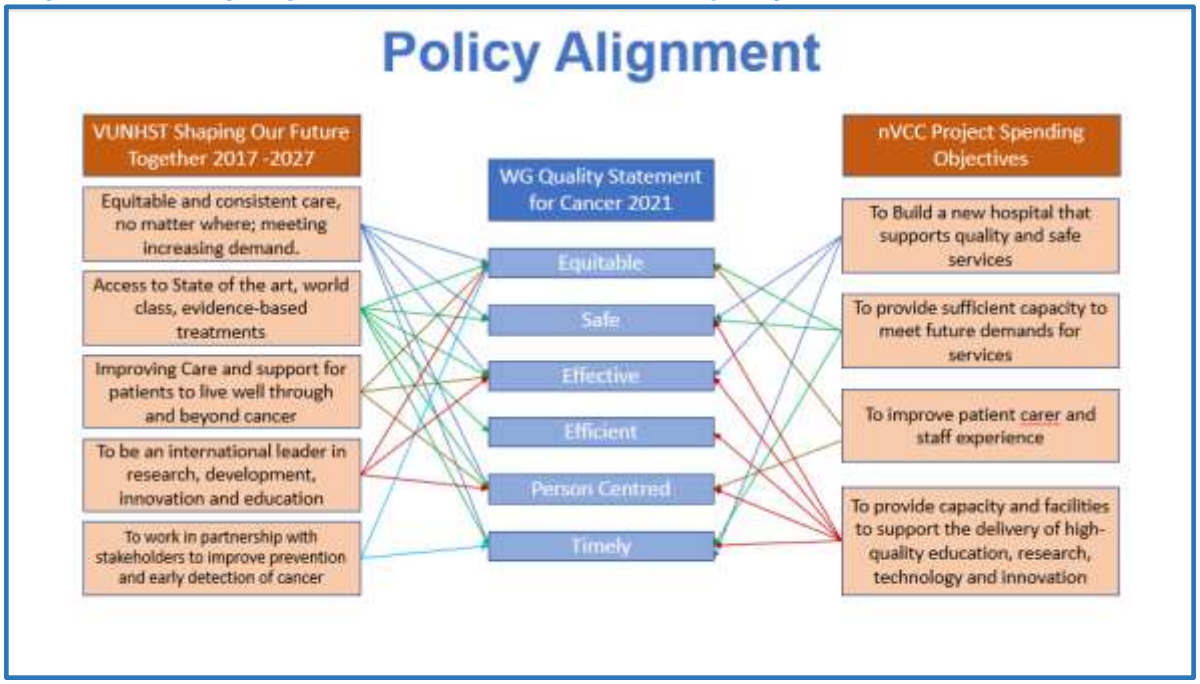
Alignment between the Trust's Strategy and Aims and Welsh Government Policy

2.33 The Trust is aware of the importance of aligning its programmes and major project investment objectives with the Welsh Government policy drivers, especially those set out in Figure S3, some of which are legislative.

2.34 As part of the FBC development, and in addition to the Nuffield advice, the Trust has sought to confirm continued alignment with the Welsh Government's strategic health and cancer policies, such as *A Healthier Wales*; *The Quality Statement for Cancer (2021)*; and *A Cancer Improvement Plan for NHS Wales 2023 - 2026*. It has also aligned the FBC with environmental and social policy, strategy and legislation such as the *Well-being of Future Generations Act 2015*, *NHS Wales Decarbonisation Strategic Delivery Plan*, the *Socio-economic Duty 2023* and more.

2.35 Figure S6 below sets out a mapping exercise between VUNHST's *Shaping Our Future Together 2016 – 2026* Strategy, the nVCC Project Spending Objectives (PSOs) and the *Welsh Government Quality Statement for Cancer 2021*, it demonstrates a strong alignment.

Figure S6 - Policy Alignment with Welsh Government Quality Cancer Statement 2021



Other Relevant Strategies / Guidance / Frameworks

2.36 Additionally, during 2022 the World Health Organisation (WHO) and the International Atomic Energy Agency (IAEA) published a framework in respect of setting up of a Cancer Centre. This document provides a useful blueprint which is aligned to VUNHST's vision for future services. Table S6 below sets out some of the main findings / recommendations of the WHO / IAEA report and how this aligns with the Trust's intent.

Table S6 – WHO Setting up a Cancer Centre Framework

	Recommendation	The Trust's Approach
1	Cancer centres are an important element in the provision of services and *exertion of leadership in cancer care [7–9*]. They are facilities for the control of cancer, serve as a guiding institution for all aspects of cancer control and are instrumental in operationalising and achieving the goals of countries.	As part of the wider TCS Programme the Trust has established a Collaborative Cancer Leadership Group (CCLG) with its commissioners. The CCLG strengthened collaborative ways of working and was a driver for delivering regional cancer priorities including the Nuffield Trust recommendations.
2	The benefits of Cancer centres go far beyond clinical care. They contribute to strengthening health systems by targeting cross-cutting system-related issues.	As 1 above
3	Cancer centres should serve as hubs for the training of the health professionals and as flagships for the implementation of a national strategy of quality care	The nVCC has been designed to be a Hub for training and innovation. The design includes a Collaborative Centre for Learning and Education which will be a regional asset.
4	A well-developed and functioning infrastructure is essential for delivering the responsibilities of a Cancer centre. A cancer centre's infrastructure should enable efficiency of movement, integration across levels and departments, optimal use of resources and machinery, reduced waiting times, decreased length of stay, cost efficiency improvements and improved patient and staff safety and satisfaction	With regards to existing arrangements the current Velindre Cancer Centre has very poor adjacencies due to necessary, but ad hoc, extension over time. These create inefficiencies for staff and poor patient experience. The nVCC has been designed with adjacencies and staff/patient flow in mind. Staff continue to be involved with the design process and team as they were throughout dialogue and following consideration of the FBC. A monetised benefit has been identified relating to efficiencies due to improved adjacencies.
5	A cancer centre's location and any evaluation of its infrastructure and equipment must be based on a detailed analysis	The location of the nVCC was subject to a detailed analysis of our patient and staff profiles many of which travel via the M4. The location close to the Coryton interchange provides easier access for the majority of our patients. The nVCC has been sized using trends in Trust activity and the expected future growth in the incidences of cancer. This information was fed into an Integrated Activity, Workforce and Financial Model and has also informed the future equipment requirements. These assumptions are tested later on in this chapter

	Recommendation	The Trust's Approach
6	Creating an integrated care network where the organisation is planning multiple centres with similar or distinctive capabilities that rely on each other operationally.	The TCS Programme sets out a Clinical Operating Model which sits as part of the regional networked model of cancer services across south east Wales. This model of care is based on care pathways through primary care; diagnostics; treatment; and rehabilitation/end-of-life with a variety of capabilities integrated to deliver an effective cancer care system. The Nuffield Trust provided advice on the model and it aligns with Welsh Government (WG) policy. Key to the Clinical Model is the aim of treating patients closer to home in either a Radiotherapy Satellite Centre at Nevill Hall Hospital or at a number of outreach centres in local hospitals. The nVCC has been sized to take account of this movement in treatment location and the implementation of a networked model of care.
7	All designs must have a state of the art, comfortable, well-lit scheme, with departmental zoning facilitated by clear zones of movement for patient, staff, materials, and use of intuitive signage to facilitate the following.	The requirements of this recommendation were covered in the Design Brief and during the procurement process and are reflected in the cancer centre's final design which will deliver these features.
8	A good patient experience. Focusing on ensuring dignity, privacy, convenience, optimizing treatment compliance and better outcomes.	The requirements of this recommendation were covered in the Design Brief and procurement process and are reflected in the cancer centre's final design which will deliver these features.
9	Hospital standards. These must comply with applicable national standards and requirements of the relevant atomic energy authorities. — Efficient and green hospital design. — Scalability. Modular, flexible, and adaptable designs are needed.	The requirements of this recommendation were covered in the Design Brief and procurement process and are reflected in the cancer centre's final design which will deliver these features. NHS Wales Shared Services Partnership (NWSSP) – Specialist Estates Services will be providing independent assurance in this regard.
10	Medical imaging and nuclear medicine will require a variety of equipment. It is expected that with the expansion of services there will be an incremental increase in equipment, human resources, and related support services.	The Trust has carried out a detailed planning exercise to determine its future diagnostic imaging and treatment machine configurations. These requirements are covered in the Design Brief and procurement process and are reflected in the cancer centre's final design.
11	It is recommended that all health care professionals involved in the work of a cancer centre receive adequate academic education and clinical training. National or international guidelines typically lay the basis for the definition of the path to be followed to become a professional competent to work independently in one or more specialties.	The nVCC has been designed to be a Hub for training and innovation. The design includes a Collaborative Centre for Learning and Innovation which will be a regional asset.

	Recommendation	The Trust's Approach
12	A clinical research programme is an essential component in any cancer centre. It has an intrinsic goal of generating or contributing to generate knowledge, but also adds value by: (i) contributing to the clinical training programmes; (ii) creating multicentred research networks; leveraging other available resources; (iii) and strengthening quality and safety culture in the centre	Velindre Cancer Centre is already a centre for Research and leads/or participates in a range clinical research. The design of the new cancer centre includes a Collaborative Centre for Learning and Innovation to enhance this and a Radiotherapy Research Bunker. Plans are also well-advanced to develop the Cardiff Cancer Research Hub between the Trust, Cardiff and Vale University Health Board and Cardiff University. The aim is to develop a vibrant research hub for clinical and translational trials across south east Wales and Wales and develop strategic partnerships to achieve CRUK status. A Strategic Outline Case was submitted in August 2023 to the Welsh Government.

2.37 As can be seen in Table S6 the process of developing the nVCC project aligns to many aspects of the WHO framework. Most notably that:

(i) Cancer centres are ideally placed to be system leaders for cancer

(ii) The importance of satisfactory design (meeting all hospital standards) and procurement that supports good patient experience, efficiency, productivity and minimises unnecessary movement

(iii) Location and access to services is important

(iv) Imaging and diagnostics are key as is the allied staffing

(v) Research and training are important factors in a modern cancer centre

2.38 The issue as to whether the nVCC should be co-located with an acute hospital facility has been subject to much discussion. This matter was considered in 2020 by the independent health think tank the Nuffield Trust, when, having considered evidence from a range of stakeholders, it advised that full co-location would *"not be an option for some considerable time"*[4]. It also stated that solutions to the immediate issues facing cancer services across south east Wales and at Velindre Cancer Centre were *"required now, rather than at an indeterminate point in the future"*[5].

[4] *Advice on the proposed model for non-surgical tertiary oncology services in South East Wales* (Nuffield Trust, December 2020), p.2

[5] *Ibid.* p.27

2.39 The Nuffield Trust concluded that with the implementation of its recommendations, the proposed model for tertiary non-surgical oncology services in south east Wales would *"offer a safe and high-quality service that provides a good patient experience"*[6]. The WHO framework clearly states the importance of framing future cancer services in a national context with an emphasis on providing accessible services that do not intensify inequalities.

2.40 Subsequent to adopting the Nuffield's advice, the Trust has worked jointly with its commissioners to publically agree to and to progress the recommendations. This has included working with Cardiff and Vale University Health Board (CAVUHB) to plan and deliver a range of services set out below:

(i) Haemato-oncology and solid tumour work: there is a clear recommendation in the Nuffield advice to develop an oncology footprint at UHW[7] to include complex early phase trials, working with the haemato-oncology specialists to deliver advanced therapies including CAR-T – chimeric antigen receptor T-cell – therapy, and caring for those with severe treatment related complications e.g., immuno-oncology toxicity. This is a specialist activity, most clearly defined as Complex Specialist Oncology and will support the complex care of patients from across south east Wales. It is an extension of the Acute Oncology Service which is delivered in all health boards.

(ii) The development of the Cardiff Cancer Research Hub (CCRH) which brings together research activity across Cardiff and Vale University Health Board (CAVUHB), Cardiff University and the Trust, already describes an approved Clinical Output Specification for research requirements. Recent productive conversations between CAVUHB and the Trust have focused on describing the clinical model to meet both the CCRH criteria, as well as the emerging wider service requirement for this Complex Specialist Oncology need, resulting in the submission of a of a Strategic Outline Case to Welsh Government.

[6] *Ibid.* p.3
[7] *Ibid* p28

(iii) The CAVUHB Bone Marrow Transplant (BMT) Business Case which has recently been approved by the CAVUHB (and formally support by the Trust) is critical in providing the opportunity to deliver the capital development required to implement the recommendations from the Nuffield advice.

2.41 In summary the Trust believes that by working in partnership with its commissioners as set out in the Nuffield advice, it will achieve a future model of cancer care this is safe and of high quality. The networked model of care described in this FBC along with strong system leadership and collaboration will provide many benefits for our patients, staff, and carers. The shift of care closer to home is strongly embedded in the Trust Clinical Operating model and supported by a range of Welsh Government Policies

Programme Enabling Strategies / Ambitions – relevant to nVCC Project

2.42 To support the delivery of the assured Clinical Operating Model there are a number of approved enabling strategies within the TCS Programme that link strongly to this FBC. These are:

(i) *TCS Equipment Strategy*

(ii) *Cognitive by Design* (Digital Strategy)

(iii) Environmental / Sustainability – Green Credentials

TCS Equipment Strategy

2.43 The Equipment Strategy agreed with Welsh Government has been updated since OBC, but primarily remains extant with the main principles as follows:

Table S7 – TCS Equipment Strategy Approach

Category	Approved Decision
Replacement Options	• Extend the operational life of some existing equipment assets where possible, avoiding replacing this equipment in the existing VCC and then having to transfer into nVCC. This reduces cost and loss of treatment capability. • Accept some accelerated depreciation where it is not economically viable to consider transferring to the nVCC • Replace all other items as new in nVCC.
Maintenance Options	• A range of maintenance options are proposed depending upon the category and type of equipment. Full details are outlined in the equipment strategy in **Appendix FBC/SC4**
Transfer Options	• Transfer major clinical equipment if economically viable. • For radiotherapy the current assumption is three linacs will be transferred from current VCC to new VCC. • For non-radiotherapy equipment the current assumption is no major equipment is planned to be transferred. However, the Trust has a process to undertake a two-stage equipment asset inventory to determine any item suitable items for transfer. • A programme has been developed for completion of this before order quantities are confirmed and in line with the procurement programme within the Project agreement,

2.44 The updated TCS Equipment Strategy reflecting this approach can be found at **Appendix FBC/SC4.**

Cognitive by Design (Digital Strategy)

2.45 At OBC stage the Trust had outlined its vision for future digital services in the strategy *Cognitive by Design*. This vision and Trust planning and capability in this area had been subject to an external assurance review carried out by a company called Channel 3 (C3) at OBC stage. The output of this review confirmed that *Cognitive by Design* remained aligned in terms of VUNHST's vision and alignment to National Digital Strategies.

2.46 Since the OBC submission, the Trust has been progressing significant developments in Information Management and Technology (Digital) systems. These have been a combination of national programmes, internationally used systems and bespoke local developments all of which have enabled an improvement in services for professionals, patients, and donors.

2.47 The Trust has prioritised the development of its Digital Strategy to support the identified organisational and clinical priorities and to ensure that next generation digital is used to transform service delivery.

2.48 At the heart of the informatics delivery are the four principles from the *Informed Health and Care: A Digital Health and Social Care Strategy for Wales* (2015). These are:

(i) Information for you (the patient)

(ii) Supporting Professionals (digital tools)

(iii) Improvement and Innovation (better use of information / whole systems approach)

(iv) A Planned Future (joint planning regional and national)

2.49 The Trust approach is also aligned to the wider and more recent *Digital Strategy for Wales* (2021) and the missions that deal with:

(i) **Digital services** – deliver and modernise services so that they are designed around user needs and are simple, secure, and convenient

(ii) **Digital inclusion** – equip people with the motivation, access, skills, and confidence to engage with an increasingly digital world, based on their needs

(iii) **Digital skills** – create a workforce that has the digital skills, capability, and confidence to excel in the workplace and in everyday life

(iv) **Data and collaboration** – services are improved by working together, with data and knowledge being used and shared

2.50 The Trust has produced an ambitious strategic informatics programme, *Digital Excellence,* which up to 2033 will implement a range of national technology solutions, while growing our capacity, capability, and culture to build innovative digital services.

2.51 Since OBC approval the Trust has used its assured digital vision, plans and expertise to inform, influence and optimise the competitive dialogue process to achieve a digitally enabled nVCC which can support the Trust, its staff, and patients in achieving digital excellence.

2.52 The outlined approach is based on the fundamental premise that high quality healthcare in the twenty first century cannot be delivered with out of date or obsolete legacy systems, and/or paper-based information recording and delivery.

2.53 By utilising Digital as a critical enabler to support service transformation, the Trust aims to fundamentally redesign administrative, operational, and clinical processes into simple services around patients, donors and staff needs. These new ways of working will maintain high levels of data quality, and not only ensure information is accurate and up to date, but also embed state of the art technologies to deliver exceptional services.

2.54 The enablement of, and connectivity of patients, and staff is critical to the success of the Digital strategy. To this end, the Trust is working with colleagues from across NHS Wales to ensure mobile computing requirements, patient engagement systems, as well as digital staff communication tools are at the forefront of the Digital Programme. We will continue to look to national programmes such as Digital Services for Patients and the Public (DSPP) to deliver the strategic framework for digitally transforming our services.

2.55 To ensure the Trust continues to provide the most effective informatics services, we will continue to explore further opportunities for standardisation of processes, rationalising systems and solutions, alignment of resources, where possible, and the sharing best practice both from across the divisions, and also externally, by incorporating the lessons from other Health Board/Sector experiences.

2.56 The updated Trust Digital Strategy *Digital Vision for the new Velindre Cancer Centre* can be found at **Appendix FBC/SC5**.

Embedding Sustainability

2.57 The Trust has developed a *Sustainability Strategy 2023 – 2033* and is aware of its legal obligations under the *Well-being of Future Generations Act 2015* (WFGA 2015). It also acknowledges the *Welsh Government Environment Act 2016* that mandates public sector organisations must be carbon neutral by 2030, four years after the planned go live of the nVCC.

2.58 The Trust factored into its procurement procedure the requirement for ACORN to deliver a design capable of supporting this future compliance with Welsh Government Policy and relevant Acts.

2.59 To enable this the bidders were given a Sustainability Brief which was mapped against the seven goals of the WFGA 2015 and their responses were evaluated as part of the final tender submissions, specific sections of brief are set out in Table S8 below:

Table S8 – nVCC Sustainability Brief

Goal	The Brief
A globally responsible Wales – A nation which, when doing anything to improve the economic, social, environmental, and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.	While Velindre is acting primarily to improve the health of the Welsh population the green section of the nVCC Design Brief takes account of the contribution this might make to global well-being, in particular global warming. The green section specifically asks for: - • Designs that minimise energy use and the environmental impact of building materials. • Design features which encourage active travel. The practical section calls for designs which will minimise maintenance and avoids where possible reliance on expensive mechanical equipment.

2.60 As a result, the ACORN design will deliver one of the most sustainable hospital developments with further opportunities available to meet the Welsh Government's legislative aspiration to be carbon neutral in the public sector by 2030.

2.61 The environmental benefits aligned to the Welsh Government's decarbonisation framework includes:

(i) Quantifiable benefits for reduced CO2 emissions and air quality tied to cleaner (renewable) energy use, lower operational energy per m2 and low carbon design

(ii) Biodiversity benefits arising from the design and management of the nVCC campus

(iii) Patient, staff, and public well-being benefits arising from access to the natural environment

2.62 ACORN have therefore approached the decarbonisation agenda by looking to design and deliver a building with healthy attributes, these are set out in the Table S9 below:

Table S9 – Approach to designing a healthy building

Attribute	Details	Benefits
Environmental control	No overheating, good IAQ No recirculation of exhaust air.	Contributes to health, well-being, productivity of staff and recovery times and patients.
Non-toxic materials	Timber,hemp, clay, interior finishes.	Contributes to health, well-being, productivity of staff and recovery times and patients.
Pleasant visual, aural and environment	Natural materials: timber, hemp, clay, interior finishes.	Contributes to health, well-being, productivity of staff and recovery times and patients.
Good connections with outside space	Access to gardens and outside activities.	Contributes to health, well-being, productivity of staff and recovery times and patients Provides access for community use.
Good parking	Easy parking	Less stress, less fuel use.

2.63 In January 2023 the Trust commissioned experts to look into the sustainability credentials of the nVCC. This work concluded that, at that time, the following sustainability performance was achieved:

(i) Heating Reduced by 73%

(ii) Total Energy Reduced by 44%

2.64 In moving to an all-electric solution the estimates made in January 2023 are set out in Table S10 below, which shows a 32% reduction in CO2 admissions.

Table S10 – Forecast reduction in carbon emissions

		Energy use kWh/year	CO2 emission factor kgCO2/kWh	CO2 emissions kg/year
Gas heating	Gas	1,675,040	0.33	1,658,290
	Electric	8,106,566	0.26	2,107,707
	Total emissions			**3,765,997**
All electric	Electric	9,781,606	0.26	2,543,218
	Total emissions			**2,543,218**

	Reduction in total emissions	**1,222,779**	**32%**

2.65 A second review was commissioned in autumn 2023 to assess the impact of the design - which had reached RIBA Stage 3 - on carbon emissions and on capital and revenue costs.

2.66 The review identified the key design features of the nVCC that go above and beyond the standard hospital construction (BREEAM Excellent rating) to move towards a net zero carbon hospital. These include:

(i) Photo voltaic panels

(ii) Hempblock and natural material choices (lime and clay renders)

(iii) Cross Laminated Timber (CLT) structure for the 'Y Lolfa'

(iv) Reversible air source heat pumps

(v) Landscaping

2.67 These features enable the scheme to target a BREEAM score of 87%, which will achieve an 'Outstanding' rating providing no credits are lost due to value engineering at RIBA Stage 4. This rating exceeds the BREEAM 'Excellent' required as standard for all new builds.

2.68 In terms of upfront embodied carbon, the design betters the NHS England (NHSE) Net Zero Building Standard. It also compares well when benchmarked against a range of other standards and guidance documents.

2.69 An all-electric heating system combined with passive design measures will reduce energy demand.

2.70 Full analysis against the operational energy and carbon requirements of the NHSE Net Zero Building Standard requires a Dynamic Simulation Model (DMS) to be run, to incorporate all the design data. However, without rerunning the DMS the nVCC project largely complies against the NHSE limits of 63.9 regulated kWh/m2/year and 129 unregulated kWh/m2/year, with the nVCC design achieving 132.48 kWh/m2/year net regulated energy and 106.64 kWh/m2/year unregulated energy use. This also compares well against other projects, for example the Alder Hey Children's Hospital that has a combined energy use of 580 kWh/m2/year.

2.71 Capital costs have been reduced by replacing ground source pumps with air source pumps which typically have a lower initial cost.

2.72 The review concludes that the design offers particularly good value for money and achieves compliance with many best practice documents, which whilst not net zero in themselves, enable a clear transition to achieving net zero emissions in line with Welsh Government and NHS Wales commitments. Further to this the review concluded that the projects targets and Net Zero targets were in line with similar schemes and in places surpassed them. The

review team confirm that they have never seen a greener RIBA Stage 3 healthcare scheme of this size and scale.

2.73 The full report can be found in Appendix FBC/SC6.

2.74 With reference to the Welsh Government's *Decarbonisation Delivery Plan 2021 – 2030,* the nVCC contributes as set out in the Table S11 below:

Table S11 – nVCC Alignment with Decarbonisation Delivery Plan 2021-2030

Strategic Plan	Contribution
NHS Wales will have reduced carbon emissions by 34% equivalent to 383,000 tCO2e as a minimum contribution to a net zero Welsh Public Sector	nVCC will contribute to this.
Every building will have undergone an energy-efficient upgrade – low carbon heating will be utilised and renewable energy will be generated on site	nVCC has been designed with modern low carbon technology, such as air pumps, high performance environment insultation and photovoltaic technology
Aim for all natural-gas combined heat and power plant to be decommissioned	nVCC has an all-Electric Solution which will be procured via Crown Commercial Services (which includes % renewable energy sources)
WAST will aim for new ambulances procured to be plug-in electric, or alternative low carbon fuelled	*Not Relevant to nVCC, but green travel plan to be implemented*
Large-scale renewable energy generation will be implemented by collaborating with public sector partners, landowners, developers, and local communities	*Not Applicable to nVCC*
Carbon sequestration land will have been developed and included within carbon accounting	*Not Applicable to nVCC given recent Welsh Government Direction*
A climate smart approach to modern healthcare will be incorporated into new developments	Lower energy next generation of equipment will provide reduced energy requirements along with better designed working space and primary adjacencies

Strategic Alignment: Summary

2.75 VUNHST's strategic approach and plans in support of the FBC for a nVCC are fully aligned with the Welsh Government's *Programme for Government 2021-26* and all related policies and strategies. Specifically, its commitment to prioritise cancer treatment and the need to address COVID-19 backlog and waiting times.

2.76 It is also fully integrated and aligned with the south east Wales regional cancer strategies.

2.77 The nVCC project, and its associated Project Spending Objectives, will support the delivery of national, regional, and local ambition by:

(i) **Providing effective, high quality and resilient healthcare** by creating a 21st century NHS that tackles health inequalities and focuses on prevention

(ii) **Building an economy based on the principles of fair work, sustainability and the industries and services of the future** by building an economy based on sustainable jobs. Specifically, by creating skilled jobs and apprenticeships

(iii) **Building a stronger, greener economy as we make maximum progress towards decarbonisation** by developing a modern and productive infrastructure which acts as an engine for inclusive and sustainable growth

(iv) **Embedding our response to the climate and nature emergency in everything we do by delivering a green transformation**. Specifically, through greater green energy

3 EXISTING ARRANGEMENTS

Introduction

3.1 The purpose of this section of the FBC is to provide an overview of the Trust and the existing arrangements at the current VCC**.**

3.2 The latter will describe the current arrangements for the delivery of services covered within the scope of the nVCC project; provide a description of the existing VCC estate and supporting infrastructure; and outline the existing land arrangements. Together, they will provide a baseline for identifying the business needs and for measuring future improvements.

Velindre University NHS Trust: an overview

3.3 The Trust has evolved since its establishment in 1994 and is operationally responsible for the management of the following two divisions:

(i) Velindre Cancer Centre; and

(ii) the Welsh Blood Service

3.4 The Trust is also responsible for hosting the following organisations on behalf of the Welsh Government (WG) and NHS Wales

(i) NHS Wales Shared Services Partnership (NWSSP)

(ii) Health Technology Wales (HTW)

Velindre Cancer Centre: existing arrangements

3.5 VCC was established in 1956 in Whitchurch on the north west edge of Cardiff. It is one of the ten largest regional oncology centres in the United Kingdom and the largest of the three cancer centres in Wales. VCC is responsible for the delivery of non-surgical tertiary oncology treatment to the catchment population of 1.53 million across south east Wales.

3.6 The service provision delivers Radiotherapy and Systemic Anti-Cancer Therapy (SACT), recovery, therapies, well-being and welfare, follow-up care, and specialist palliative care. Specialist teams provide care using a well-established multi-disciplinary team (MDT) model of service for oncology and palliative care, working closely with local partners, and ensuring services are offered in appropriate locations in line with best practice standards of care.

3.7 A considerable proportion of Outpatient and SACT activity is already delivered in University Health Board settings by VCC staff. All Radiotherapy activity is currently delivered centrally at the VCC. The new Radiotherapy Centre in Nevill Hall Hospital is expected to open in 2025.

3.8 The range of services delivered by Velindre Cancer Centre includes:

(i) Radiotherapy

(ii) Systemic Anti-Cancer Therapies (SACT)

(iii) Inpatients

(iv) Ambulatory Care

(v) Outpatient Services

(vi) Pharmacy

(vii) Specialist Radiology/Imaging

(viii) Nuclear Medicine

(ix) Specialist Palliative Care

(x) Acute Oncology Service (AOS)

(xi) Living with the impact of Cancer

(xii) Education and Learning

(xiii) Research, Development, and Innovation

3.9 The following patient services are delivered by the Trust in outreach settings across south east Wales:

(i) SACT Delivery

(ii) Outpatient appointments

(iii) Inpatient reviews; for patients receiving care and treatment in HB locations

(iv) Health Board MDTs

(v) Research and Education

3.10 The Trust also works in partnership with a wide range of partners to deliver high quality cancer care and undertake clinical research. Partners include:

(i) Voluntary sector

(ii) NHS Wales Trusts (Public Health Wales and Welsh Ambulance Service)

(iii) Third sector

(iv) Higher Education Institutions (HEIs)

(v) Industry/Commercial Partners

(vi) Social enterprises

(vii) Wales Cancer Network

(viii) Llais Cymru

3.11 The current VCC does not have the facilities, space or modern infrastructure required to meet future service standards and predicted activity.

Planning Cancer Services in south east Wales

3.12 The planning and delivery of cancer services in Wales is the responsibility of the seven University Health Boards as part of their statutory responsibility to meet the health needs of the populations they serve.

3.13 The University Health Boards are supported by the Welsh Health Specialist Services Committee (WHSSC) which commissions specialist cancer services on their behalf, such as Proton Beam Therapy or CAR-T therapy in certain specific circumstances.

3.14 The University Health Boards served primarily by VCC are:

(i) Aneurin Bevan University Health Board (ABUHB)

(ii) Cardiff and Vale University Health Board (CAVUHB)

(iii) Cwm Taf Morgannwg University Health Board (CTMUHB)

(iv) Powys Teaching Health Board (PTHB)

3.15 Additionally, VCC sees a proportion of patients from Swansea Bay and Hywel Dda University Health Boards, mainly for more specialist cancer treatments.

Regional Leadership and Collaboration of Cancer Services in south east Wales

3.16 In 2019, the four south east Wales University Health Boards listed above and the Trust in conjunction with other stakeholders including Public Health Wales and the Wales Cancer Network (WCN) established the Collaborative Cancer Leadership Group. The CCLG was established to oversee Collaborative Cancer programmes across the south east Wales region, providing leadership and coordination with a focus on benefit delivery for patients. Thus putting into practice the national policies, standards, and procedures for the benefit of patients. The CCLG operated at a regional level in support of the work of the Wales Cancer Network and other partner organisations.

3.17 The CCLG continued to operate collectively following the Nuffield advice in order to provide further focus in a post-pandemic context.

3.18 In early 2023, CAVUHB, CTMUHB, ABUHB and the Trust Chief Executives agreed to consider aligning the regional cancer planning agenda currently taking place via the CCLG with the wider regional planning arrangements delivered through the south east Wales Regional Delivery Board in order to further optimise regional collaboration.

3.19 Subsequently, the Chief Executives of the four University Health Boards agreed a proposal to reform the CCLG as the south east Wales Cancer Programme reporting into the south east Wales Regional Delivery Board alongside regional programmes for orthopaedics, ophthalmology, diagnostics, and stroke.

3.20 A single regional cancer programme board will be established to reinvigorate the strategic system leadership that the CCLG established. It will be chaired by the Chief Executive of ABUHB and have a dedicated clinical lead, programme manager and supporting administration.

3.21 It is envisaged that the regional cancer programme will develop through the same process adopted by the other regional programmes. This is likely to include a series of collaborative regional workshops to design, develop, articulate, and prioritise the future cancer programme (and an associated regional delivery plan). It is anticipated that these new arrangements will commence early in 2024, following a regional cancer programme workshop in January.

The Cancer Pathway

3.22 The delivery of cancer services across Wales is set out in a well-defined pathway of care which includes the five key stages outlined below in Table S12.

3.23 The approach is consistent with the National Optimal Pathways (NOPs) developed by the Wales Cancer Network through their multidisciplinary Cancer Site Groups. The NOPs set out what should happen according to professional guidance and standards for any patient in Wales presenting with a certain type of cancer through their cancer pathways.

3.24 The NOPs are available in Welsh Health Circular (2022) 021 and the National Cancer Pathway is set below.

Table S12 – The National Cancer Pathway Described

Cancer Prevention: Enhancing public awareness and education to make informed decisions about lifestyle choices that promote a healthy, cancer free population.
Cancer Diagnosis: Cancer can be identified through a National Screening Programme or where cancer symptoms are identified by the patient/health care professional. If cancer is suspected the patient is assessed by a multi-disciplinary team in the Health Board (often supported by Velindre Cancer Centre staff) and cancer may be diagnosed.
Treatment: The treatment options for every patient are discussed and considered by multi-disciplinary teams (MDTs). The treatment options include surgery, non-surgical treatment e.g., Radiotherapy or Systemic Anti-Cancer Therapy (SACT), a combination of these treatments and supportive care. Care often straddles organisational boundaries.
Recovery/Follow Up: Regular follow up appointments are important to monitor recovery, manage and reduce the aftereffects of treatment and to ensure any signs of cancer relapse/recurrence are identified at their earliest stage.
End of Life Care: Sadly, not all patients survive cancer – openness about the need to plan end of life care is essential. A focus on living and dying well, early identification of needs and access to fast, effective palliation are important to reduce distress for both the patient and their family.

Service Delivery Arrangements

3.25 The VCC delivers tertiary non-surgical cancer services to a catchment population of 1.53 million people[8] using a hub and spoke service model. Services are currently provided across south east Wales from:

(i) Velindre Cancer Centre: the hub of VUNHST's tertiary cancer services is a specialist treatment, training, research, and development centre for non-surgical oncology.

(ii) Outreach Centres: some services are delivered on an outreach basis within facilities such as District General Hospitals and from patients' own homes across the south east Wales region.

[8] Based on the 2018 census data

3.26 Patients are referred to VCC for treatment by the following routes:

(i) Referral by a GP to the relevant Health Board.

(ii) Following presentation as an emergency at an A&E department.

3.27 Prior to referral to VCC, all patients will have been investigated and diagnosed with a solid tumour. Some patients may have already undergone surgery. VCC's role is to deliver tertiary non-surgical cancer treatment until the patient can be referred back to their host University Health Board for ongoing treatment, management, and follow-up care (as required).

3.28 A table of the core services delivered by the Trust at VCC and the existing functional capacity of the centre to deliver these services (e.g., number of inpatient beds), is provided as Table S13 below.

Table S13 – Existing Functional Capacity

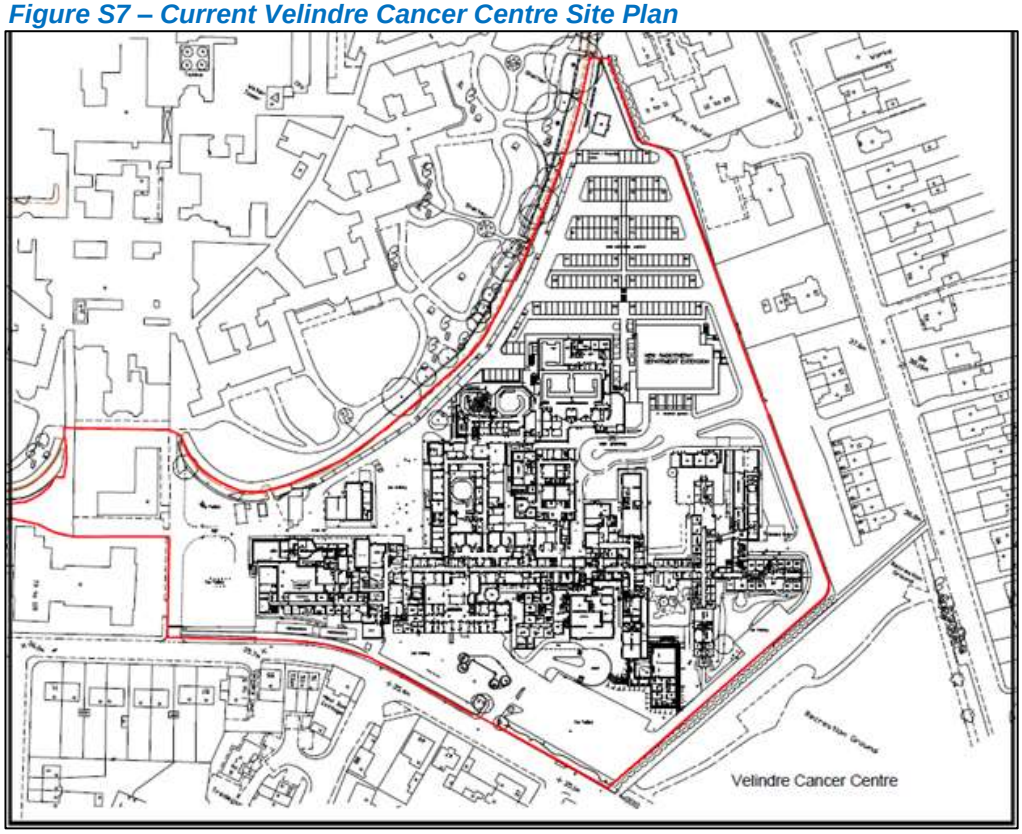
Service	Overview	Current Velindre Cancer Centre	Functional Content (February 2020 Pre-COVID)
Outpatients	Outpatient services include consultation, examination, follow-up, SACT assessment, phlebotomy, psychology, clinical trials, therapy services and specialist palliative care.	Outpatient clinics are held five days a week. Outpatient clinics are distributed across morning and afternoon sessions (2 clinical sessions a day).	Velindre Cancer Centre has 26 Outpatient consultation rooms.
Radiotherapy	Radiotherapy services include radical, palliative, and emergency RT Planning and treatment, brachytherapy, chemo-radiotherapy, and radiotherapy research.	The radiotherapy service provides core services for 9.5 hours per day, 5 days per week. The service provides an emergency service at weekends.	Velindre Cancer Centre has 8 Linear Accelerators (Linacs).
Systemic Anti-Cancer Therapies	SACT services cover a range of biological therapies and cytotoxic chemotherapies. SACT services include: ○ Intravenous, oral and subcutaneous treatments; ○ Research including early and late phase trials; and ○ Stratified, targeted, and personalised treatments and vaccine therapies.	The SACT service operates Monday to Friday between 08:00 – 18:00 hrs.	Velindre Cancer Centre has 19 SACT chairs across two units.

Service	Overview	Current Velindre Cancer Centre	Functional Content (February 2020 Pre-COVID)
Inpatients	Inpatient services cover elective and non-elective admissions including: ○ Elective SACT admissions; ○ Toxicity management of SACT; ○ Outpatients requiring hydration prior to treatment; and ○ Patients receiving Radiotherapy and SACT treatments.	The inpatient service operates a 7 day/24-hour service and is supported by an Acute Assessment Unit.	Velindre Cancer Centre has 49 beds, which includes 2 isolation beds, 49 in total.

Velindre Cancer Centre Infrastructure

3.29 Velindre Cancer Centre was built in 1956 and has been subject to multiple extensions and redevelopment. It consists of traditional build, single and two storey accommodation. The current site plan is provided below at Figure S7. It clearly demonstrates that there are no material opportunities on the site for notable expansion as the site development has been maximised through time.

Figure S7 – Current Velindre Cancer Centre Site Plan



3.30 The main building pre-dates 1964 in terms of its construction. This is evident in the value of current backlog maintenance recently recorded in all Wales Estate Facilities Performance Management System (EFPMS). The definition of condition in terms of backlog can be identified as:

(i) **Condition A:** as new and can be expected to perform adequately to its full normal life

(ii) **Condition B:** sound, operationally safe and exhibits only minor deterioration

(iii) **Condition C:** operational but major repair or replacement is currently needed to bring up to condition B

(iv) **Condition D:** operationally unsound and in imminent danger of breakdown

(v) **Condition X:** supplementary rating added to C or D to indicate that it is impossible to improve without replacement

3.31 Tables S14 & S15 below set out the backlog maintenance estimated as of April 2020 which was reconfirmed in 2023.

Table S14 – Backlog Maintenance Position (as of April 2020)

Measure	Value
Cost to eradicate High Risk Backlog	£85,013
Cost to eradicate Significant Risk Backlog	£1,623,329
Cost to eradicate Moderate Risk Backlog	£4,740,688
Cost to eradicate Low Risk Backlog	£2,496,082
Risk Adjusted Backlog Cost	£1,875,521
Cost to achieve Physical Condition B	£1,257,583
Cost to achieve Statutory Health and Safety Compliance Standard B	£113,121
Cost to achieve Fire Safety Compliance Standard B	£98,632
Total	**£12,289,969**

Table S15 – Backlog Maintenance Position – Percentage of patient occupied floor area (as of April 2020)

Measure	Value
Percentage of total occupied floor area in Physical Condition C plus D	35%
Percentage of patient occupied floor area not in Statutory Health and Safety compliance	5%
Percentage of patient occupied floor area not in Statutory Fire Safety compliance	5%

3.32 From the previous EFPMS submission, the cost of eradicating high risk and significant risk backlog has decreased. This is due, in the main, to the moderate capital investment associated with water infrastructure at the VCC crucial to maintain basic patient and staff safety.

3.33 Over 90% of the Estate fire safety is being managed within condition B, a very similar position as the previous year. Risk Adjusted Backlog has also shown a small decrease, since 2015/16. It must be stated that the overall condition

of the building is condition B. However, space availability and site restrictions prevent future investment from achieving spatial compliance or functional suitability without considerable investment and disruption to the existing facilities and surrounding community.

3.34 To achieve and maintain overall Physical Condition B investment has increased from £0.735m in 2012/13 to £1.3m in 2020-21. This represents a 77% increase over this timeframe.

3.35 Table S16 below provides an overview of the asset profile for the current VCC. This shows that there has been little modernisation in the existing infrastructure over recent years. This has led to a reduction in the quality of the patient environment and subsequently in the overall patient experience.

Table S16 – Overview of the Asset Profile

Age and Asset Profile	%
Age Profile – 2005 to present	14%
Age Profile – 1995 to 2004	18%
Age Profile – 1985 to 1994	22%
Age Profile – 1975 to 1984	6%
Age Profile – 1965 to 1974	12%
Age Profile – 1955 to 1964	29%
Age Profile – 1948 to 1954	0
Age Profile – pre-1948	0

Velindre Cancer Centre Footprint

3.36 The existing VCC has a footprint of just short of 18,000m2. A breakdown of the space is summarised in Table S17 below:

Table S17 – Existing Velindre Cancer Centre Footprint (February 2020 Pre-COVID)

Functional Area	m^2
Radiotherapy	5,126
Inpatients	1,879
SACT & Ambulatory Care	1,024
Outpatients & Therapies	1,280
Imaging and Nuclear Medicine	1,069
Pharmacy	637
Hospital Clinical / Non-Clinical Administration & Support Services	4,369
Hospital Education, Training and Associated Support Services	349
Digital	144
Specialist Registrar & On Call	12

Functional Area	m^2
Staff Facilities	299
Mortuary	47
Catering & Restaurant	377
Hospital Main Entrance	581
Central Facilities Management (FM) Areas	583
Total Gross	**17,777**

3.37 Analysis undertaken by the Trust identified that the footprint of the existing VCC would increase from 17,777m2 to circa 28,000m2 if it were to be built today on a 'like for like' basis to modern building standards. This analysis is explored further below in 4.1.

Existing Major Medical Equipment

3.38 The delivery of non-surgical cancer services is dependent upon having access to a range of major medical equipment – this is essential to support the safe and effective delivery of patient care. All major medical equipment which is currently operational at the VCC, and which has a unit value of over £0.125m (excl. VAT), is summarised in Table S18 below.

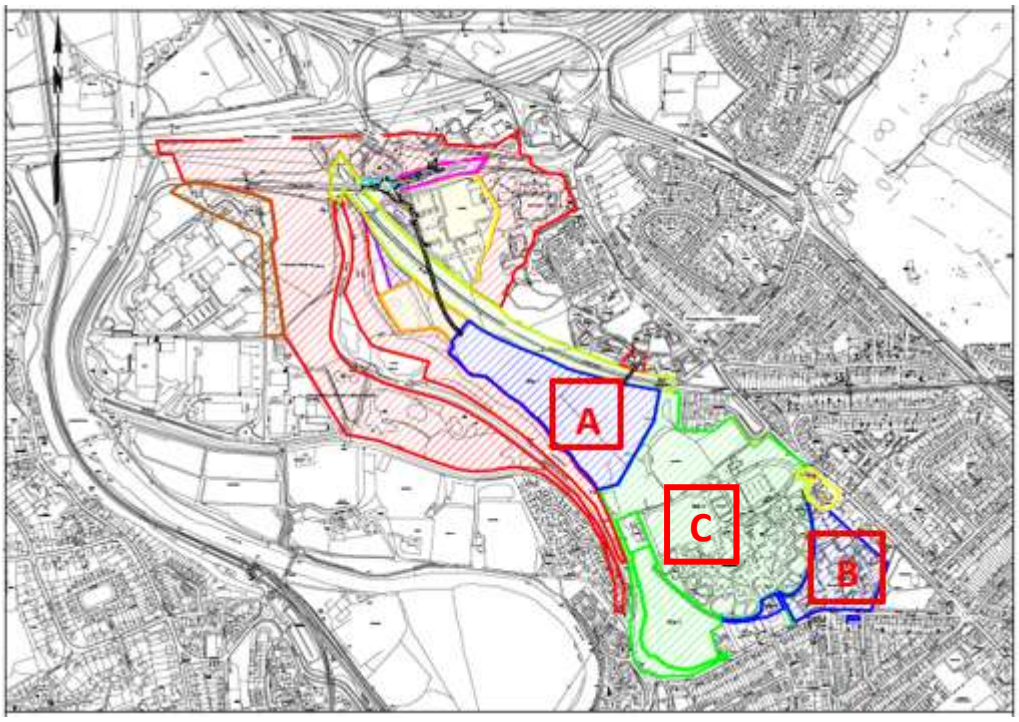
Table S18 – Summary of Major Medical Equipment – Existing Cancer Centre

Department	Equipment	Total
Radiotherapy	Linear Accelerators	8
Radiotherapy	CT Simulators	2
Radiotherapy	Brachytherapy System	1
Radiology	MRI Scanner	1
Radiology	CT Scanner	1
Radiology	Imaging Systems (Plain Film/Fluoroscopy System)	2
Nuclear Medicine	Gamma Camera	1

Existing Land Ownership

3.39 The *current* land ownership arrangements are set down below in Figure S8:

Figure S8 – Current Land Ownership Plan



Key:

A	Proposed nVCC site
B	Existing VCC
C	Old Whitchurch hospital site and land owned by CAVUHB (denoted in Green)

3.40 The land owned by the Trust are the blue A and B areas identified in Figure S8. They consist of the land previously transferred from Cardiff and Vale University Health Board (CAVUHB) in April 2021 (A), which is the development site for the nVCC, and land used by the current Velindre Cancer Centre (B).

3.41 In addition, the Trust currently has legal agreements in place with CAVUHB for a southern emergency access, habitat reprovision (linked to the EPSL licence) and ancillary access (including utilities) being provided to the nVCC site via the Whitchurch Hospital site.

The Trust Board has agreed an approach in principle to acquire the Whitchurch Hospital site and the south west corner currently owned by CAVUHB.

4 CASE FOR CHANGE

Introduction

4.1 This section of the FBC establishes the case for change for the development of a nVCC by:

(i) Providing a clear understanding of the business needs, that is, what is required to close the gap between existing arrangements and what is required in the future. A key aspect will be the 'rightsizing' of the nVCC by ensuring the new facility has adequate space and facilities to meet the forecast future demand and service model.

(ii) Outlining and reaffirming the Project Spending Objectives (PSOs) which provided a basis for appraising potential options and for post-project evaluation.

Project Spending Objectives

4.2 The following nVCC PSOs were developed in partnership at a stakeholder workshop, which was attended by representatives with a broad range of service views. In presenting the nVCC PSOs it is important to emphasise that:

(i) The scope of the FBC is limited to the replacement of the existing VCC with a nVCC.

(ii) The FBC for the nVCC will focus only on the additional infrastructure costs directly attributable to the nVCC. The rationale is, that variable workforce costs as a result of modelled demand is a cost pressure that will need to be addressed irrespective of the decision on the replacement of the VCC and can be taken forward with Commissioners as part of the Long-Term Agreement (LTA) commissioning framework.

4.3 Table S19 sets out the agreed PSOs that have been reaffirmed and revalidated as part of the development of this FBC.

Table S19 – Project Spending Objectives

Project Spending Objective	Description
Project Spending Objective 1	To build a new hospital that supports safe and quality services.
Project Spending Objective 2	To provide sufficient capacity to meet future demand for services.
Project Spending Objective 3	To improve patient, carer, and staff experience.
Project Spending Objective 4	To provide capacity and facilities to support the delivery of high-quality education, research, technology, and innovation.

4.4 The PSOs were approved by the nVCC Project Board who provided assurance to the Trust Board that they were:

(i) Aligned with the national context for healthcare developments in Wales

(ii) Aligned with the scope and strategic context of the nVCC Project

(iii) Specific, measurable, achievable relevant and time-constrained (SMART)

(iv) Focused on business needs and vital outcomes rather than potential solutions

4.5 The PSOs were subsequently shared and agreed with Welsh Government officers and factored into the OBC and this FBC.

Performance Metrics

4.6 To support the delivery of these objectives a number of key performance metrics have been developed and mapped against the five drivers for investment outlined within the Welsh Government's Business Case guidance. These are set out in Table S20.

Table S20 – nVCC FBC Project Spending Objectives - Key Performance

Project Spending Objective	Performance Metrics	Baseline Current known and reported	Baseline Achievable
PSO1 – To build a new hospital that supports quality and safe services	• Number of Velindre Acquired Healthcare Associated Infections	Yes	
	• Percentage compliance with HBNs		Yes
	• Compliance assessment against BREAM		Yes
	• Percentage assessment against WHTM Estate Code (Category A Condition of Buildings)		Yes
PSO2 – To provide sufficient capacity to meet future demand for services	• Percentage of patients receiving radical radiotherapy treated within 28 Days	Yes	
	• Percentage of patients receiving palliative radiotherapy treated within 14 Days	Yes	
	• Percentage of patients receiving emergency radiotherapy treated within 2 Days	Yes	
	• Percentage of non-emergency chemotherapy patients treated within 21 Days	Yes	
	• Percentage of urgent therapies outpatients seen within 2 Weeks		Yes
	• Percentage utilisation of equipment / accommodation: ○ Linear accelerator utilisation ○ SACT chair utilisation ○ Inpatient bed utilisation	Yes	
PSO3 – To improve patient, carer, and staff experience	• Percentage of patients rating their experience as excellent	Yes	
	• Distance (m2) between key clinical functions		Yes
	• Percentage staff satisfaction	Yes	
	• Percentage recruitment of workforce		Yes
	• Percentage retention of workforce		Yes

Project Spending Objective	Performance Metrics	Baseline Current known and reported	Baseline Achievable
PSO4 – To provide capacity and facilities to support the delivery of high-quality education, research, technology, and innovation	• Percentage of patients who can participate in clinical research trials at VCC		Yes
	• Percentage of VCC Site Specific Teams (SSTs) to include national or international leaders		Yes
	• Percentage of patients recruited into interventional clinical trials for each cancer site		Yes
	• Percentage of patients for each cancer site entered into clinical trials each year		Yes
	• Percentage of clinical trials sponsored by the Trust		Yes
	• Percentage of portfolio trials who have a VCC chief investigator		Yes

5 BUSINESS NEEDS

5.1 There are a range of business needs which this FBC seeks investment to address. These are set out below and tend to fall into two main areas. These are:

(i) The current VCC infrastructure deficiencies relating to an aging estate and its constraints on service delivery, future expansion, and backlog maintenance

(ii) The inability of the existing VCC to fulfil future anticipated activity increases and confirmation of the appropriate sizing of the nVCC

Infrastructure Deficiencies: Overview

5.2 Based on Patient Satisfaction Surveys, complaints and compliments, statutory inspections and feedback from our Commissioners, Velindre Cancer Centre is acknowledged as providing high quality, patient focussed cancer services through a compassionate and caring culture where staff consistently go the 'extra mile' to meet the needs of patients.

5.3 However, the current VCC infrastructure is making it increasingly difficult to maintain this high standard of care, particularly in relation to patient experience and staff safety and welfare, patient privacy and dignity. The following section of the FBC focuses on the deficiencies of the existing VCC and the key factors influencing the need to replace the existing VCC.

The Existing Patient Environment at the Velindre Cancer Centre is Sub-optimal and does not Promote Patient Recovery and Well-being

5.4 The physical environment at the VCC is not fit for purpose and is not appropriate for providing high quality, patient centre services.

5.5 The current estate has also been extensively developed over its lifecycle. This has been in an incremental fashion which has left the VCC with a number of 'add-on' buildings leading to deficiencies in circulation and service adjacencies, which are not consistent with current health care design standards and efficient means of patient care. For example, Figure S9 below illustrates the current poor adjacency between the current phlebotomy and outpatients department which ideally should be immediately adjacent to each other.

Figure S9 – Example of a Typical Inefficient and Inconvenient Patient Journey within the Outpatients Department at the Velindre Cancer Centre

5.6 In addition:

(i) There is no separation between patients, visitors, staff, and contractors. This means that there are multiple crossover spaces i.e., spaces that used by patients, visitors, staff and contractors in terms of the movement of people and goods. This can lead to a potential safety risk – especially evident during the pandemic – poor patient and visitor experience, and workforce inefficiency. A good example of this would be patients having Brachytherapy treatment whereby we have to close the main corridor during treatments to transport patients between theatre and radiology for their scans.

(ii) The adjacencies of services are inappropriately located resulting in poor service flow and workforce inefficiencies.

(iii) The locations of those services, which a patient may need to access, are sub-optimal. Patients are required to make multiple journeys to access such services e.g., to be weighed.

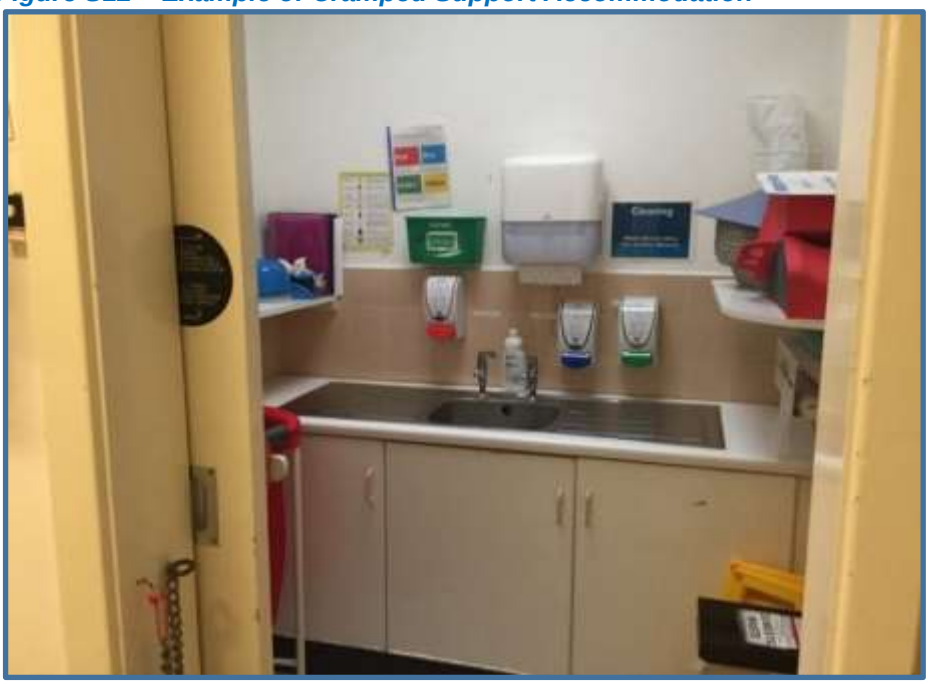
(iv) The main entrance to the Outpatient department is located immediately outside a doctor's consultation room.

5.7 Examples of the infrastructure deficiencies across the estate are provided from Figure S10 through to Figure S12 below.

Figure S10 – Example of Narrow Circulation Space

Figure S11 – Example of Crossover of Clinical and Non-Clinical Working Areas

Figure S12 – Example of Cramped Support Accommodation



A High Proportion of the Accommodation at the Existing Velindre Cancer Centre is Non-Compliant with Statutory Requirements

5.8 If the VCC is to maintain standards for the longer term, it will not only need its arteries of infrastructure to be upgraded and/or be replaced, but also the secondary, more localised infrastructure. There are many risks associated with these works, e.g., Asbestos management, complex phasing, decant and isolation issues will have a major impact on patient care and experience over a prolonged period of time. With limited space, decant facilities are not guaranteed and almost certainly not to be on the VCC site.

5.9 The performance in terms of functional suitability and space utilisation has generally been maintained at status quo over the last three years. However, this does not identify key areas of concern in relation to non-compliance against Health Building Notes (HBNs) which outline best practice guidance in the design and planning new healthcare buildings.

5.10 It is evidenced that approximately 75% of the existing estate does not comply with current space standards i.e., HBNs, Health Technical Notes (HTNs) and Building Regulations. For example, existing outpatient consultation rooms range from as low as 9m² compared to the 16m² outlined in guidance.

5.11 To demonstrate and evidence the high-level 'non-compliance' of the existing VCC, the Trust has undertaken two comparative sizing exercises. This involved comparing the current hospital footprint against the required footprint for a new hospital as if it was built in compliance with HBNs and current relevant standards. This analysis showed that the footprint of the existing VCC would increase from the current footprint of 17,777m2 to circa 28,000m2 if it was built today on a 'like for like' basis i.e., same functional content number of inpatient beds.

5.12 This analysis, which is summarised in Table S21 below, has been presented to, and validated by, NHS Wales Shared Services – Specialist Estates Services and WG Officers.

Table S21 – Comparison of the Existing Velindre Cancer Centre Footprint versus a New Build Velindre Cancer Centre on an Equivalent Basis

Functional Area	Current VCC (m2)	VCC built 'in line' with HBNs
Radiotherapy	5,126	8,046
Inpatients	1,879	3,183
SACT & Ambulatory Care	1,024	1,873
Outpatients & Therapies	1,280	1,720
Imaging and Nuclear Medicine	1,069	1,840
Pharmacy	637	1,106
Hospital Clinical / Non-Clinical Administration & Support Services	4,369	4,491
Hospital Education, Training, and associated Support Services	349	497
Digital	144	439
SPR & On Call	12	91
Staff Facilities	299	891
Mortuary	47	171
Catering & Restaurant	377	1,022
Hospital Main Entrance	581	1,380
Central FM Areas	583	1,360
Total Gross	**17,777**	**28,110**

External Site Constraints

5.13 Another major challenge for the VCC site relates to car parking. Table S22 below identifies the current allocation of parking 'on site'.

Table S22 – Parking Arrangements (as of February 2020)

Type of Parking Space	No of spaces
Visitor/patients spaces	165
Emergency vehicle parking spaces	4
Visitor Cycle parking	10
Staff parking spaces	176
Consultant parking spaces	25
Staff Cycle parking	25
Total	**405**

5.14 The Trust has undertaken and reported on a range of traffic and car parking analyses including a Transport Statement (September 2022) associated with the new Velindre Cancer Centre's Outline Planning permission **(see appendix FBC/SC7)**. All reports demonstrated a significant need for increased numbers of patient and staff car parking. This current shortfall is further compounded by the predicted increase in patients expected in future years.

5.15 The nVCC final design has in total 618 car parking spaces. This design was submitted as part of the reserved matters planning submission made to Cardiff City Council which was approved.

Summary – Infrastructure Deficiencies

5.16 In summary, the main physical challenges related to the patient environment include the following:

(i) 100% of the current inpatient accommodation is well below the required standard for modern healthcare.

(ii) There is very limited overnight accommodation available for families and visitors.

(iii) The majority of circulation routes are too narrow for the volume of traffic and patients and staff/families have to stand tight to the wall in the main

corridor if a trolley or wheelchair is passing, as there is insufficient room for two-way traffic. Adhering to social distancing requirements during the pandemic, which was imperative for the Trust's often immunocompromised patients' population, highlighted how deficient the current estate is in this respect.

(iv) Patients, staff, and services have to cover large distances due to the poor adjacencies that have resulted from piecemeal design and developments e.g., the pharmacy department at the furthest point away from the outpatient department.

(v) The main outpatient reception area is located in direct visual line with a vast number of consultant rooms leading to privacy issues during consultation/treatment.

(vi) The relatively short distances between patient waiting areas and clinical areas presents difficulties when communicating sensitive or confidential information as they are often within audible range of each other enabling conversation to be inadvertently overheard.

(vii) The hot and cold-water infrastructure across the estate is insufficient and there is no spare capacity to accommodate any increases in demand for services.

(viii) The current backup power generation resilience of the site is insufficient and only covers approximately 55% of the site, mainly clinical areas, but excluding the Linear Accelerator treatment machines meaning patients receiving radiotherapy would have their treatment disrupted and rescheduled.

(ix) The existing working environment often causes staff to make compromises as they deliver care. For example, using smaller hoists in patient rooms due to the limited space.

5.17 The facilities also present a range of challenges for patients and families:

(i) The facilities do not always provide patients with their basic and fundamental needs e.g., the showers on the first-floor ward are shared between patients.

(ii) Patient dignity is compromised due to the lack of space and privacy for inpatients. For example, there is little space between beds on the first floor. There is a similar picture for outpatients where the design of the consulting rooms does not allow for total privacy.

(iii) Most of the inpatient, outpatient and therapies environment is not synonymous with a cancer centre that supports well-being and healing.

(iv) There is insufficient car parking. This results in patients having long waits on occasions trying to find a space to park. This causes additional stress during what can already be a challenging time for patients and families and at worst can result in patients being late for their appointments.

Forecasting Future Activity, Actual Activity, and links to our Service Design

5.18 This section concentrates on the methodology used to determine the future forecasting of cancer activity and how this has informed the design of the nVCC and our Clinical Operating Model. The section will:

(i) Outline the methodology which has been applied for forecasting future activity and capacity requirements in relation to the nVCC

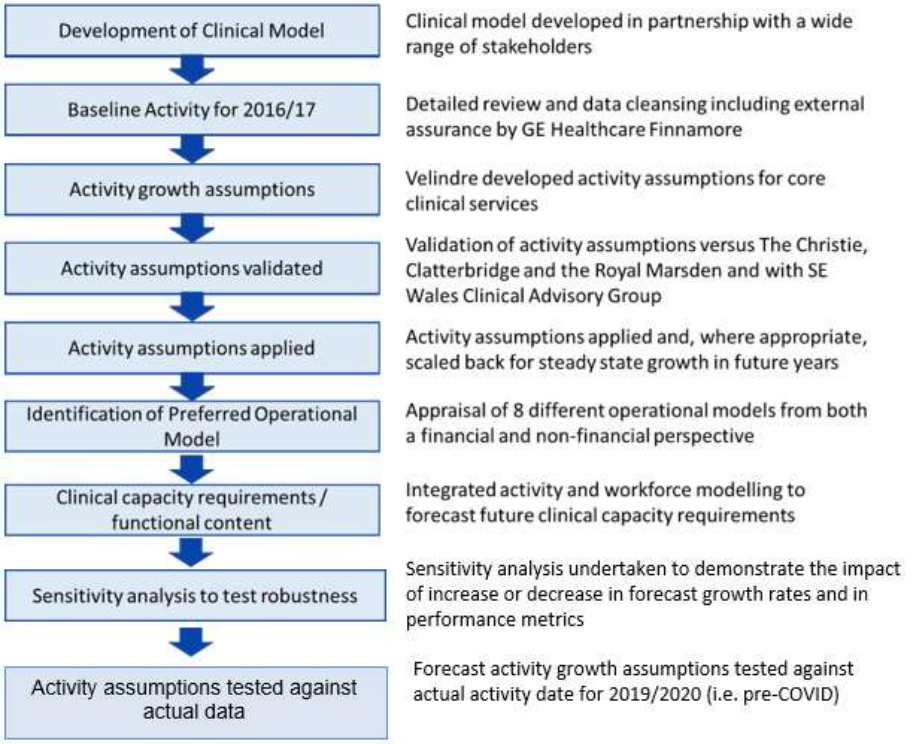
(ii) Summarise the forecast activity and capacity requirements for the new Velindre Cancer Centre

Forecasting Future Activity and Capacity Requirements

5.19 The Trust has developed a comprehensive Activity, Workforce and Financial model to forecast future capacity requirements for the nVCC.

5.20 A summary of the process followed in forecasting future activity and capacity requirements is shown in Figure S13 below. This methodology was approved by the nVCC OBC Collaborative Scrutiny Group and remains relevant for FBC purposes.

Figure S13 - Methodology for Forecasting Future Capacity Requirements



Note: *the final step shown above was completed subsequent to the approval of this methodology with the purpose of providing assurance that the capacity outputs detailed within the OBC are still valid and is set out in detail in this section.*

Activity Assumptions

5.21 The Trust developed a set of activity assumptions for its core services. These clinical growth assumptions were developed in partnership with clinical colleagues from across south east Wales and were informed by cancer incidence projections provided by the Welsh Cancer Intelligence and Surveillance Unit (WCISU) and Cancer Research Wales / UK.

5.22 The activity assumptions were set across two timeframes.

(i) The first timeframe was through to 2021/22 financial year where the Trust, and University Health Board colleagues, believed there was a fair degree of certainty in terms of forecasting future activity

(ii) The second timeframe was from 2022/23 – 2031/32 financial years where there was, at the time of developing the OBC, less certainty when forecasting future demand (e.g., stratified approach for SACT versus greater incidence of cancer) and the Trust therefore opted to revert to the forecast incidence of cancer (2%) as provided by WCISU in 2016/17

5.23 This 2% figure has been updated more recently by Cancer Research UK who state, “All cancers combined incidence rates are projected to rise by 2% in the UK between 2023-2025 and 2038-2040”. Therefore, for planning purposes the general 2% activity growth per financial year planning assumption remains valid, although there will be variations in incidence rates and the conversion of incidence into activity growth across specific cancers will also vary.

5.24 The clinical growth assumptions were supported by Health Board cancer clinical leads and were agreed by Health Board’s Officers as part of the nVCC OBC Collaborative Scrutiny process, they are set out in Table S23 below. These growth assumptions are subject to further analysis later on in this case where we test their robustness against actual growth in activity per service.

Table S23 – Clinical Growth Assumptions for Core Services

Service	Annual Clinical Growth Assumption (per financial year)
	2016/17 - 2022/23
▪ Radiotherapy	2%
▪ SACT	5%
▪ Inpatients	2%
▪ Outpatients and Ambulatory Care	2%

5.25 In addition, a detailed benchmarking exercise was undertaken to compare VUNHST's activity assumptions against the following cancer centres from across the UK:

(i) Beatson West of Scotland Cancer Centre

(ii) Clatterbridge Cancer Centre NHS Foundation Trust

(iii) Christie Cancer NHS Foundation Trust

(iv) Leeds Teaching Hospital NHS Trust

(v) The Royal Marsden NHS Foundation Trust

5.26 The outcome of the benchmarking exercise was that the Trust activity assumptions were in line with those from other cancer centres across the UK, where comparable data was available.

Clinical Operational Model

5.27 The Trust evaluated a number of different operational models which were subsequently approved by VUNHST's commissioners and as previously stated and have been subject to external assurance by the independent health think tank the Nuffield Trust.

5.28 The primary objective of VUNHST's appraisal was to identify a model that could provide sufficient levels of service capacity, respond to the needs of patients and families, and make effective and efficient use of resources.

5.29 The OBC for nVCC outlined eight different operating scenarios which were evaluated by a multidisciplinary group, including the current operational model. The different scenarios considered extended working hours as well as five-, six- and seven-day operational models. The outcome of the options appraisal informed the requirement for the nVCC and was tested during the competitive dialogue process, which has led to the final design.

5.30 The assessment undertaken was based upon:

(i) A non-financial assessment of options against the Project Spending Objectives and Critical Success Factors

(ii) A financial (capital and revenue) assessment of options.

5.31 The preferred operating scenario (Scenario 8) scored the highest based on a combined non-financial and financial score. This scenario included the following components for core patient services:

(i) Radiotherapy service - 5 days a week, 9.5 hours a day (7-day Radiotherapy service for category 1 emergency patients and for urgent palliative patients).

(ii) Outpatient service – 5 days a week, 2 sessions a day (8-6)

(iii) SACT service – 5 days a week, 12 hours a day

(iv) Inpatient service – 7 days a week, 24 hours a day.

5.32 Once the preferred operating scenario was agreed the Trust developed its Clinical Operating Model which has already been set out in the Section 3 of this Strategic Case.

5.33 In parallel the Trust undertook a detailed analysis to understand where treatments should be best delivered and what the percentage split should be, this is set out in Table S24:

Table S24 – Percentage Activity Delivered by Location

Service	VCC	Outreach	Home
Radiotherapy	80%	20%	0%
SACT	45%	45%	10%
Inpatients	100%	0%	0%
Outpatients	55%	35%	10%

5.34 This following section further explores the clinical growth assumptions by service area for, Radiotherapy, Systemic Anti-Cancer Therapies, Outpatients and Ambulatory Care and Inpatients. It also compares these with actual activity since the OBC was approved to ensure good alignment in terms of the forecasting of activity.

5.35 Due to the COVID-19 pandemic and the impact this had on capacity and demand figures the following information has been split into pre and post pandemic.

(i) Pre-pandemic figures (up to 2019/20) are shown to provide a comparison between VUNHST's planning assumptions and actual demand in a relatively stable planning environment

(ii) Post-pandemic figures aim to demonstrate how the planning assumptions and actual activity is starting to normalise after a period of significant disruption

Radiotherapy Service

Clinical Growth Assumption:

5.36 In line with the assumptions outlined in Table S23, the forecast clinical growth assumption for radiotherapy services was 2% from 2016/17 through to 2022/23. This was agreed and approved by all commissioning Health Boards as part of the nVCC OBC collaborative scrutiny process and set out in Table S25 below:

Table S25 – Radiotherapy Growth Assumptions

Service	OBC Annual Clinical Growth Assumption
	2016/17 - 2022/23
Radiotherapy	2%

Actual Radiotherapy Activity Versus 2% Growth Assumption (2019-20 comparison (pre-COVID)):

5.37 Pre-pandemic full year figures for 2019/20 demonstrate that actual radiotherapy activity, measured as fractions delivered, supports our original baseline planning assumption of a 2% increase in activity year-on-year with a variance of less than 1% over the three-year time period. This provides a high level of assurance that the physical capacity (number of linacs) planned within the nVCC is appropriate based upon actual activity recorded post the submission of the nVCC OBC, this figure does not consider the increasing complexity of Radiotherapy Treatments, such as online adaptive techniques[9], nor does it address the comparatively low access rates to radiotherapy.

5.38 There are several sources which refer to the disparity in radiotherapy access rates; including HERO study and the UK Parliamentary Inquiry *'Future cancer'* received evidence noting that the internationally accepted standard is that 53% of cancer patients should have access to radiotherapy, whereby, in the UK only 24 -27% of cancer in the UK Parliamentary Inquiry *'Future cancer'*, the Committee received evidence highlighting the disparity in radiotherapy access rates and noting that the internationally accepted standard is that 53% of cancer patients should have access to radiotherapy, whereby, in the UK only 24 -27% of cancer patients currently access radiotherapy[10]. The actual and forecasted radiotherapy figures are set out in Table S26 overleaf.

[9] For an illustration of online adaptive techniques see https://www.varian.com/products/adaptive-therapy/ethos (accessed 25.10.2023)

[10] Written evidence to *Future Cancer,* UK Parliamentary Inquiry, submitted by Radiotherapy UK and #CatchUpWithCancer campaign (FCR0050). https://committees.parliament.uk/work/7394/future-cancer/publications/written-evidence/?SearchTerm=FCR0050&DateFrom=&DateTo=&SessionId= (accessed 15.01.2024)

Table S26 – Forecast V Actual RT Activity

Service	Activity Measure	2016/17 (baseline)	Forecast 2019/20	Actual 2019/20	Difference (total / %)
Radiotherapy	Fractions	51,915	55,092	54,899	193 (≤1%)

5.39 The forecast and actual fractions set out in Table S26 generate a requirement of the following numbers of Linear Accelerators at the nVCC, this is set out in Table S27 below and these numbers are accommodated for in the nVCC design.

Table S27 – Linear Accelerator Requirement Based on Activity

Service	Description	2016/17 (baseline)	202/27 (nVCC)
Radiotherapy	Linacs	**8**	**8**

5.40 The implementation of the RSC at Nevill Hall will also provide 2 additional linear accelerators in the community i.e., 20% of total activity.

Actual Radiotherapy Activity (COVID) / Forecast Radiotherapy Activity (Post-COVID):

5.41 Table S28 below sets out actual radiotherapy activity post COVID-19 pandemic.

Table S28 – Post COVID-19 Activity

Service	Activity Measure	Actual 2019/20	Actual 2020/21	Actual 2021/22	Actual 2022/23	Current % increase in 2022/23 over 21/22 (ytd)	Forecast increase in 2023/24 over 22/23
Radiotherapy	Fractions	54,899	36,861	40,507	44,546	10%	6%

5.42 The COVID-19 pandemic, commencing in March 2020, caused a significant fall in radiotherapy activity due to a number of factors including:

(i) Reduced presentations to GPs

(ii) Reduced UHB referrals

(iii) Disruption to routine screening

(iv) Reduced capacity due to social distancing, increased infection control procedures and reduced workforce to deliver services

5.43 However, actual demand for radiotherapy has increased significantly since March 2021 (circa 10% year-on-year).

5.44 The introduction of Hypofractionation radiation therapy treatments in Breast, where the total dose of radiation is divided into large doses is also partially responsible for a reduction in fractions. It is worth noting that compared to standard radiotherapy, Hypofractionation is given over a shorter period but is more complex in terms of treatment and dosage. The treatment will be expanded into Prostate, and whereas a reduction in fractions is expected as a result, the 2% long term growth figure is expected to be maintained overall.

Radiotherapy Summary and Conclusion

Key Points:

- The 2% activity growth assumption, included within the nVCC OBC, has been reviewed at FBC and is supported by actual activity up to 2019/2020.
- Based upon forecast activity, tested against actual activity to 2019/20, there is an appropriate number of Linear Accelerator included within the nVCC FBC to meet service demand. This will ensure that the Trust has capacity to meet all relevant performance targets.
- The implementation of the Radiotherapy Satellite Centre (RSC) at Nevill Hall will also enable the achievement of the TCS planning assumption i.e., 80% of activity delivered at nVCC and 20% in the community.

Systematic Anti-Cancer Therapies (SACT)

Clinical Growth Assumption:

5.45 In line with the methodology, outlined in Table S23, the forecast clinical growth assumption for SACT services was 5% from 2016/17 through to 2022/23, noted in Table 29 below. This was agreed and approved by all commissioning University Health Boards as part of the nVCC OBC collaborative scrutiny process.

Table S29 – SACT Clinical Growth Assumption

Service	OBC Annual Clinical Growth Assumption
	2016/17 - 2022/23
SACT	5%

Actual SACT Activity Versus 5% Growth Assumption (2019/20 comparison (pre-COVID)):

5.46 Our most recent full-year 'pre-COVID' data (2019) demonstrates that actual SACT activity (attendances) delivered supports our original baseline planning assumption of a 5% increase in activity year-on-year with a variance of less than 1% over the three-year time period. This provides a high level of assurance that the physical capacity (number of SACT chairs) planned within the nVCC is appropriate based upon actual activity recorded post the submission of the nVCC OBC. The SACT attendances are set out in Table S30 below:

Table S30 – Actual SACT Activity v Growth Assumption

Service	Activity Measure	2016/17 (baseline)	Forecast 2019/20	Actual 2019/20	Difference (total / %)
SACT	Attendances	22,685	26,107	26,282	175 (≤1%)

Forecast Capacity Requirements at the New Velindre Cancer Centre

5.47 The forecast and actual activity set out in Table S30 above generates a requirement of the following numbers of SACT Chairs as set out in Table S31 below.

Table S31 – SACT Chair Requirements nVCC

Service	Description	2016/17 (baseline)	2021/22	2025/26 (nVCC)
SACT	Chairs	17	19	20

Note: *Implementation of the SACT Clinical Operating Model, as outlined in Table S23, will result in 55% of total activity being delivered across south east Wales.*

Actual SACT Activity (COVID) / Forecast SACT Activity (Post-COVID):

5.48 The COVID-19 pandemic, commencing in March 2020, caused a significant fall in activity for SACT due to a number of factors, including:

(i) Reduced presentations to GPs

(ii) Reduced UHB referrals

(iii) Disruption to routine screening, and

(iv) Reduced capacity due to social distancing, increased infection control procedures and reduced workforce to deliver services.

5.49 However, actual demand for SACT services has increased significantly since March 2021 and is expected to continue to climb over the next year(s), and, in line with our forecast growth assumption of 5% through to 2022 and 2% thereafter (Note – not flat line - ‘ups and downs’), as set out in Table S32.

Table S32 – SACT Activity

Service	Activity Measure	Actual 2019/20	Actual 2020/21	Actual 2021/22	Actual 2022/23	Forecast increase in 2023/24 over 22/23
SACT	Attendances	26,282	20,618	26,001	28,240	12%

Summary and Conclusion:

Key Points:

- The 5% activity growth assumption, included within the nVCC OBC, has been supported by actual activity up to 2019/2020.
- Based upon forecast activity, tested against actual activity though to 2019/20, there is an appropriate number of SACT chairs included within the nVCC FBC to meet service demand. This will ensure that the Trust has capacity to meet all relevant performance targets.
- The implementation of the SACT Clinical Service Model will result in 55% of total activity being delivered across south east Wales, either at home or in an outreach location

Outpatients and Ambulatory Care

Clinical Growth Assumption:

5.50 In line with the methodology outlined in Table S23, the forecast clinical growth assumption for Outpatient services was 2% from 2016/17 through to 2022/23. This was agreed and approved by all commissioning University Health Boards as part of the nVCC OBC collaborative scrutiny process and is set out in Table S33 below.

Table S33 – Outpatients Growth Assumption

Service	OBC Annual Clinical Growth Assumption
	2016/17 - 2022/23
Outpatients and Ambulatory Care	2%

Actual Outpatient Activity Versus 2% Growth Assumption (2019 comparison (pre-COVID)):

5.51 Our most recent full-year 'pre-COVID' data (2019) demonstrates that actual Outpatient activity (attendances) supports our original baseline planning assumption of a 2% increase in activity year-on-year with a variance of less than 1% over the three-year time period. This provides a high level of assurance that the physical capacity (number of Outpatient rooms) planned within the nVCC is appropriate based upon actual activity recorded post the submission of the nVCC OBC, set out in Table S34 below.

Table S34 – Outpatients Forecast v Actual

Service	Activity Measure	2016 (baseline)	Forecast 2019	Actual 2019	Difference (total / %)
Outpatient	Attendances	58,403	63,779	63,609	170 (≤1%)

Note: Excludes research, palliative care, clinical psychology, and radiotherapy review and planning activity.

Forecast Capacity Requirements at the New Velindre Cancer Centre

5.52 The forecast and actual activity set out in Table S34 above generates a requirement of the following numbers of Outpatient rooms as set out in Table S35 below.

Table S35 – Outpatients Room Requirements

Service	Description	2016/17 (baseline)	February 2020	2025/26
Outpatients	Rooms	26	26	30

Note: *Implementation of the Outpatient Clinical Operating Model, as outlined in Table S23, will result in 45% of total activity being delivered across south east Wales.*

Actual Outpatient Activity (COVID / post-COVID):

5.53 Unlike other services at VCC the COVID-19 pandemic, commencing in March 2020, resulted in a significant increase in activity for Outpatients due to a number of factors, including:

(i) Increased virtual clinics to support patients who couldn't attend VCC in person

(ii) Growth in SACT activity which impacted Outpatient capacity requirements

(iii) Reduced capacity within Health Boards

(iv) Increased number of MDT sessions

5.54 The post COVID-19 activity is set out in the Table S36 below.

Table S36 – Outpatient Activity Post COVID-19

Service	Activity Measure	2016 (baseline)	Actual 2020	Actual 2021	Actual 2022	Forecast increase in 2023
Outpatient	Attendances	58,403	66,583	84,097	86,713	10%

Note: Excludes research, palliative care, clinical psychology, and radiotherapy review and planning activity.

5.55 Despite the actual significant increase in demand for Outpatient services over the last three years, we are confident that the annualised (compounded) activity planning assumption used to size the nVCC is still robust and valid as a large proportion of additional Outpatient activity is / will be supported through digital solutions.

Summary and Conclusion:

Key Points:

- The 2% activity growth assumption, included within the nVCC OBC, has been supported by actual activity up to 2019/2020.
- Based upon forecast activity, tested against actual activity though to 2019/20, there is an appropriate number of Outpatient rooms included within the nVCC FBC to meet service demand. This will ensure that the Trust has capacity to meet all relevant performance targets.
- The implementation of the Outpatient Clinical Operating Model will result in 45% of total activity being delivered across south east Wales.

Inpatients

Clinical Growth Assumption:

5.56 In line with the methodology outlined in Table S23, the forecast clinical growth assumption for inpatient services was 2% from 2016/17 through to 2022/23. This was agreed and approved by all commissioning Health Boards as part of the nVCC OBC collaborative scrutiny process, this is set out in Table S37 below.

Table S37 – Future Growth Assumptions of Inpatients

Service	OBC Annual Clinical Growth Assumption 2016/17 – 2024/25
Inpatients	2%

Actual Inpatient Activity Versus 2% Growth Assumption (2019 comparison (pre-COVID)):

5.57 Our most recent full-year 'pre-COVID' data (2019) shows that inpatient activity, as measured by occupied bed days, actually reduced from 2016 (nVCC OBC submission) – 2019. However, this was not related to an evidenced reduction in demand for inpatient services at VCC. Instead, a capacity constraint was placed upon the service during this time period as there was a requirement to undertake essential estates works to the inpatient wards in order to improve the patient environment and to ensure compliance with our statutory responsibilities. In order to facilitate these works, there was a requirement to close beds / wards for sustained periods of time.

5.58 In addition, and during the same time period, we made significant enhancements to our inpatient service model which resulted in a shift towards an enhanced ambulatory / assessment care model; this reduced the number of inpatient admissions at VCC. Table S38 below sets out inpatient activity.

Table S38 – Inpatient Bed Activity

Service	Activity Measure	2016 (baseline)	Forecast 2019	Actual 2019
Inpatients	Oncology Beds Available	43	43	28 (Constraint capacity)

5.59 Over the course of 2020 – 2022 (COVID impacted timeframe) we continued to experience reduced inpatient activity at VCC. However, and although full-year data for 2023/24 is not available at the time of producing this FBC, data which we have available for September – November 2023 shows that total inpatient activity is returning in line with pre-COVID levels, this is set out in Table S39 below.

Forecast Capacity Requirements at the New Velindre Cancer Centre

Table S39 – Inpatient Bed Activity Post COVID-19

Service	Activity Measure	Current Capacity at VCC	February 2020 Capacity	2025/26 (nVCC) Capacity
Inpatients	Oncology Beds	34	39	31
	Assessment / Ambulatory Care Spaces	8	8	23
	Isotope Cubicles	2	2	3
	Total	**44**	**49**	**57**

Inpatient Services – An Evolving Service Model

5.60 In line with the recommendations from the Nuffield Trust report in relation to the Clinical Operating Model, there have been developments and enhancements to the inpatient clinical service over recent years and subsequent to the approval of the nVCC OBC. The majority of these improvements were already being progressed prior to the publication of the Nuffield advice.

5.61 Fundamental to these changes has been the transition to a better resourced ambulatory / assessment care model. Key to supporting this service development has been the implementation of a regional Acute Oncology Service.

5.62 Acute Oncology (AO) patients broadly fall into three groups: those whom a first presentation of cancer is suspected in an emergency setting; those with a known cancer who present as an emergency with complications of their treatment; and those with known cancer who present as an emergency with cancer progression or acute complications of co-morbidities.

5.63 AO ensures that cancer patients receive the care they need quickly and in the most appropriate setting. It brings a multitude of benefits to patients, clinicians and the wider system through improved communication, timely access to

expert advice, improved patient experience and cost savings through more appropriate use of investigations, early discharge, and admission avoidance.

5.64 Management of AO challenges the whole health and care system across south east Wales, from primary and community care to tertiary specialist service. However, the approval of the Business Case for a regional AO Service in 2021 is addressing this.

5.65 The development of the inpatient service model has, and will continue, to deliver a number of quantifiable benefits. These include:

(i) Reduced average length of stay at VCC and in University Health Boards

(ii) Reduced inpatient admissions at VCC and in University Health Boards

(iii) Patients admitted to the most appropriate location for their treatment 'first time'

(iv) Increased oncology presence within Health Boards

(v) Improved patient experience

5.66 The nVCC has an intentionally flexible inpatient design solution, which is built around patient experience, quality, and improving outcomes.

5.67 The design of the inpatient areas at the nVCC has responded to the feedback received from our clinical teams and other key stakeholders. This feedback emphasised the need for:

(i) Flexibility in the design covering a range of areas:

- Ability, on the day of opening the nVCC, to only open the number of beds which are required at that point in time to reduce the risk of any 'non-required' costs
- Ability to use the space for inpatients, Assessment unit and ambulatory care in a flexible manner, reflecting the varying demand on these facilities on different days
- Ability to continue, over time, the development of our inpatient service model by reducing the number of oncology beds and increasing the number of ambulatory / assessment spaces

(ii) The requirement for additional single oncology bedrooms as a proportion of total rooms

Key Points:

- Inpatient activity has been impacted by the following since 2019:
  - Essential estates work to the inpatient wards, requiring the closure of inpatient beds.
  - Workforce shortages due to a variety of reasons and which have been outside of the control of the Trust.
  - Impact of COVID from 2020 – 2022.
- In line with the recommendations of the Nuffield advice on the Clinical Operating Model there have been significant changes and enhancements to the inpatient clinical service. This has been supported by the transition to a more focused ambulatory / assessment care model. Key to supporting this service development has been the implementation of a regional Acute Oncology Service.
- The nVCC has space to accommodate fifty-four patients across inpatients, Assessment unit and ambulatory care and the hospital has been designed in a way to promote flexibility of use i.e., can increase / decrease the number of beds between these functions as appropriate and / or use for alternative uses e.g., increased ambulatory care provision.
- Inpatient beds will only be made available (opened) when demand presents.

Overall Summary and Conclusion of Growth and Activity Assumptions:

5.68 The clinical growth assumptions and actual activity have been overlaid against VUNHST's approved Clinical Operating Model that was assured by the Nuffield Trust. This approach supports the need to replace the existing cancer centre and as such has informed the sizing of the nVCC taking into account VUNHST's aspirations to treat patients closer to home where appropriate, as set out in Table S21. Growth assumptions have been revisited and activity / demand updated between OBC and FBC. Despite activity and service delivery changing as a result of the COVID-19 pandemic there is still a compelling case for investment that has been subject to scrutiny.

5.69 Based on the activity update, it remains clear that the existing estate is severely constrained and inhibits the Trust in delivering its services now. The site is landlocked by building and infrastructure owned by the Trust, which renders any expansion of the site boundary extremely challenging. The only possible option for expansion would be onto the staff and patient car park but this has been discounted, as it would impact on an already sub-optimal parking facility which would, most likely, impact on the local community.

5.70 This presents a very immediate and high-risk issue for the Trust given the current pressure on demand. It is compounded by the anticipated growth in demand for services in the near future. While planning is underway to mitigate capacity limitations in the short term, it is imperative that a long-term solution is established urgently.

5.71 Without significant transformation, VCC faces an immediate and high risk in our ability to continue to deliver services and to maintain current performance levels. This represents a significant risk to the south east Wales cancer system as VCC is the only provider of non-surgical tertiary oncology services in south east Wales.

Sizing of the nVCC

5.72 Following the activity and capacity modelling process outlined above, the Trust has been able to establish its core capacity requirements, referred to hereafter as the 'Do Minimum' requirements, in relation to:

(i) Building footprint requirement for the nVCC

(ii) Functional content requirements e.g., number of Inpatient beds, for the nVCC

(iii) Major Medical equipment requirements for the nVCC

Building Footprint for the New Velindre Cancer Centre – 'Do Minimum'

5.73 The activity and capacity analysis has demonstrated that the required building footprint for the nVCC, based upon the 'Do Minimum' service requirements, is 30,689m2 compared to the existing VCC footprint of 17,777m2. This analysis, which is summarised in Table S40 below, has been presented to, and validated by, NHS Wales Shared Services and accepted by Welsh Government Officers.

Table S40 – 'Do Minimum' Building Footprint for the New Velindre Cancer Centre

Functional Area	m2
Radiotherapy	8,090
Inpatients	3,534
SACT & Ambulatory Care	2,067
Outpatients & Therapies	2,034
Imaging & Nuclear Medicine	2,073
Pharmacy	1,518
Learning, Education, and Innovation	2,535
Administration and Non-clinical support	2,859
Digital	439
SPR & On Call	91
Staff Facilities	1041
Mortuary	171
Catering & Restaurant	1,022
Hospital Main Entrance	1,855
Central FM Areas	1,360
Total Gross	**30,689**

Functional Content Requirements for the New Velindre Cancer Centre – 'Do Minimum'

5.74 The activity and capacity analysis has demonstrated the following Functional Content requirements for core service delivery at the nVCC, based upon the 'Do Minimum' service requirements. Table S41 summarises these

requirements compared against functional capacity, which is currently available at the existing VCC (February 2020, pre-COVID).

Table S41 – Functional Content Requirements for Core Services within the New Velindre Cancer Centre

Department	Existing (Feb 2020 Pre-COVID)	nVCC	Variance
Radiotherapy Linear Accelerators	8	8	0
Outpatient Consultation Rooms	26	30	+ 4 rooms
SACT Chairs	19	20	+1 chair
Inpatients (including Isotope	49	57	+ 8 beds

Note: *Inpatient beds reflects capacity that is subject to the confirmation of the Clinical Operating Model but could represent 'flexible' bed capacity.*

Major Medical Equipment Requirements for the New Velindre Cancer Centre – 'Do Minimum'

5.75 The activity and capacity analysis has identified the major medical equipment requirements for the nVCC, based upon the 'Do Minimum' service requirements. The major medical equipment requirements for the nVCC, with a unit value of over £0.125m (excl. VAT), compared to major medical equipment, which is currently operational at the existing Velindre Cancer Centre (February 2019, pre-COVID) are summarised in Table S42.

T*able S42 – Major Medical Equipment Requirements for the New Velindre Cancer Centre*

Department	Equipment	Existing (2018)	nVCC	Additionality
Radiotherapy	Linear Accelerator / Treatment Machines	8	8	0
Radiotherapy	CT Simulator	2	2	0
Radiotherapy	Brachytherapy System	1	1	0
Radiotherapy	MR SIM	0	1	+1
Radiology	MRI Scanner	1	2	+1
Radiology	CT Scanner	1	2	+1
Radiology	Imaging System (Plain Film/Fluoroscopy System)	2	2	0
Nuclear Medicine	Gamma Camera	1	2	+1
Pharmacy	Robotic Dispensing System	0	1	+1

5.76 To inform the final design of the nVCC and the additionality of equipment required to meet demand (as set out in Table S42) the Trust utilised its Integrated Activity, Workforce and Financial Modelling (IAWFM) tool to ascertain future equipment need.

5.77 Based on feedback to date via the various rounds of scrutiny the Trust has regularly updated its equipment requirements to align with its demand predications and to take account of any planned changes to Clinical Practice

5.78 In particular, the Trust has provided more granular information relating to areas identified as additionality in Table S42, this relates to the proposed MRI and CT provision and is set out in Appendix FBC/SC8.

5.79 The nVCC equipment strategy is set out in **Appendix FBC/CC11**.

Conclusion

5.80 In summary, this section of the FBC examined in detail service activity from the original base line, through COVID, to today and then compared this with VUNHST's approved growth assumptions for all major service areas.

5.81 This analysis has demonstrated that VUNHST's forecast growth assumptions have been accurate to within very small margins of variance against actuals. Therefore, there is a high degree of confidence that the activity and future growth assumptions can be relied upon in terms of the design of the nVCC and wider Clinical Operating Model.

6 POTENTIAL SCOPE OF THE NEW VELINDRE CANCER CENTRE PROJECT

Introduction

6.1 The scope of the nVCC Project is limited to the building of a nVCC. In taking forward this scope, the Trust sought formal approval from commissioners and from the Welsh Government in relation to the Outline Business Case (OBC) for a nVCC. In seeking approval of the OBC, the Trust provided assurance in relation to:

(i) The need for a nVCC

(ii) The Preferred Option identified within the OBC

(iii) The building footprint of the nVCC

(iv) The additional costs directly attributable to the nVCC

(v) The Project Management and Governance arrangements for delivering the nVCC project

6.2 The following has been confirmed as outside of the scope of the nVCC Infrastructure Project:

(i) All variable clinical costs of modelled demand which will be considered through the development of the commissioning LTA framework and are therefore excluded from this FBC

(ii) All service development projects e.g., Acute Oncology Service, which will be subject to separate Business Cases and therefore excluded from this FBC

(iii) All future outreach capital Projects e.g., SACT facilities, will be subject to separate Business Cases and therefore excluded from this FBC. The FBC for Radiotherapy Satellite Centre has already been approved

(iv) All digital projects which the Trust needs to complete irrespective of the nVCC Project. These will be the subject of separate Business Cases

(v) Radiotherapy equipment has been procured via a separate procurement and Business Case – approved and being implemented

Potential Business Case Options

6.3 Although the scope of the nVCC Project is well defined, there was the potential to develop a range of options for delivering the objectives of the project. The range of options have been considered against a continuum of need ranging from:

(i) Minimum scope: core and essential service requirements/outcomes which are currently provided by VCC

(ii) Intermediate scope: core and desirable service requirements/outcomes which the project can potentially justify on a cost/benefit and thus value for money basis

(iii) Maximum scope: core, desirable and optional service requirements/outcomes which the project can potentially justify on a cost/benefit and thus value for money basis

6.4 The outcome of the formulation of project scope and allied options for this Business Case is outlined in Table S43 below and was used as the starting point to develop the longlist of options within the Economic Case of the OBC.

Table S43 – Potential Project Scope

Service / Function	Minimum	Intermediate	Maximum
Radiotherapy	✓	✓	✓
SACT	✓	✓	✓
Inpatients	✓	✓	✓
Specialist Palliative Care	✓	✓	✓
Outpatients	✓	✓	✓
Ambulatory Care	✓	✓	✓
Radiology and Nuclear Medicine	✓	✓	✓
Pharmacy	✓	✓	✓
Acute Oncology Service (Existing arrangements)	✓	✓	✓

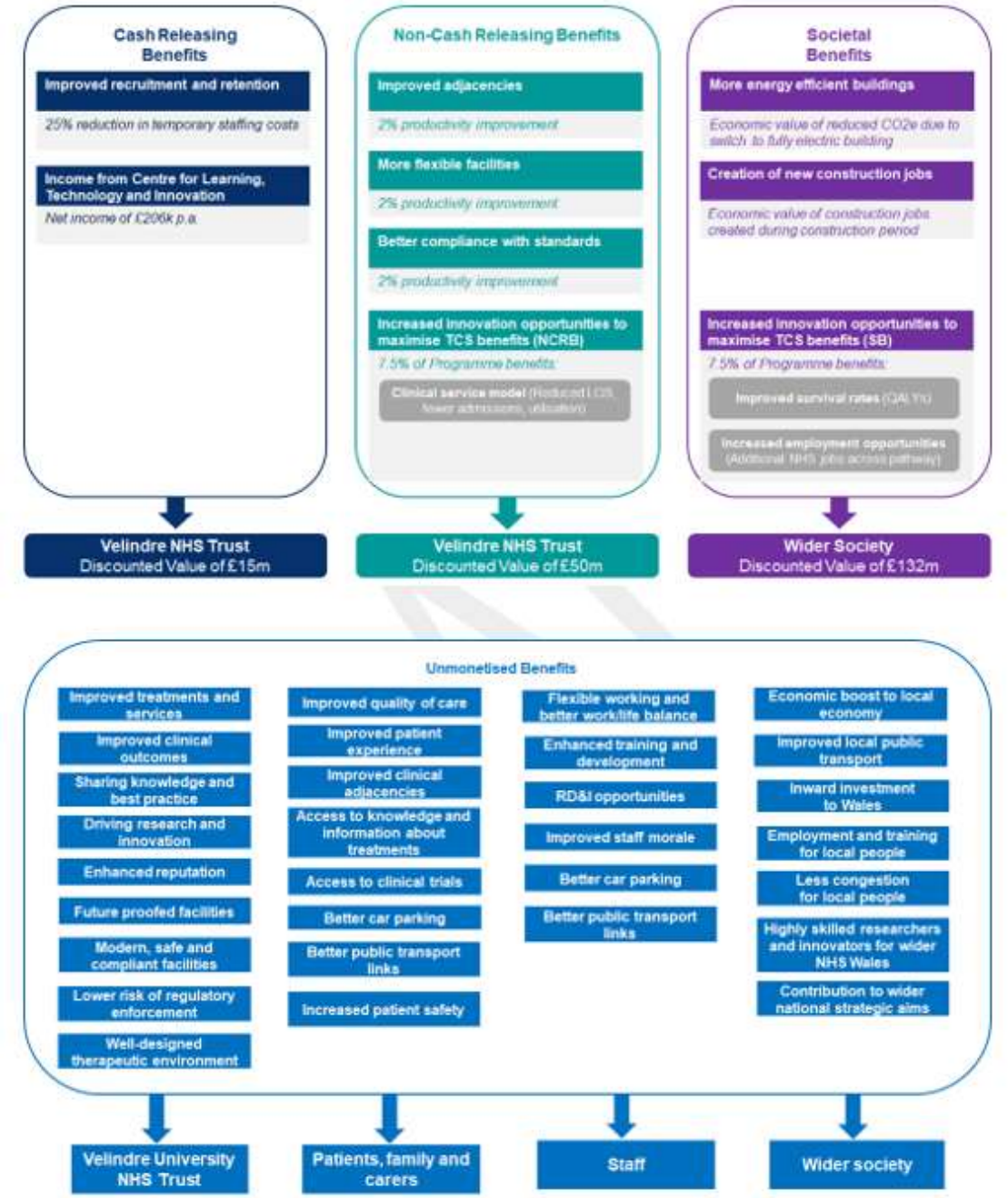
Service / Function	Minimum	Intermediate	Maximum
Research and Development (existing arrangements)	✓	✓	✓
Learning, Technology, and Innovation (existing arrangements)	✓	✓	✓
Research and Development (enhanced scope)		✓	✓
Learning, Education, and Innovation (enhanced scope)		✓	✓
Capacity to introduce PET CT Service		✓	✓
Capacity to introduce Proton Beam Service			✓
Capacity to introduce Advanced Technologies, including: • Platform specific stereotactic service • Cyclotron service			✓
Relocation of the Trust Corporate Function			✓

7 PROJECT BENEFITS, RISKS, CONSTRAINTS, DEPENDENCIES AND ASSUMPTIONS

Benefits

7.1 In addition to monetisable benefits, the nVCC project offers a broad range of non-financial benefits to patients and staff as well as contributing to the delivery of the overall TCS Programme benefits and delivering on both Trust and Welsh Government strategies. These are summarised in Figure S14.

Figure S14 – nVCC Project Benefits



7.2 Detailed analysis of the benefits is provided in the Economic Case.

Risks

7.3 Identifying, mitigating, and managing the key risks is crucial to successful delivery, since the key risks are likely to be that the nVCC Project will not deliver its intended outcomes and benefits within the anticipated timescales and spend.

7.4 A full risk register for the nVCC project has been developed which includes the following categories:

(i) **Business risks:** risks that remain 100% with the Trust and include political and reputational risks

(ii) **Service risks:** risks associated with the design, build, financing, and operational phases of the project and may be shared with other organisations; and

(iii) **External Non-System risks:** risks that affect all society and are not connected directly with the proposal. They are inherently unpredictable and random in nature

7.5 The nVCC risk register is managed by the Project Management Office (PMO). The exact role of the PMO in managing risks is described within the Management Case.

Constraints

7.6 The main constraints in relation to the nVCC project are outlined in Table S44.

Table S44 – Main Constraints of the nVCC Project

Constraint	Overview
Financial Constraints	The infrastructure solution for the nVCC must be ideally deliverable within the affordability thresholds (both capital and revenue) set by Welsh Government (including VAT but excluding equipment).
Timescale Constraints	The nVCC must be operational in line with the programme agreed with the Welsh Government.
Service Continuity	Delivery of patient services must be maintained during the period of construction at the nVCC site.

Constraint	Overview
Compliance with Statutory Requirements	The nVCC must be fully compliant with all relevant statutory compliance requirements.

Dependencies

7.7 A number of dependencies have been identified in relation to the nVCC project. These are provided in Table S45.

Table S45 - Main Dependencies of the nVCC Project

Dependency	Overview
Capital Funding Availability	Access and timing to capital funding is critical to deliver the Project, especially in relation to the procurement of Major Medical equipment and Digital.
Revenue Funding Availability	Access to revenue funding at an agreed level is essential to support the recurring revenue implications associated with the nVCC project and dual running costs
Compliant Project Agreement	The project must deliver a compliant Project Agreement with the correct Office for National Statistics classification
Welsh Government Approval	The Full Business Case must be approved by the Welsh Government.
Partnership Working	Co-production in the design and implementation of the project that involves all stakeholders from across the health and social care economy is essential to the project's success.
Programme interdependencies	Interdependency with the Velindre Futures Programme which is responsible for delivering the Integrated Radiotherapy Solution, which has an important interface with the nVCC Project.
Wider Health Strategy and Governance	It is important that general health strategy and governance in Wales, which underpins the nVCC project, remains broadly consistent over the period of change.
Site Enabling Works	The site enabling works project, which is outside of the scope of this FBC, must be completed sufficiently by the start of construction for the nVCC.

Assumptions

7.8 The key assumptions underpinning the nVCC Project are provided in Table S46.

Table S46 – Main Assumptions for the nVCC Project

Assumption	Overview
Implementation of the wider TCS programme	It is assumed that the following capital Projects identified within the TCS Programme that are part of the Trust Clinical Operating Model are funded and therefore the nVCC has been 'sized' on this basis. (i) Radiotherapy Satellite Centre at Nevill Hall Hospital (ii) Non-surgical cancer Outreach centres across south east Wales delivering SACT and Outpatient services (iii) Delivery of the equipment and digital project
Clinical Growth Assumptions	The nVCC has been 'sized' on the basis of a number of clinical growth assumptions, summarised below: (i) Radiotherapy activity will increase by 2% per annum through to 2025 (ii) SACT activity will increase by 5% per annum through to 2025 (iii) Outpatient activity will increase by 2% per annum through to 2025 (iv) Inpatient activity will increase by 2% per annum through to 2025 **(v)** Radiology and Nuclear Medicine activity will increase by 9% per annum through to 2025

8. CONCLUSION

8.1 The Strategic Case has demonstrated a compelling case for investment to support the replacement of the existing Velindre Cancer Centre.

8.2 The key factors supporting the case for investment are:

(i) The existing patient environment at the Velindre Cancer Centre is sub-optimal and does not promote patient recovery, and patient or carer well-being

(ii) A high proportion of accommodation at the existing Velindre Cancer Centre is non-compliant with statutory requirements and creates challenges in maintaining high levels of patient safety

(iii) The existing Velindre Cancer Centre, built on a 'like for like' basis and in line with Health Building Notes, would have a footprint of circa 28,000m2 compared to the existing building footprint of 17,777m2

(iv) There is extremely limited expansion space on the existing Velindre Cancer Centre. This prevents VUNHST's ability to expand its footprint to meet the increasing demand for its clinical services across a range of specialities / departments

(v) There is insufficient patient and family car parking at the existing Velindre Cancer Centre

(vi) And all the while growth assumptions suggest that cancer prevalence is increasing and demand for cancer services will grow

TABLES

For Information

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S2	TCS Programme Business Cases Status
S3	nVCC Full Business Case Timeline
S4	nVCC Full Business Case Structure and Content
S5	The Five Strategic Priorities and Aims of "Shaping our Future Together 2016 -2026" nVCC Full Business Case Structure and Content
S6	WHO Setting up a Cancer Centre Framework
S7	TCS Equipment Strategy Approach
S8	nVCC Sustainability Brief
S9	Approach to designing a healthy building
S10	Forecast reduction in carbon emissions
S11	nVCC Alignment with Decarbonisation Delivery Plan 2021-2030
S12	The National Cancer Pathway Described
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S31	SACT Chair Requirements nVCC
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GLOSSARY TABLES

For Information

Notation	Definition / Description
ABUHB	Aneurin Bevan University Health Board
ACORN	Referring to the Successful Participant
AO	Acute Oncology
AOS	Acute Oncology Service
BJC	Business Justification Case
BMT	Bone Marrow Transplant
C3	Channel 3 Consulting
CAP	Commercial Approval Point
CAR-T	Chimeric Antigen Receptor T-cell therapy
CAVUHB	Cardiff and Vale University Health Board
CCLG	[South East Wales] Collaborative Cancer Leadership Group
CCRH	Cardiff Cancer Research Hub
CLT	Cross Laminated Timber
CT Sim	Computerised Tomography Simulator
CTMUHB	Cwm Taf Morgannwg University Health Board
DMS	Dynamic Simulation Model
DSPP	Digital Services for Patients and the Public
EFPMS	[All Wales] Estate Facilities Performance Management System
FBC	Full Business Case
FC	Financial Close
HBNs	Health Building Notes
HEIs	Higher Education Institutions
HTNs	Health Technical Notes
HTW	Health Technology Wales
IAEA	International Atomic Energy Agency
IAWFM	Integrated Activity, Workforce and Financial Modelling
IMTP	Integrated Medium-Term Planning
IRS	Integrated Radiotherapy Solution
Linacs	Linear Accelerators
LTA	Long-Term Agreement
MDT	Multi-Disciplinary Team
NHS Wales Decarbonisation Strategic Delivery Plan	Also referred to as the *'sustainability agenda'*
NHSE	NHS England
NOPs	National Optimal Pathways
nVCC	new Velindre Cancer Centre

NWSSP	NHS Wales Shared Services Partnership
OBC	Outline Business Case
PBC	[Transforming Cancer Services] Programme Business Case
PMO	Project Management Office
PSOs	Project Spending Objectives
PTHB	Powys Teaching Health Board
RSC	Radiotherapy Satellite Centre
RT	Radiotherapy
SACT	Systemic Anti-Cancer Therapy
SMART	Specific, Measurable, Achievable, Relevant and Time-constrained
SSTs	Site Specific Teams
TCS	Transforming Cancer Services
UHB	University Health Board
UHW	University Hospital Wales
VCC	Velindre Cancer Centre
VFM	Value for Money
VUNHST or 'the Trust'	Velindre University NHS Trust
WCISU	Welsh Cancer Intelligence and Surveillance Unit
WCN	Wales Cancer Network
WFGA 2015	Well-being of Future Generations Act 2015
WG	Welsh Government
WHO	World Health Organisation
WHSSC	Welsh Health Specialist Services Committee

APPENDICES

For Information

The following appendices are set out in Table S48 in support of the Strategic Case**.**

Table S48 – List of Appendices

Appendix Reference	Title
FBC/SC1	Commissioner approval letters
FBC/SC2	Nuffield Trust Report – 'Advice on the proposed model for non-surgical tertiary oncology services in south east Wales'
FBC/SC3	Nuffield Trust Recommendations and Progress Summary* **Further updates are pending subject to Regional Cancer Programme workshop (Jan 2024)*
FBC/SC4	TCS Equipment Strategy
FBC/SC5	Digital Vision for the new Velindre Cancer Centre
FBC/SC6	nVCC – Carbon and Cost Assessment
FBC/SC7	Traffic Analysis (Car Parking)
FBC/SC8	Imaging Activity Modelling