

# Princess Alexandra Hospital Trust

## New Hospital Design Brief

June 2021 (v1.0)



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<b>1. Our Vision.....</b>	<b>5</b>
1.1 Over-arching vision for the new Hospital and its Services .....	5
1.2 Key Drivers .....	5
1.2.1 Clinical Efficiency .....	5
1.2.2 Modern.....	5
1.2.3 Environmentally Sustainable.....	6
1.2.4 Digitally Enabled .....	6
1.2.5 Focused on recovery .....	6
1.2.6 Usable and inclusive .....	6
1.2.7 Flexible and Adaptable.....	6
1.2.8 Holistic Care.....	6
1.3 Performance Objectives – New Hospital Programme (NHP) .....	7
1.4 Our Aspiration.....	8
<b>2. The Services we will deliver .....</b>	<b>10</b>
2.2 Our Models of Care.....	10
2.2.1 Urgent Care .....	10
2.2.2 Elective Care .....	11
2.2.3 Cancer & Diagnostics.....	13
2.2.4 Family & Women .....	15
2.2.5 Discharge .....	18
2.3 Our clinical space .....	19
2.4 Our Clinical Services.....	20
2.4.1 Emergency Dept .....	20
2.4.2 Emergency Assessment.....	20
2.4.3 Oncology.....	20
2.4.4 OPD (ENT/Maxillo Facial & Audiology).....	20
2.4.5 Surgery (incl Day) .....	21
2.4.6 Critical Care .....	21
2.4.7 Wards .....	21
2.4.8 Diagnostics .....	21
2.4.9 Diagnostic Imaging .....	22
2.4.10 Maternity Inpatients, Neonatal & Gambu/EPU (Early Pregnancy Unit) .....	22
2.4.11 Maternity Delivery.....	23

2.4.12 Paediatrics .....	23
2.4.13 Research & Training .....	23
2.4.14 Therapies .....	23
2.5 Support Services .....	24
2.5.1 Mortuary .....	24
2.5.2 Pharmacy .....	24
2.5.3 Sterile Services .....	24
2.5.4 Pathology .....	24
2.5.5 FM Services .....	25
<b>3. How we will use the Hospital .....</b>	<b>27</b>
3.1 Layout .....	27
3.2 Functional Relationships & Adjacencies .....	27
3.3 Schedule of Accommodation (SoA) .....	28
3.4 Patient, Visitor and Staff Wellbeing .....	28
3.5 Privacy & Dignity .....	32
3.6 Access and Accessibility .....	33
3.7 Arrival and Wayfinding .....	34
3.8 Parking .....	35
3.9 Flexibility and Potential Future Expansion (Planned & Unplanned) .....	35
3.10 Pandemic Planning .....	36
3.11 Security .....	37
3.12 Other Users/Health Campus/Community Use .....	38
<b>4. The Hospital and its context .....</b>	<b>40</b>
4.1 Scale and Proportion .....	40
4.2 Appearance and External Materials .....	40
4.3 The Proposed Site .....	41
4.4 Planning Issues .....	41
4.5 Site Constraints .....	44
4.6 Internal Spaces .....	47
4.7 Interior Design and Artwork .....	47
4.8 External Areas and Garden Town .....	48
<b>5. Building Standards and Requirements .....</b>	<b>51</b>
5.1 Building Performance .....	51

5.2 Mechanical Engineering Systems .....	53
5.3 Electrical Engineering Systems .....	54
5.4 Public Health Engineering Systems.....	55
5.5 Specialist Engineering Systems.....	55
5.6 Intelligent Building Management System .....	56
5.7 Sub-Metering .....	57
5.8 Fire Strategy .....	57
5.9 Sustainability.....	57
5.10 Net Zero Carbon (NZC).....	60
5.11 BREEAM Target.....	61
5.12 Modern Methods of Construction (MMC) .....	61
5.13 Building Components.....	62
5.14 Health & Safety.....	62
5.15 BIM.....	63
<b>6. Technology and Innovation .....</b>	<b>66</b>
6.1 The Digital Experience .....	66
6.2 Fabric .....	67
6.3 Footprint .....	70
6.4 Flow.....	72
6.5 Transformation .....	74
<b>Appendix 1 - Indicative Layouts</b>	
<b>Appendix 2 - Schedule of Accommodation (SOA)</b>	
<b>Appendix 3 - FM Requirements</b>	

**01**

# Our Vision

- Over-arching vision
- Key drivers
- Performance objectives (NHP)
- Our aspiration

## 1. Our Vision

### 1.1 Over-arching vision for the new Hospital and its Services

This is a once in a lifetime opportunity to transform the care we deliver to our local population. We are committed to delivering the best care to every patient, every day, through joined-up integrated care with our local health and care colleagues, which puts the patient at the heart, improving patient experience, outcomes and efficiency. At the same time, scientific, technological and clinical innovation is constantly pushing the frontiers of medicine and it is essential that we embrace these developments to deliver our vision and drive for health equality for all.

Streamlining and sharing information across all providers will lead to quicker diagnosis and faster access to services. We will deliver innovative responsive care in different settings (like patients' homes) that will challenge the traditional models of healthcare delivery. Population health management and risk stratification will result in less duplication, simpler services, speedier access and increased self-management and prevention; ensuring patients remain healthier for longer and out of hospital.

To do this we will modernise and transform our culture, our clinical and corporate services, with a focus on digital health and the development of an outstanding environment. We are committed to making PAHT a place that attracts the best and gives our people great career and development opportunities, is a model for diversity and inclusion and is the best place to work in the NHS.

To achieve this ambition the development of a hospital infrastructure and estate that enables the delivery of new care models that will sit at the heart of everything we do. That is why our plans for a new hospital are so ambitious and are central to our strategy.

### 1.2 Key Drivers

We know that our new hospital will help us deliver outstanding care but we want it to deliver so much more. That is why we have developed the following eight key pillars on which our design will be built:

#### 1.2.1 *Clinical Efficiency*

Although we have great ambition that our hospital will break the mould, at its core is a fully functioning clinical environment that takes the best the world has to offer and brings it together in a building that is clinically efficient, safe and a pleasure to work in. It will enable our clinicians and ancillary staff to deliver outstanding care, and managing patient flows seamlessly.

#### 1.2.2 *Modern*

We want a hospital that breaks the mould with non-clinical spaces that feel welcoming, spacious and bright. We will welcome views of nature in, allowing our patients and staff to benefit from a view of a tree, the rippling of the brook and the clouds in the sky. We won't have dark waiting spaces scattered though the building but will invite visitors to relax and linger, enjoying first class

facilities cleverly designed to be both affordable and beautiful. We want to learn from the best of public spaces from all sectors and not be constrained by what has come before.

### *1.2.3 Environmentally Sustainable*

We want a building that has minimal impact on the environment with a net zero carbon ambition at its heart. Using technology to manage power usage so every penny possible can be spent on healthcare. But it needs to be affordable. We will not skimp but we will be frugal. We will use clever design and challenge our clinicians to ensure spaces are multi use and in the most appropriate setting maximising our investment and minimising the cost.

### *1.2.4 Digitally Enabled*

We want to be the most digitally enabled hospital in the UK at the time of opening. This means our building needs to be smart and fully integrated with the care that is provided within but also connected to care that is delivered in patient's homes and communities. We will have a digital command and control centre that will help manage.

### *1.2.5 Focused on recovery*

We want our new hospital to be a place of wellness not illness. A place where we support the both the physical and emotional recovery of our patients and our staff. One thing that the recent pandemic has taught us is the importance of investing in the wellness of our people supporting them to be their best every single day.

### *1.2.6 Usable and inclusive*

We want a building that is easy to navigate, intuitive and simple, relaxing and calm even for those with challenging conditions or from different cultures and backgrounds. Respecting privacy and dignity will be a valued asset, patients are only seen by visitors at the bedside, the bustle of a working building hidden from view, allowing the calm, simple movement of our visitors.

### *1.2.7 Flexible and Adaptable*

We want a building that is fit for the future, ready to rise to any challenge the future throws at us. Adapting with ease to advances in healthcare, agile in the face of a future pandemic. We want a building to be proud of for many generations to come.

### *1.2.8 Holistic Care*

We want a building that embraces the whole patient journey, from lifestyle decisions through to end of life care. Helps mothers to care for their unborn children and carers receive the support they need. A hospital for everyone no matter where they are in their life journey.

### 1.3 Performance Objectives – New Hospital Programme (NHP)

As part of its inclusion within the NHP, the Trust has set a number of Core Performance Objectives which it aims to deliver as part of the project, many of which are directly impacted by the design of the New Hospital. A summary of the Core Performance Objectives that will need to be met by the design are summarised in the table below:

Core Performance Objective	Criteria
Programme Standardisation – Shell & Core Design Parameters	Standardised structural grid and approach to floor to floor heights – typology of medium / high tech spaces
Programme Standardisation – repeatable rooms and components	<p>80% of repeatable rooms on a project basis. Commitment for programme application of standardised components.</p> <p>80% room standardisation and primary assemblies (bathroom pods / bedhead</p> <p>walls / door sets / major FFE assemblies, integrated plumbing systems etc</p> <p>Rooms to be HBN/HTM compliant and where derogated, evidenced to show full functionality</p>
Delivering Modern Methods of Construction	<p>Presence of MMC strategy</p> <p>PMV – Premanufactured Value (measure of offsite) - minimum 65%</p> <p>RCD – Residual Cost Density (measure of efficiency) - minimum 55%</p> <p>Standardisation evidence of application within design from strategy</p> <p>MMC Maturity Assessment (measure of enablers)</p>
Patient Flows	<p>Complying with the draft HBN</p> <p>Matrix of clinical adjacencies</p>

	<p>Separation of Elective and Emergency</p> <p>All areas minimising cross flows of patients/staff/logistics</p> <p>Infection control processes in place</p> <p>Major patient pathways</p>
Net Zero Carbon	<p>Full application of Net Zero Technologies</p> <p>Project specific strategy that demonstrates compliance with national NHS targets.</p> <p>Complies with Intelligent Hospital Guide</p>
Digital	<p>Digital strategy aligned with physical infrastructure solutions</p>
Capacity & Modelling	<p>Project specific inclusions for Pandemic Resilience, Left Shift, Surge &amp; Peaks Standardisation of occupancy &amp; utilisation (85-90% + application of different working weeks / days)</p>
Patient Experience & Outcomes	<p>Minimum 71% single bedrooms</p> <p>Minimum one Isolation room per ward</p> <p>Minimum one Bariatric bedroom per ward</p> <p>All patient rooms with direct access to natural light</p>

### 1.4 Our Aspiration

**“This is a once in a lifetime opportunity and we are ready to build the future”**

# 02

## The Services we will Deliver

- Our Models of Care
- Our Clinical Space
- Our Clinical Services
- Support Services

## 2. The Services we will deliver

### 2.2 Our Models of Care

For our models of care we have five key areas of focus:

- ✓ Urgent care
- ✓ Elective care
- ✓ Cancer and diagnostics
- ✓ Family and women
- ✓ Discharge from hospital

Getting the models of care right is essential and will mean embracing best practice quality care and services for everyone we care for, throughout the entirety of their care. Critical to this is ensuring people get the right care at the right time, the first time.

A new hospital offers us the exceptional opportunity to develop plans to deliver care in new and innovative ways. In developing the models of care, we have identified six platforms that will enable us to take full advantage of the scientific and technological advances on the horizon along with the flexibility to adopt new advances and technology when they arise; these are:

- ✓ **Remote consultation** – for example virtual clinics to reduce unnecessary visits to hospital
- ✓ **Remote surveillance and monitoring** – for example taking physiological measures, such as heart rate, respiratory rate and pulse rate, at home and this data being used by the hospital to inform clinical decision making
- ✓ **Machine learning and artificial intelligence (AI)** – for example utilising data to inform care delivery, care planning, diagnosis and treatment development
- ✓ **Decisions aids** – for example providing expert clinical advice to all health and care staff via technology to support clinical decision making
- ✓ **Precision** – for example utilising public health data as a way to develop pre-emptive care and inform risk stratification
- ✓ **A conduit to a learning health system** – for example drawing together digital maturity, data flows and analytical capability as a means of continuous improvement and facilitating integration of new technologies

#### 2.2.1 Urgent Care

Urgent care serves thousands of people every year and will provide exemplary care for patients with urgent life-threatening conditions or who have been involved in a serious accidents. Patients with less urgent needs will be signposted to complementary parts of the system either provided by PAHT or an alternative healthcare provider as appropriate. PAHT will play its full part in limiting the need for urgent or emergency care through using its expertise to support those at risk of attendance by:

- ✓ guiding risk stratification, escalation thresholds and pathway refinement for those with long-term conditions
- ✓ intelligence gathering and analytics on attendees and contributory factors to inform ongoing efforts

Hospital based functions for urgent care will include:

- ✓ urgent and emergency care with single front door to accelerate the implementation of the urgent care model of care from the first encounter by the patient
- ✓ a single floor or village layout concept - to enable co-location of critical services adjacencies and urgent services to which patients may be directed. To create an environment that is familiar and easy to navigate
- ✓ access to diagnostics - provision of rapid diagnostics to respond to patient needs, support care plan and enable early discharge planning right from the front door
- ✓ co-location of critical settings of care such as emergency hot clinics with admission unit(s) or observation ward(s)
- ✓ Same Day Emergency Care (SDEC) facility

### 2.2.2 Elective Care

#### Outpatients

The provision of outpatient services will continue to transform and, as part of this, the new hospital will continue to provide expertise, technological capabilities and service adjacencies within the hospital that cannot be provided in other settings to ensure the best patient experience and outcomes in the most cost-effective manner.

Digital enablement will ensure integration with community services and provide real time data flows to support adaptability to meet changing demand, continuous quality improvement and the adoption of new technologies to enhance further the elective model of care.

In-hospital functions for outpatient will include:

- ✓ **separate adult and paediatric outpatient areas**; with consideration given to the space for adolescent services and transitional care
- ✓ **fracture clinic** located on the main site with a large proportion being dealt with remotely – for example through virtual clinics
- ✓ **flexible space** requirements to meet the needs of out-patient appointments, procedures and day case care supporting the concept of blended facilities and to provide flexibility/adaptability
- ✓ **supporting remote consultation** with the a combination of technologically enabled booths, and larger rooms for MDTs, multi-professional involvement, and conventional consulting rooms equipped to also accommodate inbound tertiary centre remote advice
- ✓ **Blended provision** with conventional consulting rooms and larger rooms able to accommodate interventional procedures and complement day case provision
- ✓ **Waiting areas** will be minimised near clinical areas and, where otherwise necessary, sited in non-clinical areas designed to promote health and wellbeing

## **Surgery**

Surgery teams will provide care that results in optimal outcomes, healthcare value, patient experience and length of stay and integration back into the community with minimised disruption and adverse health legacy. Adoption of early interventions and prevention for common conditions, rapid diagnosis and optimised interventions which are made through an active partnership with patients and their GP.

Hospital based functions for elective surgery will include:

### **Theatre provision**

A mixture of conventional theatres with new types of theatres such as hybrid configurations:

- ✓ Modular theatres, with the possibility of two operation rooms sharing one anaesthetic room
- ✓ Separate anaesthetic rooms will be necessary in some circumstances to support patient experience, for example children
- ✓ Modular theatres will be required for infected cases and if sited in a separate theatre zone would offer pandemic resilience
- ✓ There will be a growing need for hybrid theatres capable of accommodating increased use of robotics and complex imaging.
- ✓ The growth in imaging requirements and interventional radiological procedures will require optimised adjacency to radiology and the development of a multidisciplinary team approach to surgery incorporating radiological expertise
- ✓ The implications of real time pathology to guide surgical intervention will need to be accommodated, e.g. access to pathology services and the use of sophisticated digital imaging analytics to produce pathology insights in real time
- ✓ Although optimal use of estate is a key consideration it is acknowledged that theatre efficiency is heavily influenced by culture, workforce preparedness and supervisory arrangements

### **Virtual and augmented reality**

- ✓ We are designing the operating theatres of the future. Utilising technology such as augmented reality-assisted surgery (ARAS) to enhance the operative procedure
- ✓ Using virtual reality to visualise and analyse anatomical complexity
- ✓ Enabling less severe operations to be carried out remotely
- ✓ Is largely dependent on software therefore estate implications are limited
- ✓ Facilities capacity to run virtual operative rehearsals to enhance training and outcomes.

### **Recovery rooms and intensive monitoring capability**

- ✓ Using intensive physiological monitoring and analytics to inform clinicians of patient status
- ✓ Locating post-operative patients in a ward environment to facilitate holistic, collaborative, patient-centred post-operative care

**Supporting remote pre-admission assessment and initial GP diagnosis**

- ✓ Digitally enabling GPs to undertake initial diagnosis and streamlining referral process, while reducing hospital footfall in the elective domain via virtual pre-admission. To include decision aids and access to relevant point of care testing

**Flexible space**

- ✓ Flexible operating theatres will allow for the space to reconfigured to accommodate new technologies (eg robotics and enhanced imaging) or used for surge capacity

**Critical access**

- ✓ Structural interpretation to take account of the need for intraoperative imaging and real-time pathology as well as critical care interventions

*2.2.3 Cancer & Diagnostics*

The provision of cancer care and services will span multiple settings. The move towards a community model is central to this shift and will enable patients to access care locally and even allow therapeutic elements to be carried out at home. Rapid Diagnostic Centres will enable faster, more efficient diagnoses and facilitate the development of personalised care packages that will give patients a choice as to the type of care they receive. Critical to this, will be maximising clinical and technological advancements in treating and testing, such as genomic testing and immunotherapy and nuclear medicine.

Digital enablement will support integration with community provision and provide real time data flows to support adaptability to changing demand, continuous quality improvement and the rational adoption of new technologies to further enhance the model of care.

Hospital based functions to support cancer care will include:

**Genomics Hubs**

- ✓ Building in capacity for the future of genomic medicine that in cancer will aid risk prediction and selection of therapy. Links with regional Genomic Medicine Alliances that are in formation will be important.

**Onsite facilities for delivery of treatment**

- ✓ Centralised chemotherapy delivery unit on the new hospital site

**Surgery**

- ✓ Provision of surgery capacity and capability locally so patients can be treated as close to home as possible. Potentially this will be advanced in the future through remote specialist input and robotics

- ✓ Complex surgery to continue referral into London Alliance

### Cancer Care Hub

The development of a Cancer Care Hub to ensure that novel forms of cancer diagnosis and treatment are incorporated into practice. These modalities include: liquid biopsy, genomic profiling of primary and secondary sites, nuclear medicine, immunotherapy and interventional procedures.

It is anticipated that this would comprise of:

- ✓ **chemotherapy suite** for treatments that need to be delivered in hospital with rapid review function
- ✓ **immunotherapy suite** – in time, this may largely replace chemotherapy space if home/community delivery is optimised
- ✓ **space** - eg larger outpatient room(s) for tumour profiling, image directed biopsy and possibly tumour ablation
- ✓ **proximity** to nuclear medicine, and radiotherapy if local delivery agreed
- ✓ **sub-nerve centre room**, focal point for managing increasingly complex care and profound relationships with the tertiary centre and community
- ✓ **proximity** to the Rapid Diagnostic Centre.

### Diagnostics

The provision of radiology services will span multiple settings and will enable patients to receive the right care, in the right place at the right time as part of a care pathway that is integrated and personalised.

In the hospital, radiology services will be largely centralised to achieve optimal efficiency and productivity. In the community, Rapid Diagnostic Centres will enable faster, more efficient diagnoses and facilitate the development of personalised care packages that give patients a choice as to the type of care they receive.

Digital enablement will also enable integration with community provision and provide real time data flows to support adaptability to changing demand, continuous quality improvement and the rational adoption of new technologies to further enhance the model of care.

Hospital based functions for radiology will include:

- ✓ **Centralised radiology** department - involving all imaging modalities including nuclear medicine, co-located with critical settings such as outpatients, urgent care and theatres. Ready access to interventional radiology procedure rooms, space for reporting and multi-disciplinary team (MDT) conferences Control rooms will be clustered
- ✓ **Devolved imaging** where it supports care delivery - with an independent breast screening hub that tests for suspected cancer; appropriate use of artificial intelligence (AI) to interrogate imaging. Ultrasound scanning as part of maternity/women's health along with

- the potential earlier use of CT in the ED assessment process
- ✓ **Rapid Access Diagnostic Centre** - The development of a Rapid Diagnostic Unit that provides patients with direct access to diagnostic analysis in a centralised location away from the main site.
- ✓ Supporting a **streamlined diagnostic pathway** – with digitally enabled streamlining of appointments and attendance, minimising hand-offs and facilitating rapid reporting
- ✓ **Precision prognostication** and technologically enabled follow-up and surveillance – this will be a further demand on the analytic hub (nerve centre) with the hospital operating as an anchor institution

#### 2.2.4 Family & Women

##### Women's services

The provision of services for women and children will embrace a life course approach acknowledging the particular vulnerabilities at different life stages and the health-sustaining opportunities this approach represents. The enduring disadvantages that women face in terms of access to services that accommodate their needs and preferences will be redressed and the growing health needs of children and adolescents, including transitional care, met. In doing so we will optimise our contribution to the integrated care system (ICS) whilst ensuring the provision of the highest quality is confined to activity that is most appropriately conducted in in the community.

Hospital based functions for women's services will include:

- ✓ **Precision diagnosis** and (minimally invasive) treatment – it is likely there will be an increasing call on outpatient flexible accommodation for interventional procedures
- ✓ **Precision prognostication** and technologically enabled follow-up and surveillance, which will be a further demand on the Analytic Hub (nerve centre) with the hospital operating as an anchor institution
- ✓ Supporting **remote consultation and monitoring** - digitally enabled follow-up and surveillance that facilitates better diagnosis, prognostication and risk management
- ✓ **Flexible space** - that is easily adaptable to meet a number of functions; outpatient rooms that can accommodate interventional procedures, MDTs, shared meeting areas, family liaison and therapy and reablement

##### Maternity and neonatal care

The focus for maternity and neonatal services will be on developing excellence in obstetric, maternity and neonatal services by providing woman-centred, family friendly, personalised care which enables patient choice on the location and method of birth and provides continuity of care across acute, community and other services. Supporting women with the choices available to them prior to, during and after pregnancy is central to this philosophy and will be delivered by offering safe, effective and evidence based care for women and their families.

Hospital based functions for maternity and neonatal services will include:

#### **Provision of patient-centred safe care**

- ✓ Obstetrics-led labour ward for high risk deliveries
- ✓ Midwife-led unit for standard/low risk deliveries
- ✓ Co-located to support care escalation (where required)

#### **Provision of care away from the main acute hospital site**

- ✓ Longer-term ambition to develop a midwife led unit (MLU) away from main hospital site
- ✓ Increased use of family delivery sites for ante-natal and post-natal care to support multi-professional working across traditional organisation boundaries

#### **Transitional Care Unit**

- ✓ To enable mother and baby to receive care simultaneously and to reduce the effects of separation and improve neurological outcomes.
- ✓ Areas required for parents to stay with all unwell babies

#### **Supporting remote consultation and monitoring**

- Digitally enabled care and surveillance that facilitates better diagnosis, prognostication and risk management as well as patient engagement
- Recognition that face to face consultation still required in some circumstances e.g. safeguarding concerns

#### **Flexible space**

- ✓ Flexible space which is easily adaptable to meet a number of functions; MDTs, shared meeting areas, hot-desking, and family liaison

#### **Co-location of maternity and neonatal services on a single floor**

- ✓ Co-location of critical settings of care such as a post-natal ward located adjacent to neonatal critical care (particularly for transitional care) and other maternity centric facilities located on a single floor care

#### **Paediatric care**

Paediatric care will deliver a comprehensive, local service to children and young adults which meets their emergency and planned care needs and focuses on excellence. There will be a centred focus on integrating our services with GPs, statutory agencies and other providers of services in South Hertfordshire and West Essex.

Hospital functions for paediatric care will include:

#### **Planned care**

- ✓ Inpatient ward area
- ✓ Dedicated outpatient areas, including virtual consultations
- ✓ High Dependency Unit to be enhanced – currently limited by space and workforce
- ✓ Designing child and family spaces within the hospital setting

#### **Urgent care**

- ✓ Rapid Assessment Clinics co-located within paediatrics department
- ✓ Paediatric Assessment Unit (PAU) for short stay care with adjacencies with ED
- ✓ Safeguarding suite within paediatric unit
- ✓ Single front door for the emergency department as part of urgent care village but with separate children and young people waiting, assessment, resuscitation and observation areas
- ✓ Inpatient ward

#### **Transitional care**

- ✓ Teenager and young adult areas
- ✓ Creating a youth friendly model of care including youth friendly space, identification of vulnerable young people, peer support and self- management skills, including through the use of digital capability

#### **Supporting remote consultation**

- ✓ Physical space for activity – a combination of technologically enabled booths and larger rooms for MDTs, multi-professional involvement and conventional consulting rooms equipped to accommodate inbound tertiary centre remote advice

#### **Blended provision**

- ✓ Conventional consulting rooms and larger rooms able to accommodate interventional procedures and complement day case provision

#### **Co-location**

- ✓ Co-location of critical settings of care such as emergency hot clinics with admission unit(s) or observation ward(s) and High Dependency Unit (HDU)

#### **Parents and carers**

- ✓ Areas for parents and carers in outpatient and MDT spaces and remaining with children in certain inpatient circumstances

**Child friendly environments**

- ✓ Where pathways or services are part of the offer from other services eg urgent care and outpatients, provision of child and family friendly spaces in clinical areas

**Adolescent environments**

- ✓ Areas and spaces designed for the specific needs of adolescents and the sensitive placing of facilities for this group as they transition to young adulthood

**2.2.5 Discharge**

The new hospital will provide a patient-centred discharge process which exceeds traditional organisational boundaries to enable a seamless patient experience, both within and outside of the hospital.

Supported by a single, integrated workforce which works across the whole Integrated Care System (ICS) the model of care will seek to minimise time in the acute hospital setting leading to:

- ✓ better outcomes
- ✓ higher satisfaction
- ✓ reduced avoidable readmission rates
- ✓ safe minimisation of bed days for a specific episode of care

Hospital based functions for discharge will include:

**Multi-disciplinary spaces**

- ✓ The need for shared workspaces for PAHT and system colleagues
- ✓ Meeting spaces for both staff including MDT assessments but also patients and their families
- ✓ Areas to support health and social care assessments away from the patient bedside when discharge to assess is not possible

**Discharge spaces**

- ✓ A general agreement to avoid the need for discharge lounges should processes work effectively but with some discharge lounge space still required
- ✓ Space for day rooms on the wards to support patient's self-management and socialisation that could also act as discharge areas to prevent patient transfers from all around the hospital

**Therapy and reablement areas**

- ✓ Therapy spaces which support patients reablement and discharge from hospital
- ✓ Spaces designed to feel safe, reflective of a home environment and have a non-clinical feel.
- ✓ Readily accessible storage space in the hospital for equipment needed to support safe

- discharge
- ✓ Onsite facilities such as gym

### Supporting remote discharge support

- ✓ Digitally enabling secondary care to be involved in patient care and recovery beyond hospital setting. Supporting GPs and community care to manage patients away from the acute setting and support rehabilitation

### Flexible spaces

- ✓ Flexible spaces which are easily adaptable to meet a number of functions; MDTs, shared meeting areas, family liaison and therapy and reablement. Day rooms doubling as discharge areas

### Infrastructure

- ✓ Robust processes and logistics which support efficient and safe discharge, for example responsive transport, pharmacy (to take home drugs) and portering (including at weekends)

## 2.3 Our clinical space

The layout of services, their adjacencies to other services and how space is utilised is key to the delivery of care. To deliver this outcome the following is envisaged:

- ✓ **An urgent care village** in one single location, within close proximity to diagnostics (particularly imaging) and theatres for emergency surgery
- ✓ **Centralised outpatient department** with close proximity to both diagnostic facilities and day-case facilities; with some devolved outpatient spaces where needed, such as women and children's services
- ✓ **A centralised radiology** function to be located with critical, high-volume settings such as outpatients, urgent care and theatres (interventional and intra-operative imaging). Devolved imaging where it supports care delivery, such as maternity (ultrasound), emergency department (x-ray) and breast screening
- ✓ **Centralised women and children's services** covering women's health, maternity and neonatal care, paediatrics and teenage and young adult services. Proximity to urgent care village to support emergency care
- ✓ **Inpatient elective care** to be separated from urgent care village. Close proximity to theatres and day-case facilities
- ✓ **Centralisation of cancer services**, ideally away from other clinical areas to allow for treatment delivery in the event of a future pandemic but with separate external entrance/exit to protect immune suppressed patients

## 2.4 Our Clinical Services

This section of the Brief highlights the key requirements in relation to the Clinical Services that will be delivered within the new Hospital.

### 2.4.1 *Emergency Dept*

- ✓ Zoned into Majors, RAT, Resus, de-escalation space, minors
- ✓ Paediatric Assessment unit and Paediatric ED - Own entrance into both spaces
- ✓ Careful consideration of each co location to support patient flow
- ✓ 25 Majors rooms with central staff base
- ✓ 6 minor cubicles with central staff base
- ✓ Allocation of isolation rooms with lobby access and en suite x 2
- ✓ Reception with Triage rooms
- ✓ Clustered shared support areas: office, seminar room, MDT, Staff change, Staff rest
- ✓ Allocation of Head and Neck room and plaster room
- ✓ Decontamination room close to side external access
- ✓ Side access for ambulances into RAT and Resus
- ✓ Specific spaces for those attending with Mental Health crisis

### 2.4.2 *Emergency Assessment*

- ✓ Assessment space, mix of multi bed bays (x6) and Single bedrooms with en suite (x32)
- ✓ Minimum of 79 'chair' spaces
- ✓ Patient at Home room located on the unit
- ✓ Co-located with direct access into ED
- ✓ Consideration for an additional patient mobility assessment area (TBC)
- ✓ Clustered support areas: staff base, treatment room, assessment rooms, clinical measurements room,

### 2.4.3 *Oncology*

- ✓ Designated own entrance with waiting area and reception
- ✓ Quiet room and interview room
- ✓ Use of the courtyard for patients and staff
- ✓ Macmillan information hub including complementary therapy rooms
- ✓ Chair bays x 18
- ✓ Chemo treatment rooms x 6
- ✓ Chemotherapy bed for intrathecal procedures x 1
- ✓ Mix of Consult rooms/ exam rooms/ physical therapy x 12
- ✓ Clustered staff rest, seminar room, admin support space
- ✓ Current adjacency with Pathology

### 2.4.4 *OPD (ENT/Maxillo Facial & Audiology)*

- ✓ 4 x cluster including 1 butterfly cluster to support orthopaedics

- ✓ Consideration for multi specialty use of exam rooms
- ✓ Breast screening dedicated space with US
- ✓ Reporting rooms for Breast, ENT/Maxillo Facial & Audiology
- ✓ Virtual consultation rooms pods x 8 and virtual consult open plan x 1
- ✓ Plaster room
- ✓ Adjacencies with ADL suite and Research clinical rooms

#### 2.4.5 *Surgery (incl Day)*

- ✓ 12 Theatres including 1 Hybrid Theatres
- ✓ Layout as: 3 blocks of 4 Theatres - 2 AR's per block (1 x shared AR between 2 Theatres), 6 Anaesthetic rooms and 1 x block room
- ✓ Admissions area with 12 patient Cabins
- ✓ Recovery area: 17 bays and 1 bedroom
- ✓ Primary stores with 4 main storage rooms
- ✓ Consideration to patient flow with entrance and exit (red and green)
- ✓ 1 x holding space to support trolley flow
- ✓ Clustered support spaces (staff change, Admin support spaces: MDT/seminar, staff rest..)

#### 2.4.6 *Critical Care*

- ✓ Isolation rooms x 2
- ✓ Bays: 2 x 4 beds
- ✓ All with natural light
- ✓ Reception and wait area
- ✓ Interview rooms x 2
- ✓ Clustered support areas: admin, staff change, seminar, MDT
- ✓ POCT room

#### 2.4.7 *Wards*

- ✓ 28 beds per ward configured as: 20 side rooms and 2 x 4 bedded bays
- ✓ All rooms with natural lights, either external or courtyard
- ✓ Under review option of shared staff rest for IPC concerns
- ✓ Each ward with pantry, patient lounge
- ✓ 1 bariatric bedroom per ward
- ✓ 1 treatment room per ward
- ✓ 1 in patient gym between 2 wards
- ✓ Shared staff change between 2 wards

#### 2.4.8 *Diagnostics*

- ✓ Shared space for staff change, storage, admin support area, staff rest
- ✓ Cardiology - Day ward with 8 recovery bays and 3 en suite single rooms, Pantry
- ✓ Cardiology - cardiac investigations: mix of exam rooms (x5) and consult rooms (x 3), Reporting room,

- ✓ Exercise room
- ✓ Cardiac Cath lab including control room and bed/trolley bay
- ✓ Endoscopy: consideration for Male/ Female separation with single male and female exit, single entrance into the endoscopy suite, Procedure rooms x 6 , 1 x diagnostic procedure room (mixed sex),
- ✓ Breaking 'bad news' room located near exit, single sex recovery bays x 8 bays, single sex patient pods
- ✓ Endoscopy to be JAG compliant

#### 2.4.9 *Diagnostic Imaging*

- ✓ Link bridge to Emergency department (Adjacency to ED)
- ✓ Inpatient US
- ✓ OPD US
- ✓ MRI suite
- ✓ CT Scan suite
- ✓ Nuclear Medicine
- ✓ Interventional Radiology
- ✓ Clustered support areas (staff rest, seminar, reporting offices, registrar's office, admin support) with addition of cannulation rooms
- ✓ Consideration for Bariatric space

#### 2.4.10 *Maternity Inpatients, Neonatal & Gambu/EPU (Early Pregnancy Unit)*

- ✓ FAWS departments located over 3 floors: Lower ground, ground and 1 st floor (paeds)
- ✓ Allocated patient transfer lift for FAWS
- ✓ Careful consideration for all co- locations with patient flows well thought out
- ✓ Dedicated ambulance/ emergency access for Neonatal
- ✓ Neonatal inc HDU and NICU co located direct access for neonatal, wards, delivery Theatre
- ✓ Neonatal staff rest with access to courtyard
- ✓ Neonatal decontamination room
- ✓ Bereavement viewing room
- ✓ Doctors on call room in neonatal
- ✓ Option of a dedicated sensory garden for neonatal
- ✓ Gambu/EPU -Mix of trolley bays x 4 rooms with ensuite x 7 and recliner chairs for recovery
- ✓ Procedures rooms x 2
- ✓ Gambu consulting rooms x 4
- ✓ Communal change space
- ✓ In patients Maternity - 33 en suite rooms and 2 x 4 beds bays
- ✓ Access to courtyard garden
- ✓ Sitting room
- ✓ Milk rooms
- ✓ Treatment room
- ✓ Assisted bathroom

#### 2.4.11 *Maternity Delivery*

- ✓ ANC located at ground level next to the main entrance / Front of house areas
- ✓ Includes Triage, MAFU /MLU with birthing pool rooms x 3
- ✓ Theatres x 2 inc High dependency Bay x 4 beds
- ✓ Birthing rooms / delivery x 11 inc a twin delivery room and pool room
- ✓ Induction bays x 4

#### 2.4.12 *Paediatrics*

- ✓ Located on 1st floor
- ✓ Include in Paeds in patients and Paeds OPD
- ✓ In patient space includes external balcony from recreation room with Play room into courtyard for patient use
- ✓ Mix of en-suite single rooms x 22 and 1 x 4 bed bay
- ✓ Isolation room with lobby access x 1
- ✓ Snoezelen room included in design
- ✓ Quiet room, sitting room for patients and parents
- ✓ Shared staff rest with Paeds OPD
- ✓ Assisted bath facility x 2
- ✓ Milk express room
- ✓ Paeds OPD - mix of consult rooms x 10 including one larger room for services to share such as Diabetes and Safeguarding
- ✓ Treatment room
- ✓ Admin space for use by staff not located in the Admin Block
- ✓ Virtual consult rooms x 3, virtual MDT room x 1
- ✓ Emergency Paeds and Paeds Assessment located in ED space

#### 2.4.13 *Research & Training*

- ✓ Non Clinical Areas with Research rooms for patient facing clinical duties located in OPD
- ✓ Ground floor - clinical skills rooms, manual handling, simulation room
- ✓ Library with work stations, lecture room, meeting/ classrooms - consideration given to flexibility to re-assign room to use as necessary (partitioned, out of hours use)

#### 2.4.14 *Therapies*

- ✓ Therapy Gym located in OPA
- ✓ Inpatient Gym located between two Wards
- ✓ ADL Suite located in OPA adjacent to Therapy Gym

## 2.5 Support Services

There are a wide range of support services that will be accommodated within the new Hospital. The key requirements for each function are noted below:

### 2.5.1 *Mortuary*

- ✓ External access for undertakers
- ✓ Focus on discretion and privacy
- ✓ Body store capacity: 150
- ✓ 4 tables post mortem examination room
- ✓ Viewing room
- ✓ Space for medical examiners

### 2.5.2 *Pharmacy*

- ✓ Current adjacency - Mortuary
- ✓ Located central to the dedicated FM service corridor which runs between the FM delivery point and external compound
- ✓ Aseptic unit/ main assembly
- ✓ Dispensary for OPD and inpatient
- ✓ 2 x dispensing robots
- ✓ Fluid room
- ✓ Bulk store
- ✓ Staff change

### 2.5.3 *Sterile Services*

- ✓ SSD - Located in lower ground with access route from FM
- ✓ SSD incorporates scope washers facility for the site
- ✓ 'Clean trays' room located in Theatres

### 2.5.4 *Pathology*

- ✓ Chemical Pathology, Cellular pathology, Microbiology, Haematology, Histopathology, Blood Services
- ✓ 21 reporting rooms
- ✓ Maximised natural light to all reporting rooms
- ✓ External hazardous chemical store
- ✓ Reception and processing incl blood grouping, Histopathology, central mixed lab area and shared support

### 2.5.5 FM Services

The Trust has engaged Mott McDonald as its FM Advisor. Part of their brief has been to develop an FM strategy for the new Hospital together with producing the construction requirements for core FM services including Catering, Linen, Waste Management, Domestic Services, Estates & Maintenance and Supply Chain support. **Appendix 3** provides the latest iteration of the construction requirements however it is noted that these requirements may change as the FM Strategy evolves. As such this information is to be treated as 'work in progress' and not the final design requirement.

Infection prevention and control and the highest standards of cleaning are central to the delivery of high quality patient care and the overall management of the building. A tailored infection control and cleaning strategy will be established to provide a baseline of requirements across the building. This requires an extensive list of requirements, including:

- ✓ Automated cleaning/air locks for hand wash basins that are also anti-splash
- ✓ High quality plumbing systems, using pipework which is guaranteed to last and not degrade, that will prevent legionella and are also able to cope with waste generated
- ✓ Sanitiser and soap dispensers with the facility to capture data such as frequency of use and a display to indicate when it is running low
- ✓ Mixer taps with elbow controls in preference to electronic sensor taps
- ✓ RFID-type systems to assist with monitoring hand washing frequency
- ✓ All surfaces to be fully smooth and cleanable with antibacterial surfaces, screens, curtains
- ✓ Communal bays, will have built-in (floor to ceiling) partitions to section off areas and be opened and closed depending on need
- ✓ Adequate storage space in all clinical areas, including cleaning cupboards with hand wash facilities within them
- ✓ Digital screens around the hospital will continue to promote infection control standards to our patients, visitors and people. Digital screens will also be provided on each side room or bay to indicate the isolation precautions required
- ✓ Automated doors which open as you approach for all entrances and exits and clinical areas
- ✓ Doors to have alcohol-gel filled handles
- ✓ Ante-rooms will be included outside side rooms for specific areas such as the intensive therapy unit (ITU), high dependency unit (HDU), emergency department (ED), respiratory and other appropriate wards
- ✓ Negative pressure side rooms will be provided in key areas such as ED, ITU, HDU and respiratory wards for patients with airborne infections
- ✓ Built in UV and HPV to facilitate rapid decontamination of side rooms
- ✓ Appropriate ventilation to maximise comfort but also aid reduction of particles in the air

# 03

## How we will use the Hospital

- Layout
- Functional Relationships & Adjacencies
- Schedule of Accommodation (SoA)
- Patient, Visitor and Staff Wellbeing
- Privacy & Dignity
- Access and Accessibility
- Arrival and Wayfinding
- Parking
- Flexibility and Potential Future Expansion (Planned & Unplanned)
- Pandemic Planning
- Security
- Other Users/Health Campus/Community Use

### 3. How we will use the Hospital

#### 3.1 Layout

The Trust has already made significant progress towards its desired layout for the new Hospital and a full 1:500 layout has been developed. This is provided at **Appendix 1**. It is emphasised that this layout is not the definitive solution however but is the output from the Design Team engaged to support the OBC together with significant input and dialogue with the Trust. As such it represents a 'point-in-time' and a basis for further development.

Each department has been developed from the SoA and respective clinical adjacencies and followed a series of formal User group Meetings and intermediate informal meetings to ensure the incorporation of best practice/compliance. Each layout was continuously tested for HTM/HBN guidance and best practice in addition to any specific department guidance JAG accreditation etc.

Innovation was at the heart of the development of the layouts, continuing to draw upon the department and clinical leads experience, relevant exemplar Healthcare schemes and the design Teams experience. The layouts were clinically lead while appreciating the requirement to meet the overall building concept and Modern Methods of Construction aspiration for regular grids and setting out of spaces. Key requirements include centralised waiting areas and ensuring that clinical areas can be accessed directly.

The design of each department, in particular the Wards, was lead by the use of repeatable rooms and standard components to match the national programme for repeatable design to allow a consistent approach and budget savings. The entrance and non-department spaces were designed to maximise the landscaped aspect and natural light to create welcoming and calming spaces to transverse between the clinical departments. The central entrance space is designed to create an welcoming environment and feel to create a meeting, waiting and dwell space away from the clinical demands of the Acute departments.

The communication and wayfinding of the entrance and primary movement is planned to be simple and efficient leading the patients, visitors and staff around the departments with minimal stress and logical movement to the desired destination. All FM/Estates, Patient transfer and Visitors movement is separated as much as possible creating simple navigation and movement for visitors, while patients and FM are transferred around the building discretely.

#### 3.2 Functional Relationships & Adjacencies

The key clinical adjacencies that must underpin the design of the future new Hospital building are:

- ✓ Diagnostic Imaging – Children's and Adults Radiology to be co-located to achieve maximum efficiencies
- ✓ Critical Care – located directly to Theatres
- ✓ Neo Natal Intensive Care unit to be directly adjacent to Delivery Suite and Children's Operating Theatre Department

- ✓ Children's Assessment and Treatment Unit and Adults Multi Speciality Assessment Areas to be located adjacent to Emergency Department
- ✓ Out Patients Dept located directly adjacent to Main Entrance to enable ease of access
- ✓ Emergency Department to be accessible from the new main entrance
- ✓ Discreet access for private ambulances to mortuary
- ✓ Midwife Assessment Unit to be adjacent to MLU

### 3.3 Schedule of Accommodation (SoA)

The original SoA was developed by Archus and based on Acute Healthcare Modelling and involved close engagement with the existing Trust Departments leads. A number of iterations based on the original SoA have been developed and a summary of the most recent SoA is provided at **Appendix 2** (the Layouts noted above are based on the current iteration of this SoA)

The SoA was based on innovation, including but not limited to

- ✓ reduced Outpatient spaces with more virtual appointments
- ✓ open plan administration spaces for shared use outside of the clinical footprint
- ✓ digital booking and wayfinding etc.

The current 'as drawn' SoA was developed through User Group Meetings, including senior Clinical and Operational leads, and involved reviewing the proposed spaces and clinical grouping and testing them within the proposed building template. The clinical requirement was the key driver ahead of the constraints of the proposed building template with the ambition of a 'clinically led scheme'. The resulting schedule was tested against the design team and comparable Hospital schemes to test the potential opportunities and limitations of the original SoA as it was developed into a designed scheme.

Moving forward the SoA is still to be tested against new innovation and working practices, looking to continue the efficiency in room areas and clinical benefits.

### 3.4 Patient, Visitor and Staff Wellbeing

The design of the new hospital needs to be developed to allow for flexibility and to be adaptable if changes need to be put in place for clinical care and services and to be responsive to changing patient needs. The design solution will put patient wellbeing and experience at its heart and provide a welcoming environment which is easy to clean and maintain.

Interactive engagement sessions with our patients, carers, people and stakeholders have identified a wide and extensive list of points for consideration and inclusion in the design, including:

- ✓ Small seating pods which could be used in a more private capacity to relax in waiting areas
- ✓ More toilets and hand washing facilities than traditionally found. It is recognised that this will sit within the planning to ensure the environment is pandemic ready
- ✓ A relatives and carers' lounge

- ✓ Separate waiting rooms for women who are pregnant and waiting for scans and those who have experienced a miscarriage
- ✓ Quiet waiting areas not situated in the main thoroughfare
- ✓ Modern showers, with minimum numbers sharing
- ✓ More private treatment rooms, especially in the emergency department and Paediatric Assessment Unit to protect those who are clinically extremely vulnerable
- ✓ A home-like dementia-friendly environment in specific departmental areas.
- ✓ Shops for essential items e.g. toiletries
- ✓ Free access to audio visual entertainment. Dedicated charging points for patient's devices and a lockable area that is easily identifiable to the patients that it's theirs.
- ✓ Easy access to (public) telephones which will be provided in the main entrance.
- ✓ A sensory refuge area with low lights and comfortable seating available to calm those with sensory issues before or after appointments along with quiet low arousal areas throughout the building
- ✓ Low arousal lighting and decoration and acoustic cladding should be incorporated into the design
- ✓ Hearing loops should be standard in all reception and consulting areas

A warm and inviting faith and sanctuary space, open to all, will be provided to support all faiths in terms of layout and facilities and will also provide a restful sanctuary space for people who wish to someone for some time of reflection. The area will also need storage space for religious artefacts, prayer mats, shawls and holy books.

Consideration will be given to creating a hub, open to all, which brings together chaplaincy, bereavement services, volunteer services, patient experience services, PETALS (counselling service for bereaved mothers) and Butterfly volunteers from the Anne Robson Trust. Located close to the main entrance of the hospital.

### **Visitor wellbeing**

We would like to encourage and welcome patients and visitors by having a sense of community and creating a village feel to the public space through its design. In support of the health and wellbeing of our visitors the following will be taken into consideration:

- ✓ Space to park for visitors, with electric charging points where necessary. There should also be clear access to public transport for both visitors and patients. Incentives to use green methods of transport should be considered
- ✓ Clear wayfinding to public spaces and amenities, with clear linkages between the different parts of the hospital and the surroundings. Wayfinding should also make use of readily available technology to enhance the experience
- ✓ Visitor and public areas should be light and bright, with natural views and linkages to the natural environment
- ✓ The external landscaping should promote a community sense, allowing space for markets, with seating and covered areas also
- ✓ An internal garden/green space to promote holistic wellbeing
- ✓ The design of the main entrance space should provide a key focal point for the wayfinding strategy. This space will encourage social interaction and be a place where visitors can

- enjoy cafes, retail and social gathering space
- ✓ Alongside the retail offering, we would like to offer amenities that enhance both staff, patients and visitors' lives by providing services that they may need; such as hairdressers
- ✓ Fully accessible toilet facilities should be provided throughout and be clearly signposted.
- ✓ Drinking stations should also be provided, not only in public spaces but throughout the building
- ✓ Recycling and waste disposal stations should be clear, and include educational aspects to encourage users to think greener

### Staff Wellbeing

Our staff are an integral part of making our new hospital a success. Key to this success is supporting their health and wellbeing and providing a great place to work both for our current employees and also to encourage new people to join us. We are absolutely focused on getting it right for our people and to seek evidence to support our engagement, choices and decisions on the design and functioning of the hospital and the areas within it. We only have one chance to work together and to get it right.

Access to the following features and equipment will improve the wellbeing of our people in the new hospital and are points supported by evidence from a rapid literature review on hospital design and staff wellbeing and from the people engagement exercises held in July 2020:

- ✓ Acuity adaptable rooms to eliminate moving patients as their condition changes
- ✓ Ceiling lifts: access to ceiling lifts can reduce injuries in staff and associated impact on resourcing
- ✓ Non-slip flooring and handrails to provide reassurance for both our people and patients that safety has been designed into the building
- ✓ Artwork: the presence of artwork can reduce physical and emotional stress for those working and staying at the hospital
- ✓ Use of lean design principles around flow to reduce travel distances for staff
- ✓ Clear and visible signage (good wayfinding) that makes use of names rather than numbers leads to improved staff satisfaction
- ✓ Using the PAHT corporate brand throughout the design and replicated across the building so that each ward is similar but easily distinguishable. Also that there is uniformity throughout in terms of standard of finish and facilities with no ward better than another
- ✓ Separate green space and gardens for our people to relax and socialise in

A range of opportunities to engage with the development of this design brief were offered to our people. Colleagues from across the organisation took part in engagement interview, workshops and feedback questionnaires to share their comments and suggestions. Below is a summary of the key themes and requests for inclusion in the design of the new hospital:

#### Comfort:

- ✓ Separate changing, showering and toilet facilities for staff who cycle to the new hospital
- ✓ Staff break spaces: access to staff lounges and break areas in each department can

increase staff wellbeing, increase job satisfaction and reduce staff stress. There is also a need for quiet spaces in addition to busy and social staff lounges. Break spaces are more likely to be used if close to work areas. Staff break areas with access to outdoor space have significantly greater perceived restorative potential, in comparison with window views, artwork, or indoor plants

- ✓ A designated private room for staff and patients to express breastmilk/breastfeed
- ✓ Dedicated staff changing areas and toilets
- ✓ Dedicated staff decompression spaces, which can also be used for 1:1 private meetings/discussions
- ✓ High quality workstations
- ✓ Areas for group meetings with appropriate spacing, seating and IT resources
- ✓ A staff fridge-freezer in each ward and department.
- ✓ Staff offices - there must be space for private discussions. If open plan they need to be separated by department or be with similar departments
- ✓ Staff relaxation and decompression spaces to be included throughout. Potentially adjacent to the staff only restaurant where people can take time and relax or simply breathe out of the public and their colleagues view
- ✓ Collaboration spaces, to bounce ideas off of each other and creatively solve problems.
- ✓ Whiteboard walls to capture ideas and actions

#### **Health and fitness:**

- ✓ Running track and outside space for staff sports games to take place
- ✓ Drinking water stations throughout the building

#### **Professional development:**

- ✓ A separate training, education and seminar facility that is accessible by our people and available to local health and social care colleagues
- ✓ Teaching spaces: areas for learning and discussions with virtual conferencing options

#### **Spaces:**

- ✓ Staff shower and changing facilities for all staff
- ✓ A staff only restaurant and rest area
- ✓ Clinician informed design and sensible planning for good hospital flow

#### **Staff Lounge and Junior Doctors Mess:**

Rest and private spaces for our staff and junior doctors will need to be incorporated in the design. Giving our staff the space and environment they need to rest and take time away from their working area is important and should not be a shared space with patients and visitors. These areas will need resources for rest and relaxation and refreshments and to be connected with the outside. The rest areas will be used 24/7 and will include correct lighting and furnishings to offer privacy and comfort.

### 3.5 Privacy & Dignity

The design should be developed to allow for flexibility and a change in Clinical Services, to allow the building to be responsive to changing patient needs. The design solution is one that puts patient experience at its heart and one that will provide a welcoming environment which is easy to clean and maintain. The scheme must take into account Privacy and Dignity – all patient access areas to be separated from public areas and, as far as possible, dedicated Facilities Management circulation routes ensure that patient's privacy and dignity are at the heart of the design.

The scheme will provide good acoustic conditions to create a sense of calm and provide a high level of patient privacy and dignity. Good acoustics can also promote essential sleep patterns and aid recovery. This is especially important to inpatient sleeping areas. External building fabric and glazing shall be of a suitable quality to prevent unwanted noise from external influences.

Other examples of good privacy and dignity could include:

- ✓ The use of frosted sliding glass partitions in lieu of curtain tracks.
- ✓ Location of bereavement spaces away from busy areas.
- ✓ Consideration of key patient flows to prevent mixing of dressed / undressed patients.
- ✓ Separation of clinical and FM staff lifts for efficiency and privacy & dignity.

The provision of gender specific day rooms should be provided in the scheme. These will need to balance the prevention of isolation on the wards but to also respect people's privacy and dignity.

#### **The importance & dignity of individuals**

Designs should be developed to allow for flexibility and a change in Clinical Services, to allow the building to be responsive to changing patient needs. The design solution is one that puts patient experience at its heart and one that will provide a welcoming environment which is easy to clean and maintain. The scheme takes into account the following key considerations to ensure that the consumer is central to the design:

- ✓ Privacy and Dignity – all patient access areas to be separated from public areas and the dedicated Facilities Management circulation routes ensure that patients privacy and dignity are at the heart of the design.
- ✓ High quality and robust materials will be used to reduce maintenance and provide longevity, thereby reducing future disruption.
- ✓ Natural daylight will be a focus of the design for all in patient areas, ensuring that patient bedrooms all benefit from excellent light levels and views out, whilst ensuring through the detailed design that solar discomfort is eliminated.
- ✓ Natural ventilation will be provided where possible and in accordance with the HTM requirements.
- ✓ Storage space will be provided to ensure equipment, consumables and linen can be stored discretely.

- ✓ All clinical waste areas to be carefully planned to be discretely and safely located.
- ✓ The internal areas should instil a sense of quality, care, restfulness and cheerfulness and work to create a healing environment.
- ✓ Artwork should be fully integrated as an essential characteristic of the healing environment.
- ✓ Rationalisation of bed space configurations to provide a ratio of 50% or greater of single beds to multi-bed bay ward accommodation.
- ✓ Single-sex washing and toilet facilities are to be provided throughout with adequate shower/bathing facilities within in-patient departments where full en-suite facilities are not a design objective.
- ✓ Relatives'/patients' overnight stay facilities will be provided where clinical requirements dictate them, with all children's single bedrooms having the facility to provide pull out beds as part of the bedroom layout.
- ✓ Relatives' overnight stay facilities will be provided adjacent to critical care wards.
- ✓ Bed spaces have been designed to current HBN standards and can accommodate visitors in comfort without instilling the sense of crowding and all bed spaces engender patients' sense of spatial volume/airiness.
- ✓ The entrance, reception and waiting areas need to be carefully designed to act as focal point and provide excellent wayfinding characteristics throughout.
- ✓ All patient areas include secure facilities that instil a sense of safety and security of possessions.
- ✓ The overall design should allow for barrier-free access with no physical or operational barriers to the disabled.
- ✓ Clear multi-cultural signage/wayfinding that is non-institutional in character will be carried through in the detailed design.
- ✓ Patient Control of Environment, patient control of personal ambient environment.
- ✓ Temperature, task lighting at the bedhead/bedside conducive to reading and close work.
- ✓ Controllable lighting levels delivered from high-quality non-institutional style luminaires.
- ✓ The Catering strategy has been developed to provide two centralised kitchens adjacent to all ward areas for central food preparation, whilst each ward has its own ward pantry. Food is to be prepared and served in adherence to a clear hospital food, nutrition and health policy.
- ✓ Patient Advocacy, inclusion of patient advocate's room.
- ✓ Information and Communication will be provided by meeting the requirements of "Patient Power" and accommodating integrated bedside communication and entertainment systems.
- ✓ Easy access to (public) telephones which will be provided in the main entrance / atrium space.

### 3.6 Access and Accessibility

The following criteria should be addressed as part of the design:

- ✓ Open plan areas are to be designed to provide acoustic comfort whilst maintaining high levels of patient privacy and dignity.

- ✓ Public accessible areas need to be welcoming and open.
- ✓ Spaces used to deliver difficult news need to be discrete, inviting, comforting and less clinical.
- ✓ Wayfinding to be intuitive and not reliant on complex signage solutions.
- ✓ Specifications of materials to be robust and low maintenance.
- ✓ 'Back of house' elements, such as WC's, need to be conveniently located but also discreet.
- ✓ Receptions need to be at public entrances for convenience.
- ✓ Waiting rooms should be adequately sized and feature acoustic baffles to reduce noise discomfort.
- ✓ Any proposed level changes across thresholds to integrate compliant ramped access.
- ✓ All doors into clinical spaces to be of sufficient width to accommodate ambulant and semi-ambulant users.
- ✓ Use of symbols to assist children and dementia sufferers.
- ✓ Contrasting font on coloured backgrounds with sufficient LRV contrast.
- ✓ Use of colours for zoning departments or floor levels.

### 3.7 Arrival and Wayfinding

#### Arriving

Upon arriving at the hospital, people have highlighted their hope that the first impressions will be of nature and space which blends seamlessly into the main entrance or atrium. Extending the outside to bring it inside with greenery and flowers. The entrance will feel bright, light, fresh and spacious giving an open and inviting feel to people as they enter the hospital with a sense of welcome and a dedicated Welcome Centre.

Walking through the doors will give a calming and welcoming sensation whilst also having a buzz of activity and vitality. Challenging the traditional mindset of a hospital as a place for sickness, suggesting instead that it is somewhere to inspire health.

The inclusion of other smaller satellite entrances of the main street for different departments or needs such as outpatients, emergency department, paediatrics or maternity which is tailored to the needs of those visiting these areas. Although smaller in size they will capture the same feelings of spaciousness and welcoming that the main entrance does.

The entrance, reception and waiting areas will be carefully designed to act as focal points and the start of excellent wayfinding throughout.

- ✓ Feedback highlighted a number of key points people would like to see considered:
- ✓ A piano for people to play
- ✓ A stage in the main entrance space to allow the hospital choir and other visiting performers to perform
- ✓ A place where staff can enjoy cafes, retail and social gathering
- ✓ Potential for automated check-in, automation zones, and automated wayfinding
- ✓ Wheelchair storage and tracking

- ✓ A point for people who are visually impaired to connect with a hearing loop or electronic guide for their journey through the hospital
- ✓ Indoor and outdoor garden adjacent
- ✓ A help centre available 24/7
- ✓ Easy access to (public) telephones in the main entrance

Complex journeys can be broken up by directing patients first to key orientation points, then supplying secondary navigation information to find a specific location.

A hierarchy of information will use the minimum amount of information and reveal more details on a 'need to know' basis. This system is useful because people generally only remember the last couple of instructions in a journey.

A key to simplifying a complex journey is to break the site down into key destination 'hubs', with secondary destinations indicated once a hub is reached.

### 3.8 Parking

It is fully recognised that that both practical and perceived issues around travelling to any hospital are a significant point of interest for patients and visitors. It is important that everyone coming to the hospital has their needs considered and ideally provided for. A strategy to control vehicle access across the site shall be developed and agreed, including the provision of any physical barriers and associated vehicle access control/intercom systems

The Trust has an ambition to support the local Garden Town Communities' plan to achieve a target of 60% of all journeys within the new Garden Town Communities and 50% of all journeys across Harlow being undertaken by sustainable (including active) modes. This will also include encouraging a culture of active and sustainable travel ensuring all journeys will be efficient and safe. A transport hub will be included within the grounds of the new hospital that is accessible by all but preferably not at the front face of the building.

Car parking systems and number recognition systems will be provided which assist with capacity control, throughput and security.

### 3.9 Flexibility and Potential Future Expansion (Planned & Unplanned)

The design of the new hospital should be such that it accommodates the potential need to expand the hospital by two wards of 28 beds, some ten years after opening. These wards should be co-located with existing wards.

- ✓ The design should also enhance any unforeseen future adaptability/ expansion. A number of simple options can be reviewed in order to support this flexibility:
- ✓ Consistent and regular structural layout to minimise load bearing internal walls. This will ensure future expansion can be carried out with unlimited potential if future departments grow or shrink depending on demand.
- ✓ Grouping of risers behind circulation cores to ensure that floorplans are free from immovable service risers. Locating these immovable items in close proximity reduces the overall impact on the future flexibility of the floorplans.
- ✓ Creation of dedicated, non-designated 'White Spaces' which can be used for expansion.
- ✓ Sizing of non-clinical spaces such as stores to match those of clinical spaces to provide easy conversion with minimal disruption to the rest of the ward.
- ✓ Provision of full floor to floor heights to be utilised for future clinical spaces if required.
- ✓ Careful consideration of department adjacencies to enhance cross collaboration and sharing of facilities during peak demands.
- ✓ Use of 'Work Space' within and adjacent to the clinical areas to provide future expansion space for clinical services if required.

The project will be required to be designed and coordinated to the UK BIM Framework (see Section 5). One of the direct advantages to this will be the provision of a fully coordinated 'as built' model which the Trust can utilise in the future should any need for expansion arise. Having access to this level of information will aid any proposed reconfigurations and help to identify the location of services/ risers and structural components.

### 3.10 Pandemic Planning

As a result of the pandemic a number of aspects will require review as part of the detailed design development to ensure that the new Hospital is as fully prepared as possible for any future pandemic. Issues to be considered include:

- ✓ Theatres should be designed as separate areas that sit next to each other that can function as one area but easy to split (air flow and circulation between the areas needs to be separate, patients can be kept separate to allow all activity to continue)
- ✓ Need to have a dedicated Level 1 area within hospital for acutely unwell when ITU is at capacity with ventilation system with specific number of airchanges and ability to have increased oxygen supply
- ✓ ITU - need to consider air changes in different areas – Single room split will allow for care of infectious patients
- ✓ ITU bays can be next to each other or in separate areas of the unit
- ✓ Patient transfers for infectious patients should be minimalised – not to switch tower blocks - red and green lifts
- ✓ Can ED be split easily in red and green areas, this could be to use assessment spaces
- ✓ Oxygen resilience (delivery capabilities)
- ✓ Airflow consideration need to be given to any of the procedure rooms in outpatients
- ✓ Resilience in terms of field hospital – referenced in Grant Thornton MoC
- ✓ Use of diagnostic hub to create red / green pathways
- ✓ Potential for split ED into red and green areas

### 3.11 Security

It is a clear responsibility that the new hospital design will provide a safe and secure environment for everyone who visits the site. To do so there needs to be adequate external lighting from external spaces to the building, and no dark corners or areas. In addition, there needs to be the ability to lockdown from a central source using a centralised control centre with clear CCTV at all entrances and exits and in public spaces and main circulation spaces. There must also be secure access control systems, segregating the private from the public areas.

The design also needs to provide the ability to quickly and efficiently respond to incidents whilst at the same time recognising the privacy of staff, visitors and patients.

A fully integrated closed-circuit television system will form the backbone of the integrated security system and will provide 24-hour coverage of the site through a digital recording facility. The system will be monitored and accessible from the dedicated Security/Control Room.

Camera locations are summarised below:

Internal	External
All entrances and egress points	Car parks
Public areas including lift lobbies	Car park entrances & exits
Principle circulation routes	Entrance doors and fire exit doors
Ward and departmental entry points	All public areas
Waiting areas and reception desks	FM Compounds
'Flashpoint' departments (ED & Critical Care)	Energy Centre
IT Room Entrances	Transport Hub (TBC)

The closed-circuit television system will comply with the requirements of the BS EN 50132-1. Information storage will be in compliance with the Data Protection Act. All cameras will be colour, digital and provide quality digital recording facilities. All camera images will be recorded by means of network data recorders with raid storage system. Storage capacity will be sufficient to store images for 31 days storage for general surveillance cameras and 60 days for identification cameras.

The type of cameras will be suitable for their intended use and environment, including the use of either fixed dome or Pan Tilt Zoom. Cameras used for car park entrance and exits will be used for number plate recognition. The CCTV system will be integrated with the other security systems

within the hospital environment. All system images will be “water marked”. An event monitor and individual real time recorder will be provided for specific incidents.

### 3.12 Other Users/Health Campus/Community Use

The Trust is looking for the new hospital to have a community identity, thereby increasing social value where a great place brings people together and creates a community eg communal facilities, artwork from local artists or involving the community in the design.

We would like the design of the hospital to encourage and welcome not just patients and visitors but members of the general public and therefore the space around the new hospital should be available to local people and the public to use as accessible green space for exercise, etc. Consideration should be given to provide outdoor exercise facilities for the use of patients, staff and local people.

It should also be noted that the East of England Ambulance Service (EEAST) have indicated that they would wish a presence on the site and have indicated a land requirement of c 2.35 acres for a new facility. The design of this new building is not part of this brief.

# 04

## The Hospital and its Context

- Scale and Proportion
- Appearance and External Materials
- The Proposed Site
- Planning Issues
- Site Constraints
- Internal Spaces
- Interior Design and Artwork
- External Areas and Garden Town

## 4. The Hospital and its context

### 4.1 Scale and Proportion

The scale of the building is to be carefully considered to ensure that the design is appropriate for the site and its context. The mass and scale needs to respond and be understanding of the site constraints, the site topography & the clinical requirements. Understanding the relationship between its immediate context and the wider setting underpinned the design progression.

- ✓ 'Human' Scale, approach and massing creating calming and welcoming spaces and building sizing
- ✓ Non-institutional design, a cutting-edge Acute environment and facility while not feeling overbearing or 'cold' clinical appearance
- ✓ Create a strong building frontage that reinforces its use
- ✓ Understanding the key relationships with surrounding context. Consider the scale & mass of the building.
- ✓ A 'readable' design that provides clear and open points of arrival to the Campus and the Building types providing welcoming and understandable approach and entry, without need for excessive signage
- ✓ Developing a visual height parameter that considers the key journeys to & through the site.
- ✓ Ensure that open spaces developed as part of the proposals are not inappropriately overshadowed by the proposed buildings.
- ✓ Develop an understanding of the scale in relation to the topography of the site.
- ✓ Create variable heights buildings.
- ✓ Creation of an interesting skyline from key view points.

### 4.2 Appearance and External Materials

The appearance of the proposed hospital buildings should be considered as part of the development of the scale & massing. This will be further developed as part of the reserved matters application. The basis of this future design development will be as follows;

- ✓ Repeatable external materials and standard sizes creating a repetitive and simple appearance and calming cohesive appearance
- ✓ Calming and 'warm' materiality and colour palette to create a welcoming and calming built form
- ✓ The Built environment should provide a flow of the external space and materiality into the internal spaces and all primary movement and dwell spaces should have aspect and access to positive and usable external spaces
- ✓ Focus on first impressions of both site and the Built environment, including bringing the outside in, utilising natural products and environment
- ✓ Create an environment to inspire Health and Wellbeing rather than a place for poor health
- ✓ Discreet service yards and external FM/Estates movement to minimise impact on Patients, Visitors and Clinical staff

### 4.3 The Proposed Site

The proposed site for the new Hospital development is approximately 3 miles North East of Harlow, adjacent to the M11 Motorway. It is envisaged that a new motorway junction (7A) will be developed to serve the new hospital. The site is ideally situated to bridge the local catchment areas and provide a centralised provision of an Acute Hospital for the local residents with good Connections to the Town centre, existing and proposed housing and rail/bus links already in place. This will be further developed with future sustainable corridor link and immediate links to the adjacent M11 and local road networks.

Despite the Motorway aspect, the site is surrounded on all sides with rural fields, established natural landscaping and on any upper floors of the proposed Hospital 360 degree views of the countryside. The Primary entrance to the site will be provided by a new link road to the motorway and will continue to Harlow Town Centre, creating a clear point of entry and no cross over of traffic with existing housing or commercial developments. The location on the new Motorway junction will allow the Hospital to provide a gateway to Harlow and provide a point of arrival and signpost to the existing and expanded Harlow Garden Town.

The proposed site benefits from both from the existing Brook, established structural landscaping and the new landscaping as part of the new junction from the M11. The site has a natural fall from the new junction to the existing brook which allows the Hospital building to have two ground floors, ideal for a Healthcare development with departments that require deliveries and access both in and out to the road network and landscaping, while also creating a subterranean level that provides a hidden FM/Estates support function.

The existing Brook and structural landscaping will create a focal point for aspect and outdoor spaces/interaction to the more private side of the site away from the entrance and Motorway aspects. The site intends to be a key milestone on the local sustainable transport links including public footpaths and cycle ways, providing the opportunity to create a destination for health and wellbeing in addition to the Hospital function.

### 4.4 Planning Issues

The current hospital and new site lie within Harlow and Gilston Garden Town, which covers a wide area falling within the London Stansted Cambridge Corridor (LSCC). The local authorities' vision for the Garden Town is based on a series of objectives within four main principles covering:

- ✓ Economy and regeneration
- ✓ Place-making and homes
- ✓ Sustainable movement
- ✓ Landscape and green infrastructure

The broader intention is to develop new and existing communities in and around Harlow. New neighbourhoods are to be created to the east, west and south and a new village to the north, with transformative investment in transport and community infrastructure. The new hospital will play a vital role in establishing and contributing to the Garden Town vision.

The new hospital is to be located within attractive countryside east of Harlow adjacent to the programmed new M11 Junction 7a, which is due to be completed by Autumn 2022. Although currently within the Metropolitan Green Belt, this area will form part of the Garden Town new eastern community and is included within a strategic site allocation identified in the draft *Epping Forest Local Plan* (draft *Local Plan*). The strategic allocation allows for around 3,350 new homes, other facilities and infrastructure including approximately 14 hectares for a new Health and Wellbeing Campus. The new hospital site will be linked by new road infrastructure including a sustainable transport corridor and strategic green infrastructure.

The draft *Local Plan* vision also seeks to build on key strengths of the London Stansted Cambridge Corridor (LSCC) including its skilled workforce sectors such as health, life sciences and pharmaceuticals and its high-quality environment and education opportunities. Specific to community and social infrastructure provision, the Plan refers to delivering high quality healthcare facilities and services required to support the wider area. The Plan also recognises that the relocation of the Hospital will play an important role in securing sustainable growth.

Against this background planning context, it is clear that the siting, design and function of the Hospital as a Health and Wellbeing Campus will play a vital and complementary role in realising the vision for the Garden Town. The following details set out key planning policy requirements that need to be taken into account when planning for the new hospital.

### **Planning policy requirements**

National planning policies are set out in the National Planning Policy Framework (NPPF) (2019) and Planning Practice Guidance (PPG) (last update in 2019), which focus on securing sustainable development driven by interdependent economic, social and environmental objectives.

At a local level, the adopted *Epping Forest District Council Plan* (1998, altered in 2006) and emerging draft *Local Plan* (2017), develop these themes further and contain site specific and generic policies guiding new development. These are also supplemented by further planning guidance including the Harlow and Gilston Garden Town Vision (2018), Design Guide (2018), Infrastructure Delivery Plan Final Report (2019), draft Transport Strategy (2019) and other non-statutory documents.

Relevant planning policy requirements fall within the following broad areas based on the general topic areas included in the NPPF:

### **Achieving well designed places**

Design policies seek to ensure development will function well and add to the overall quality of the area for the lifetime of the scheme. The need to establish a strong sense of place which respects local landscape and history is also emphasised along with accommodating and sustaining an appropriate mix of development including green space with links to other local facilities and transport networks.

Creating safe, inclusive and accessible places which promote health and well-being is also seen as an important design policy objective.

Great weight is to be given to outstanding or innovative designs which promote high levels of sustainability or raise design standards generally providing they fit in with the local environment.

### **Promoting a healthy and safe community**

Linking with design policies and promoting social interaction and inclusivity through shared accessible and safe spaces including green infrastructure are key policy requirements for promoting and supporting healthy lifestyles and wellbeing.

### **Promoting sustainable transport**

Planning guidance requires transport issues to be considered from the earliest stages of a development proposal. This covers the need to:

- ✓ address the potential impacts of the hospital on the transport network
- ✓ utilise proposed transport infrastructure and changing technology
- ✓ provide for safe and suitable site access

Opportunities to promote and secure sustainable transport modes including travel by public transport, walking and cycling are further key transport planning objectives, whilst providing for an appropriate level of car parking. Planning for the needs of people with disabilities and reduced mobility and allowing for suitable levels of ultra-low emission vehicles also need to be considered and accommodated.

Bringing the transportation elements of the hospital together, planning policies require a travel plan to be provided, which can be an effective way of coordinating the delivery of various modes of transport and other initiatives.

### **Climate change and flood risk**

To meet the challenge of climate change and flood risk, planning policies support the transition to a low carbon future in a changing climate, taking full account of flood risk. To comply with planning policy, the new hospital will be planned to help reduce greenhouse emissions, eg through its location, orientation and design. Although local planning policy does not specify specific targets for low carbon, renewable or decentralised energy supplies, there is an expectation that new development proposals should demonstrate how they reduce their carbon footprint. These planning policies also contain a viability clause to cover circumstances where such initiatives are not realistically achievable or practicable. The new hospital will need to be flood resilient and avoid the risk of flooding adjacent land. Sustainable drainage systems (SuDS) and measures will also need to be incorporated in so far as soil conditions allow. Vulnerable parts of the hospital development, principally inpatient wards and other residential accommodation, should be located outside of the flood zone (within categories 2 and 3) once fully defined.

### **Natural and historic environment**

To meet the need to conserve and enhance the natural environment, the hospital development should be designed and developed in such a way to blend with the local rural character of the environment.

There is also a planning policy requirement to minimise impacts on biodiversity and where possible provide net gains by establishing coherent ecological networks that could be more resilient to current and future pressures. Through the provision of structural landscaping and open space potentially in the form of green corridors, there is the potential to enhance the setting of the hospital in a way which would be complementary to the Garden Town's Green Wedge vision.

Control and mitigation of any existing pollutants including contaminated land also needs to be addressed, although it is understood that the potential for ground contamination may be low. Equally, any potential pollution generated by the hospital itself including ground, water course, lighting, noise and air quality impacts will need to be assessed and mitigated, taking account of the existing baseline position and the proximity of other future planned development.

### **Economic impact and benefits**

Planning policy places significant weight on the need to support economic growth and productivity taking account of local business needs and wider investment and regeneration opportunities for development.

The new hospital and linked development strategy across the existing Princess Alexandra Hospital estate, could play a significant economic development role, especially when seen in the context of the wider regeneration and growth objectives for the Garden Town. Positive impacts include, investment benefits associated with the provision of new state of the art health care facilities and services, together with delivering new homes within east and central Harlow and at St Margaret's Hospital on recycled brownfield land.

## 4.5 Site Constraints

The following development constraints will need to be taken into account as part of the site planning exercise:

**Existing ground conditions** may not be suited to the provision of drainage soakaways and therefore, a suitable drainage strategy will need to be prepared to regulate the dispersal of surface water drainage, in order to meet the EA's required green field run off rates.

**Landscape features:** the site planning exercise will take account of features and resources from a landscape and ecological perspective including the area used by bats as a foraging corridor and therefore, a lighting strategy will need to take this potential constraint into account.

**Gas main:** A high pressure gas main bisects the southern part of the site and built development cannot be located immediately on top of it or within the associated easement area. The Health &

Safety Executive (HSE) has also identified the gas main as a major hazardous installation and imposed a 100 metre Outer Consultation Zone either side. Certain types of hospital development (mainly in-patient wards), may not be located within the Outer Consultation Zone area, which would currently constrain hospital development within a significant part of the site.

However, discussions with Cadent Gas and the HSE have highlighted the possibility to relocate the gas main and apply strengthened walling, which would allow for a greater hospital development area due to proximity and a reduced Outer Consultation Zone band. Feasibility work undertaken to date allows for a sufficient development area to provide the Hospital buildings outside of the likely redefined Outer Consultation Zone, whilst hospital buildings with less sensitive uses and surface parking may be accommodated with this outer area in any event. If the gas main is diverted, a new easement width measuring 18.3 metres would be imposed, which would need to be kept clear of any buildings, although it could lie under surface car parks or access roads.

Further feasibility work is being commissioned with Cadent Gas to help establish the optimum diversion route and strengthening specification, which will be coordinated with site and transport planning work.

**Absence of utilities:** There are no known existing utility connections or services on the site, needed to serve the hospital, which is the subject of a specific study and delivery strategy.

**M11 motorway acoustic zone:** The proximity of the existing M11 motorway to the east and provision of a duelled east–west link road to the south, may require acoustic mitigation measures to be incorporated due to the associated level of traffic noise generated. Noise impact considerations may also require the more sensitive Hospital uses to be set back into the site at a distance to be determined.

**Site access:** There is currently no suitable road access to the site, although this will be provided as part of the J7a works including a new roundabout (Champions Roundabout) with a spur to the north to facilitate a hospital entrance. The roundabout design will need to be modified to facilitate a suitable point of entry and egress to the hospital.

The current J7a scheme does not allow for an underpass needed to enable a planned Sustainable Transport Corridor link (allowing for buses, cyclists and pedestrians) to be extended into the site from the future housing area to the south. This link could also serve as a secondary emergency access route to the Hospital.

The roundabout design and underpass link need to be designed and approved as soon as possible to enable the associated works to be implemented and synchronised with the wider J7a scheme, programmed to be completed by autumn 2022. These matters are the subject of separate projects being commissioned through Essex County Council.

The Sustainable Transport Corridor link is likely to be provided in conjunction with the development of the housing area to the south. As this is unlikely to be delivered until around 2027 to 2030, there will be a need for an interim transport strategy to be put in place to enable the hospital to be served by public transport and other non-car based modes.

**Future northern bypass route:** A potential future northern bypass route has been established by Essex County Council, which would link to Junction 7a and pass through the southern part of the Hospital site. Although this particular highway scheme has not been programmed and may not be implemented, its route may need to be safeguarded, which could limit development in the southern part of the site to surface parking provision and other open space uses.

**Access corridor to the north:** Discussions with the land owners' agents have highlighted the need to allow for a potential road access corridor linking the southern Hospital site boundary to the owners' retained land to the north. This corridor would reduce the amount of developable land immediately west of the M11 embankment. However, providing the width of the access corridor is limited (eg to around 30 metres), this constraint could be satisfactorily addressed.

**Archaeology:** Recent archaeological finds during the J7a construction works have identified medium to significant Bronze Age and Roman interest including human remains. The area of influence may therefore, extend north further into the hospital site and would need to be evaluated, which could potentially impact on the development programme if not addressed in advance of the planning application.

**Historic buildings:** The setting of Grade II\* and Grade II listed buildings at Sheering Hall located will need to be taken into account as part of the site planning exercise. The woodland around the Brook will act as a visual buffer, although the wider landscape setting will need to be considered as part of heritage asset and landscape and visual setting assessments.

**Public right of way:** A public right of way in the form of a footpath which follows the alignment of the Brook on the southern ban.

**Green Belt designation:** The site lies within the Metropolitan Green Belt as currently defined in the *Adopted Local Plan* (1998 amended in 2006), which presumes against the development of a Hospital. However, the draft revised *Local Plan* (2017), which is at an advanced stage of preparation proposes to remove the land from the Green Belt as part of a strategic allocation, and refers to the identification of 14 hectares of land for the provision of a Health and Wellbeing Campus.

Epping Forest District Council is aiming to adopt the draft *Local Plan* as a statutory development plan document in early 2021. However, In the event that the draft Plan is not formally adopted in time for the submission of the related planning application for the Hospital, planned for late 2021, a 'departure' application for the development may be made and justified on grounds that 'very special circumstances' in planning terms would apply.

The wider open character of the residual Green Belt area will also need to be taken into account as part of a Landscape and Visual Assessment exercise to support the subsequent planning application for the Hospital.

**Strategic Masterplan** – The draft *Local Plan* requires all development proposals within the wider East Harlow Strategic Site Allocation area including the new hospital, to be in conformity with a previously approved strategic masterplan. No strategic masterplan has been prepared for East

Harlow to date and Miller Homes, the housing promoter is not intending to progress a strategic masterplan until the draft *Local Plan* is adopted in 2021. Epping Council planning officers have also said that they do not have the resources to undertake a strategic master planning exercise themselves either.

To help resolve this situation, further discussions with the planners through the scoping of a related Planning Performance Agreement (PPA) for the delivery of the hospital, have established that the hospital planning and strategic master-planning processes may be progressed in parallel. This approach is to be reflected in a subsequent PPA document to be agreed between all parties.

The strategic masterplan element will require cooperation from the wider site promoter and land owners, which could delay the planning programme if a consensus on the approach is not secured e.g. in relation the extent of Green Belt release north of Pincey Brook or numbers of new houses to be accommodated. However the Local Planning Authority is sympathetic to our position and will hopefully take a practical approach to facilitating the delivery of the Hospital, which will be planned in such a way to fully link and integrate with the wider East Harlow new community included in the strategic allocation.

#### 4.6 Internal Spaces

Internal spaces will have a number of key requirements including:

- ✓ Meeting, dwell and waiting spaces that encourage use, providing a good variation of open and quiet/private spaces depending on visitor, patient, and staff requirements
- ✓ Easy to navigate and understand spaces that naturally 'guide' the user to their required destination and support services, café/restaurant etc
- ✓ Dedicated Staff spaces creating uplifting spaces away from the clinical environment for 'decompression'
- ✓ Create a calming and welcoming sensation in key areas whilst recognising that other areas will have a buzz of activity and vitality
- ✓ Create a sense of entrance and belonging to each department to transition from the shared and open communication space to the more clinical environment
- ✓ Flexible spaces that encourage multiple uses and community interaction/involvement
- ✓ Level access and fully compliant accessibility for all users to every space and access around the built environment
- ✓ Separate lifts and access for Patient/Visitor, FM/Estates and Patient Transfer to separate the flows and minimise the crossover of differing functions

#### 4.7 Interior Design and Artwork

Art has long been recognised as a major component in healing environments. It is envisaged that Artwork that links to local artists and the Sculpture heritage of Harlow will be used to both uplift the spaces and increase local engagement. Key aspects will include calming and 'warm' materiality and colour palette to create welcoming and calming spaces with clear and understandable wayfinding and signage to support the Interior Design and Artwork approach.

## 4.8 External Areas and Garden Town

There will need to establish a strong sense of place which respects local landscape and history along with accommodating and sustaining an appropriate mix of development, including green space with links to other local facilities and transport networks. Fully accessible spaces for all are essential, including easy to transverse spaces and access from parking via landscaped and level access routes

A number of key principles have been established to ensure that there is a clear vision of a Health and Well-Being Campus

### **Principle 1: Bring Nature Into the Development**

The surrounding area but also the Garden Town is mainly defined by its “green context and surroundings”, a quality that can also be seen within the site. Making nature a vital element of the development reinterprets the green finger/ wedges concept that shaped Harlow, while creating the basis for a welcoming and healing environment in which the community can thrive.

### **Principle 2: Create Activity Hubs for Community Needs**

The Garden Town is built upon the concept of urban entities within the landscape. Inspired by the Garden Town, the proposed health and well-being campus will be based on different character/ activity hubs for the various community uses, reinterpreting Harlow’s history, highlighting the surrounding landscape and accommodating multiple functions. At the same time there is freedom and flexibility for the hospital buildings per se to focus on the clinical driven needs, while being open to the landscape.

## **The Site’s Context**

### **Regional**

Harlow is located between London and Cambridge, in the west of Essex County, bordered by Epping Forest and East Hertfordshire districts. Harlow falls within the London Stansted Cambridge (LSC) Corridor, having good access to the M11 and the West Anglia Mainline railway, while Stansted Airport is located 24km to the north-east of Harlow. The LSC Corridor is identified as an area of high growth, promoting strong inter-connections, commuting patterns, clusters of industries and supply chains. Harlow is forming a key location within that corridor, set to bring forward substantial growth.

### **Historic evolution of Harlow**

After WWII a great need arose for New Towns within the UK, which were influenced by the Garden Cities movement. Harlow Town was established in 1947 to alleviate pressure from the overcrowded, north-east London. The New Town was based on a series of linked but distinct and compact neighbourhoods that were separated by large areas of natural and semi-natural spaces, the ‘Green Wedges’, through which ran key transport corridors. The neighbourhoods were focussed around a shopping centre with easy access to social and educational facilities, connected

by a series of distributor roads together with a network of cycleways and footpaths. The Green Wedges, reflected the original landscape features, providing amenity space for residents, wildlife habitats, transport corridors, schools, sports and community facilities.

### **Today's Harlow & Gilston Garden Town**

The New Town of Harlow kept evolving becoming in January 2017 the Harlow & Gilston Garden Town. According to the Harlow & Gilston Garden Town Vision, 2018, is envisaged as 'a Garden Town of enterprise, health and sculpture at the heart of the UK Innovation Corridor. Harlow and Gilston will be a joyful place to live with sociable streets and green spaces; high quality homes connected to fibre optic broadband; local centres accessible by walking and cycling; and innovative, affordable public transport. It will set the agenda for sustainable living'.

### **Overarching planning framework**

The proposed Princess Alexandra Hospital forms a key and integral part of the wider Harlow and Gilston Garden Town Growth Strategy, included and located within the East of Harlow strategic site allocation. Harlow & Gilston Garden Town Vision (2018) & Design Guide (2018), Infrastructure Delivery Plan (2019), Transport Strategy (2018), Sustainability Guidance (2020), Healthy Town Framework and Digital Strategy (2020) are documents being developed in accordance with the recently adopted and emerging Local Plans of Harlow and Epping Forest Districts additionally, all linking closely to the aspirations of the new Princess Alexandra Hospital and its aims of meeting local health, wellbeing and care needs.

The Harlow & Gilston Garden Town Vision and Design Guide documents are formed around four main themes for healthy growth and development; Place Making and Homes, Landscape and Green Infrastructure, Sustainable Movement and Economy and Regeneration, which are expanded into a number of broad aims and objectives.

# 05

## Building Standards and Requirements

- Building Performance
- Mechanical Engineering Systems
- Electrical Engineering Systems
- Public Health Engineering Systems
- Specialist Engineering Systems
- Intelligent Building Management System
- Sub-Metering
- Fire Strategy
- Sustainability
- Net Zero Carbon (NZC)
- BREEAM Target
- Modern Methods of Construction (MMC)
- Building Components
- Health & Safety
- BIM

## 5. Building Standards and Requirements

### 5.1 Building Performance

#### Design Philosophy

The development of the New Princess Alexandra Hospital (NPAH) building services engineering systems shall be developed using the following key guiding principles, all based on aspects that are fundamental to the success of scheme;

Patient Focus	Spaces will be designed to provide a secure and controllable environment to patients and visitors including intuitive and accessible control of heating, ventilation, lighting, and convenient access for patients to communicate with staff, family, friends and services.
Hygienic	Close attention will be applied to Control of Infection issues including reduction of dirt traps, ease of cleaning, air quality control and Legionella prevention.
Healing environment	The provision of reassuring spaces including the use of natural light, provision of fresh air and control of environmental conditions all of which will be enhanced rather than compromised by artificial systems.
Flexible and adaptable	Systems will be designed and integrated into the building for ease of replacement, upgrade, extension and alteration. Strategies will be developed to remove main services from within clinical areas providing more adaptable and flexible clinical floorplates.
Sustainable	The systems and equipment proposed will be cognisant of the high energy requirements of a hospital, seeking to meet the energy demands in the most efficient and effective ways possible. Utilising a combination of passive design measures to minimise energy use at source, supplemented by modern carbon efficient systems, all without comprising the operational requirements of the facility. This shall align with the project aspiration to be Net Zero Carbon in Operation.
Reliable and resilient	Each system will be individually assessed in terms of its impact of failure on the operation of the hospital, and appropriate levels of redundancy and resilience applied to each service.
Minimum disruption	The arrangement of plantrooms, service risers and distribution strategies will be guided by the ability to safely maintain, replace and upgrade equipment as required on a short, medium and long

term basis, with particular attention paid to minimising disruption to clinical services through routine maintenance.

#### Digitally enabled

In line with modern and future healthcare facility design, opportunities to maximise the use of appropriate technologies, and data collection to enhance, building efficiency, clinical outcomes, and user satisfaction shall be applied

#### People

Most importantly this project is about the people, the staff and the patients and not the building. Its success will be judged by the occupants and the importance of engaging with all relevant stakeholders in the development of the design. From being able to control their environment to their feeling of security and safety, their input must not be underestimated.

### Design Standards

The building services engineering systems shall be designed in accordance with the latest versions of applicable technical guidance documents, British Standards and statutory regulations, such as relevant Building Regulations documents. This shall include but not be limited to the key references below

- ✓ Health Technical Memorandum (HTMs)
- ✓ Health Building Notes (HBNs)
- ✓ Building Regulations Approved Documents
- ✓ Health and Safety (HSE) Guidance
- ✓ Construction Design Management Regulations
- ✓ The Chartered Institute of Building Services Engineers (CIBSE) Guides, Application Manuals, Commissioning Codes and Codes of Practice
- ✓ Building Services Research & Information Associate (BSRIA) Guides & Technical Notes
- ✓ BCO Specification for Offices
- ✓ British Standards
- ✓ The Water Supply (Water Fittings) Regulations
- ✓ WRAS Water Regulations Guide
- ✓ HSE Guide L8 – The Control of
- ✓ The SLL Code for Lighting
- ✓ Activity Database (ADB) information
- ✓ BREEAM New Construction 2018
- ✓ BESA Maintenance Guides

### Future Expansion & Capacity Allowances

The building services design shall be developed with due regard to the future flexibility and expansion requirements contained elsewhere in this brief.

This shall include appropriate additional allowances within the incoming statutory services to support planned and natural growth.

The engineering systems shall incorporate an agreed level of spare capacity to accommodate natural growth as well as a flexible approach to change of use with limited increased services provisions. The specific allowances are to be developed and agreed as part of the concept design development.

### **Flexibility**

The design of the building services shall support a flexible and adaptable building floor plate, with primary services and distribution (horizontal and vertical) located outside the clinical zones where possible. This is intended to allow for ease of any future remodelling as well as supporting operational maintenance.

### **Resilience**

Due to the nature of the NPAH and the functions it performs, it will always be critical to maintain the internal environment and life safety systems as required in accordance with the guidelines within HBN 00-07. To ensure that this is the case, strategies will be need to be put into place to ensure that plant and equipment is provided in such a way that the entire system can remain operational, even in the event of one or more system components failing.

HTM 06-01 Electrical Services Supply and Distribution provides specific guidance on resilient electrical systems design and its criteria will be followed wherever possible.

### **Maintenance and Operation**

Maintenance and plant replacement shall be considered throughout the design process, and the scheme designed with regards to health and safety guidelines, good practice for access, maintenance and eventual equipment replacement.

It is expected that due to the digitally enabled nature of the scheme that a digital asset management and FM system will be put in place to support the operation and maintenance of the scheme once operational.

## **5.2 Mechanical Engineering Systems**

### **Scope of Mechanical Engineering Systems:**

The scope of the mechanical engineering systems that are to be included within the design to service the NPAH building shall include, but not be limited to;

- ✓ Primary heating & cooling generation
- ✓ Secondary heating and cooling distribution systems
- ✓ Space heating and cooling
- ✓ Mechanical ventilation systems

- ✓ Specialist ventilation systems
- ✓ Building Management System

### **System Principles**

In line with the project aspiration for a net zero carbon operation hospital, it is proposed that there is no reliance on the use of fossil fuels for the direct operation of the hospital heating or hot water systems. An all-electric solution shall be adopted for the NPAH, capitalising on the decarbonisation of the grid along with the use of a Green energy tariff.

The heating and hot water systems shall be cognisant of the cost of energy, and opportunities to minimise the need for heating, along with opportunities to recover or reuse waste heat shall be adopted wherever possible.

In line with the aspiration for Net Zero Carbon it is proposed that most of the hospital will be mechanically ventilated. The key driver behind this strategy is the alignment to a Passivhaus approach that looks to provide a sealed environment, and efficient recovery of heat used in the ventilation systems. Due to the levels of ventilation required in healthcare this strategy offers a significant contribution to the delivery of a net zero carbon (operational) hospital.

### **General Design Criteria**

External design criteria shall be based on the CIBSE Guide A Environmental Design, with due regard for future climate change impact.

Internal design criteria shall be based on the guidance given in HTM 03-01, CIBSE Guide A and the relevant parts of the Building Regulations documents.

## **5.3 Electrical Engineering Systems**

### **Scope of Electrical Engineering Systems**

The scope of the electrical engineering systems that are to be included within the design to service the NPAH building shall include, but not be limited to;

- ✓ High voltage power distribution
- ✓ Low voltage power distribution
- ✓ Small power systems
- ✓ Emergency power systems (Generators, IPS, UPS)
- ✓ Lighting
- ✓ Fire alarm & emergency call systems
- ✓ Nurse call systems
- ✓ Security systems (CCTV, Access control, Intruder alarm)
- ✓ TV distribution
- ✓ ICT Infrastructure
- ✓ Vertical transportation
- ✓ Earthing & bonding system

- ✓ Photovoltaic systems
- ✓ Electric vehicle charging

### **General Design Criteria**

Internal design criteria shall be based on the guidance given in HTM 06-01, HTM 08-03 CIBSE Lighting Guide LG2 & LG7 and the relevant parts of the Building Regulations documents.

## 5.4 Public Health Engineering Systems

### **Scope of Public Health Engineering Systems**

The scope of the public health engineering systems that are to be included within the design to service the NPAH building shall include, but not be limited to;

- ✓ Incoming water supply
- ✓ Cold water storage and distribution
- ✓ Hot water generation and distribution
- ✓ Water treatment
- ✓ Category 5 water supplies
- ✓ Specialist water services
- ✓ Above ground drainage
- ✓ Rainwater drainage
- ✓ Rainwater harvesting (Training & Admin)
- ✓ Low voltage power distribution

## 5.5 Specialist Engineering Systems

### **Medical Gases**

The hospital will be provided a complete medical gas installation comprising for each individual service of primary plant, distribution pipework, outlets and associated controls and alarms. The services to be provided are

- ✓ Oxygen
- ✓ Medical air (MA4)
- ✓ Surgical air (SA7)
- ✓ Vacuum
- ✓ Anaesthetic gas scavenging systems
- ✓ Nitrous Oxide
- ✓ Nitrous Oxide/Oxygen
- ✓ Additional gases as determined by the user group requirements

The systems will be in full compliance with HTM 02-01, with specific attention paid to the levels of resilience and redundancy required.

A new primary and secondary VIE plant will be provided with capacity to serve the whole hospital, with due regard paid to the level of storage required, and capacity of the distribution systems. It is expected that a ring main solution will be provided to allow for increased resilience.

### **Fire Protection Systems**

Fire protection systems will be provided as required and defined in the developing fire strategy; it is expected this will include as a minimum;

- ✓ External fire hydrants
- ✓ Dry risers
- ✓ Sprinkler system
- ✓ Gaseous fire suppression systems
- ✓ Smoke extract systems (as required)

### **Pneumatic tube system (PTS)**

A PTS will be provided to convey pharmaceuticals, laboratory samples, blood products and documentation between various departments. The system will generally be in compliance with HTM 2009 Pneumatic air tube systems.

## 5.6 Intelligent Building Management System

An intelligent Building Management System (BMS) will be provided on the scheme to control and monitor of all the mechanical, electrical, public health engineering systems and plant, with additional specialist systems interfaces also connected through a common platform. The key benefits of the iBMS include

- ✓ Maintaining healthy indoor environmental conditions
- ✓ Reduce energy consumption and carbon emissions
- ✓ Reduced operational costs
- ✓ Minimise the FM burden
- ✓ Resilience management
- ✓ Improved safety (occupants and operators)

The system will support an analytics platform that analyses information on how the building and its systems are functioning. The analysis will be used to visualise and automatically implement optimisation measures in order that the building operates at peak efficiency.

Each occupied room/space will generally be provided with a room automation system that acts as the central point of control for all key environmental functions in that space. The specifics of the infrastructure and provisions are to be developed in line with the wider digital agenda/brief, but it is expected any system will be able to report to the BMS (or interface with other platforms as required the following)

- ✓ Room Temperature
- ✓ Room Humidity

- ✓ Occupancy
- ✓ Lighting control
- ✓ Air quality (CO<sub>2</sub>, Dust, VOC)
- ✓ Shading control (optional)
- ✓ Pressure (where controlled for clinical purposes)

The elements of the environment that are user controllable, such as temperature and lighting will need to communicate with any proposed patient/staff digital interface systems, potentially a bedside console or specific patient mobile phone application.

It is expected that the BMS platform will also support a smart approach to asset management and facilities maintenance, or CAFM system (Computer Aided Facilities Management), allowing reporting and recording of plant failures, create planned maintenance, or preventative maintenance schedules. Functionality such as providing direct digital access to technical documentation for all major equipment and closing out of faults/maintenance tasks is also anticipated.

## 5.7 Sub-Metering

Sub metering to provide monitoring of all energy and water used within the building will be provided in accordance with the Revised Building Regulations for England and Wales, Part L2A (2013). This states that energy metering systems should enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end use categories (heating, lighting etc.), according to guidance in CIBSE document TM39.

Primary or sub metering shall be provided to the following systems:

- ✓ Building incoming mains cold water supply
- ✓ Steam/LTHW heat exchangers for domestic hot water production
- ✓ Electrical metering to each AHU control panel
- ✓ Lighting
- ✓ Power
- ✓ BMS (via electrical meters)

All meter readings shall be monitored via the intelligent building management system.

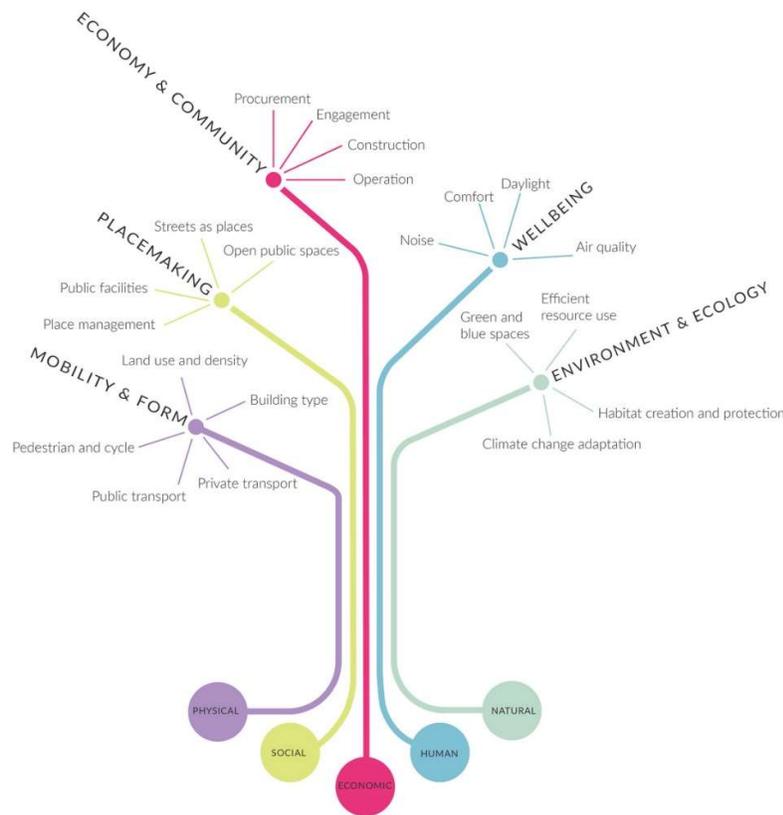
## 5.8 Fire Strategy

To be completed.

## 5.9 Sustainability

A Sustainability Strategy will be developed for the Princess Alexandra Hospital Project aligned with the Five Capitals framework to create value from sustainable development. This will include a defined sustainability vision for the project. The Five Capitals Framework will cover;

<b>Natural Capital</b>	By seeking to achieve positive gain, <b>NATURAL VALUE</b> is increased where existing quality is protected and new complimentary resources are introduced (e.g. ecological enhancement, sustainable material procurement, embodied carbon reduction).
<b>Human Capital</b>	With a focus on people, <b>HUMAN VALUE</b> is increased where quality and longevity of life is improved and happiness is increased (e.g. best practice acoustic performance, daylighting, biophilia).
<b>Economic Capital</b>	By ensuring equity for all, <b>ECONOMIC VALUE</b> is increased where all users of a place feel they have a level of ownership of the asset and buy-in to the outcomes it is seeking to achieve (e.g. local employment, SMEs).
<b>Social Capital</b>	By enabling community identity, <b>SOCIAL VALUE</b> is increased where a great place brings people together and creates a community (e.g. communal facilities, public realm, artwork from local artists).
<b>Physical Capital</b>	Creating high quality buildings ensures <b>PHYSICAL VALUE</b> is increased where buildings and infrastructure project an image of design for longevity and allow people to navigate easily on foot/by bicycle (e.g. net zero carbon, sustainable transport, connectivity).



Key objectives, overarching themes and targets are to be defined within the Five Capitals to provide a holistic response to the collective challenges of ecological, health and wellbeing and climate emergencies. A Sustainability charter to respond to the spectrum of the UN Sustainable Development Goals will be developed.

The overarching sustainability strategy for the Princess Alexandra Hospital will also cover the required Policy and Regulatory requirements including.

- ✓ Align design response with the current national and local plan policy requirements related to energy and sustainability.
- ✓ Strive to deliver against proposed changes in regulation, local policy and climate change targets.
- ✓ Align design response with the following local plan documentation:
- ✓ Harlow Local Development Plan – pre-submission Publication (May 2018)
- ✓ Adopted Replacement Harlow Local Plan (2006)
- ✓ Respond to the Harlow council declaration of a climate emergency and go beyond minimum standards of Building Regulations.
- ✓ PAH to target beyond compliance and enable a transition to zero carbon development.
- ✓ Align with the Health Technical Memorandum 07-02: EnCO2de 2015.
- ✓ Deliver against NHS Net Zero 2050 target.

- ✓ Current regulatory standards for emissions performance within the UK are the Building Regulations Part L2A 2013. The updated requirements will be assessed when they are released.
- ✓ PAH to achieve emission reduction beyond the minimum standards required for the Building Regulations Part L 2013 and impending Building Regulations Part L 2020.
- ✓ Achieve a minimum Energy Performance Certificate (EPC) rating of A.

### 5.10 Net Zero Carbon (NZC)

The zero carbon agenda will be central to the Princess Alexandra Hospital design and operation. The project approach to zero carbon will be aligned with the UKGBC framework for net zero, with a particular focus on net zero in operation with consideration will be given to embodied carbon emissions as this gains greater importance as operational emissions reduce.

A key instigator in the NZC agenda was the publication of the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C. This report concluded that to limit anthropogenic global warming to 1.5°C above pre-industrial levels, global greenhouse gas emissions need to reduce to NZC by 2050.

The Greener NHS campaign saw the formation of the NHS Net Zero Expert Panel in January 2020 with the remit of charting a practical route map to a net zero carbon NHS. The document; 'Net zero carbon client brief', sets out that it is possible to achieve a net zero carbon NHS. Furthermore, it states that 'the NHS can be a climate positive catalyst throughout the UK and the globe', leveraging its prominent position in the public eye by committing to net zero carbon and utilising innovative plant and equipment in defining that solution.

Through the development of plans to achieve net zero for the new hospital the scheme will support the contribution from the NHS and help set a path for other projects to follow and adopt.

As part of the definition of net zero, the UK Green Building Council has developed a framework definition for the built environment and this definition is widely being used to develop a roadmap to the 2050 net zero target. In line with the UKGBC framework the scheme will look at:

- ✓ Net zero in operation: eg reducing demand, integrating renewables and offsetting remaining emissions.
- ✓ Net zero in construction: eg build less, build efficiently and offset emissions at construction.

The fundamental aim behind a net zero carbon approach is to implement step by step reductions in the carbon impact of a process or product or service, and to then offset the remaining carbon emissions either through the production/procurement of renewable energy, or through the purchase of carbon offsets. The energy targets for the NPAH shall be as set out in the *Client Brief for New NHS Healthcare Buildings to Achieve Zero Net Carbon, within the Operational Carbon – Indicative Targets & Specification Requirements* section.

Detailed Energy modelling in the form of total energy assessments in line with CIBSE TM54 guidance shall be undertaken at each key project stage (in addition to core design and compliance modelling) that looks to critically appraise the energy targets against the NHS Net Zero Carbon Brief.

Assessments of the embodied carbon shall be undertaken at key stages, with technical solutions and strategies developed that look to reduced embodied carbon where possible. The total embodied carbon shall be in line with the targets established in the NHS Net Zero Carbon Brief.

### **Approach to Energy Strategy**

The energy strategy for the NPAH scheme will be based on a hierarchy approach that looks to maximise reduction in energy through passive design measures in the first instance, seeking opportunities to deliver energy efficiently and finally maximising the provision of low and zero carbon technologies. As a consequence of the optimized results derived from the application of the energy hierarchy approach, both energy demand, CAPEX and OPEX will look to be minimised. The energy hierarchy suggests the use of a four-tier approach based on a 'fabric first' approach through the Be Lean, Be Clean, Be Green and Be Seen stages.

Performance criteria for systems and building fabric shall be taken from *the Client Brief for New NHS Healthcare Buildings to Achieve Zero Net Carbon, Key Considerations for Net Zero Carbon For, Fabric and Systems Specification* section.

### **Building Regulations**

The NPAH scheme will be required to comply with Building Regulations Approved Document L2A: Conservation of fuel and power in new buildings other than dwellings (2013 edition with 2016 amendments). Applicability of any subsequent revisions to the Building Regulations will be determined when the updates are confirmed.

#### **5.11 BREEAM Target**

The PAHNSHST aspire to achieve a BREEAM 'Outstanding' rating from the outset of the project. Rather than targeting 'Excellent' and identifying a pathway to Outstanding, the reverse approach will be adopted looking at any cost savings versus sustainable / social values for optional reductions thereby maximising the value of BREEAM on the NPAH scheme.

#### **5.12 Modern Methods of Construction (MMC)**

Key areas that have been identified as part of the MMC delivery include:

- ✓ Leaner, lighter superstructure overall (which will reduce foundations)
- ✓ Less transfer structure (facilitating greater future flexibility)
- ✓ Smaller ceiling voids
- ✓ Lower floor to floor heights reducing walls, façade, building volume
- ✓ Highly productised MEP
- ✓ Highly rationalised facades

- ✓ Compressed programme

### 5.13 Building Components

At OBC level of detail no building components would be specified or detailed, however, any design should not prohibit the future specification or component type, providing an open and flexible design solution for the FBC detailing stage.

- ✓ Any proposed building components should enable and compliment the aspiration for the external and internal appearance and aesthetic, adding value to the designed space
- ✓ All building components should be robust and hardwearing in line with the anticipated use of an Acute setting while ensuring a non-clinical feel and within the cost plan
- ✓ All building components must be HTM/HBN compliant and within best guidance unless approved by the Client/Project Team otherwise
- ✓ Any proposed building component should be either specifically named and single source if essential to the delivery or approach to that element of the build or ideally open to allow a full market response and competitive tender responses
- ✓ All building components should have sufficient lifespans to reduce the future maintenance of the building and reduce any 'early' replacement works, while fitting within the cost plan
- ✓ Ensure all Building components are recorded, and lifespans noted with maintenance period in the BIM model

### 5.14 Health & Safety

The Trust places the highest importance on the health, safety and welfare of all parties involved in the development of the Princess Alexandra Hospital. This includes not only those involved in the construction process, but also those who will use, work, visit and be affected by the development and surrounding areas.

The design brief supports how the Construction (Design and Management) Regulations 2015 will be implemented across the various phases of the project and as it progresses from design to procurement, into construction and ongoing lifecycle management.

#### **Designer's responsibilities:**

Regulations 9 and 10 of the CDM Regulations set out the duties placed on designers. These include the duty to eliminate, reduce or control foreseeable health and safety risks through the design process, such as those that may arise during construction work or in maintaining and using the building once built. The key points being:

#### **Regulation 9 - Duties of designers:**

When preparing or modifying a design the designer must take into account the general principles of prevention and any pre-construction information to eliminate, so far as is reasonably practicable, foreseeable risks to the health or safety of any person—

- (a) carrying out or liable to be affected by construction work;
- (b) maintaining or cleaning a structure; or
- (c) using a structure designed as a workplace.

If it is not possible to eliminate these risks, the designer must, so far as is reasonably practicable—

- (a) Take steps to reduce or, if that is not possible, control the risks through the subsequent design process
- (b) Provide information about those risks to the principal designer; and
- (c) Ensure appropriate information is included in the health and safety file.

A designer must take all reasonable steps to provide, with the design, sufficient information about the design, construction or maintenance of the structure, to adequately assist the client, other designers and contractors to comply with their duties under these Regulations.

**Regulation 10** - Designs prepared or modified outside Great Britain:

Where a design is prepared or modified outside Great Britain for use in construction work to which these Regulations apply—

- (a) The person who commissions it, if established within Great Britain; or
- (b) If that person is not so established, the client for the project, must ensure that regulation 9 is complied with.

**Health and Safety File**

The Health and Safety File contains information that is relevant to the planning and undertaking of any future construction work. Specific requirements will be identified with the Client, the Organisation and other relevant stakeholders who will retain an ongoing legal obligation for the maintenance and provision of the information contained within the Health and Safety File.

## 5.15 BIM

Building Information Modelling is the process of creating and using electronic data models of buildings to facilitate a coordinated understanding of a broad range of real-world building issues, both as a design/specification tool and as an analytical tool for achieving statutory approvals or client driven performance requirements. The BIM Model as a rich information model, consisting of potentially multiple data sources, elements of which can be shared across all stakeholders and be maintained across the life of a building from inception to recycling (cradle to cradle). The information model can include contract and specification properties, personnel, programming, quantities, cost, spaces and geometry.

ISO 19650-1 and 2 are an evolution of the UK's standards for Information management using building information modelling as per BS 1192:2007+A2:2016 and PAS 1192-2:2013 and the PAH New Build Hospital must be delivered using the **UK BIM Framework**. A BIM Execution Plan will be required as part of this brief based on the high level EIR template which has been produced which gives a baseline for the ongoing development of the BIM for the new Princess Alexandra Hospital project. The document will be based on the information available at OBC stage.

The Exchange Information Requirement (EIR) template will be prepared for Trust acceptance to enable the Delivery Team to understand its BIM requirements in line with BS EN ISO 19650 with the aim of providing benefit for project procurement and Client Lifecycle Building Operation and Maintenance, including:

#### 1. Time Savings

Information design and delivery is collaborative through the use of Common Data Environments and coordinated models enabling an easier and more consistent design process.

#### 2. Material Savings

Using Intelligent Asset Models provides the opportunity to accurately account for and deliver/specify all assets in a collaborative manner therefore reducing the potential of incorrect material usage or wastage.

#### 3. Cost Savings

Clash detection throughout the design stage allows for accurate building design to be managed and completed more efficiently allowing the delivered asset to be utilised as an accurate representation of the built product.

#### 4. H&S Improvements

Asset models can be utilised to accurately detail all H&S requirements within a building in a collaborative model which can be used for team briefings and FM asset management.

#### 5. Risk Reduction

Intelligent data within asset models allows for accurate accounting of all building components and facilities allowing for reduced cost deriving from conflicting or out of date information whilst providing a single point platform for all asset maintenance and information updates.

#### 6. Improved Asset Quality and Utilisation

Design models have the potential to accurately include environmental factors into the design process allowing for buildings to be designed with factors such as solar gain and site placement within surrounding environments.

06

## Technology & Innovation

- The Digital Experience
- Fabric
- Footprint
- Flow
- Transformation

## 6. Technology and Innovation

We want the new hospital to set the benchmark in England for digitally enabled care. This will be achieved by embedding digital technology in the very fabric of the building, layering systems and services that work in harmony with the building infrastructure and services to deliver the overall Digital Experience for patients and staff. In addition, digital technologies will enable the transformation of the Integrated Care System and support our new Models of Care by helping to move more care to patient's homes and non-acute care settings, with resulting improvements in outcomes, efficiencies, and reduction in hospital capacity. Investment in innovative digital technology will enable a step change in the way in which care is delivered.

Embedding the right technology at the right time into the right locations of the building infrastructure is critical to achieving this aim.

### 6.1 The Digital Experience

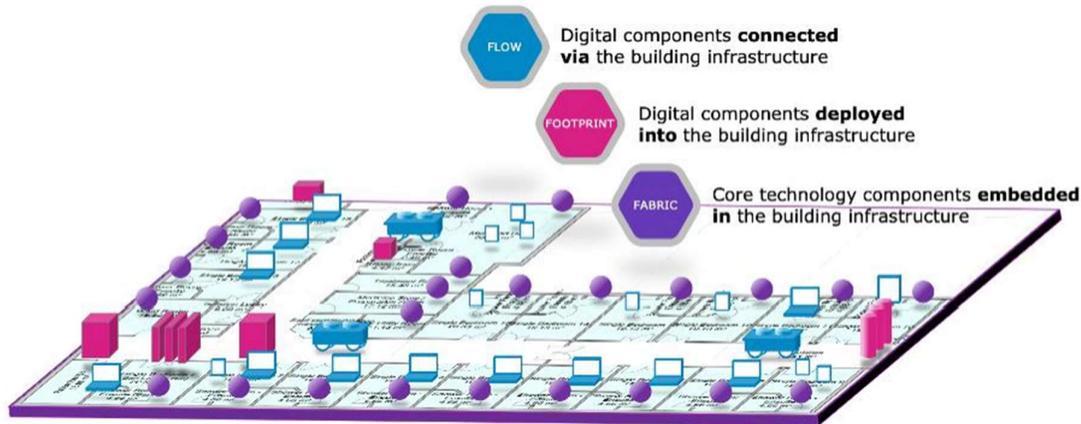
One of the fundamental principles on which the digital hospital is based is that of minimising and ultimately removing the use of paper through deployment of fully electronic health records and administrative systems. Core to this principle is the implementation and deployment of a new Electronic Patient Record (EPR) system in late 2022 within the existing hospital environment in preparation for subsequent transition to the new digital hospital.

The EPR will replace a number of existing systems and integrate to others, including at a regional ICS level, providing a seamless longitudinal view of the patient record across all departments as well as access to order entry and results reporting, online prescribing and closed loop medications administration and management.

Data will be entered once and efficiencies gained through robotic process automation (RPA), clinical decision support and analytics-driven insights. Access to the electronic record systems will be via a variety of device types for both patients and staff, within the hospital environment and from locations outside the hospital, all of which is dependent upon resilient and ubiquitous connectivity. Patients will have access to their own records and be electronically guided and informed on their journey to and through the hospital, with self-service and remote 'check-in' facilities, digital front door and digital wayfinding services. Information will be presented to both patients and staff via digital signage and digital whiteboards. Furthermore, a wide variety of embedded and supplementary digital technologies will actively monitor and feed information into central management, control and command systems, driving increased operational efficiencies and flow through the hospital.

These systems will also link with Health Learning Systems within the ICS to better manage flow across the whole ecosystem. NHSX's Digital Blueprint has been used as the basis of our digital technology architecture and introduces the three concepts of Fabric, Footprint and Flow as depicted in the diagram below. Fabric components are part of the core building infrastructure introduced during later stages of construction including connectivity, sensing and control, and form the foundation upon which Footprint and Flow technologies are deployed. Footprint components enable the core Fabric technologies to interact with the wider care ecosystem,

connecting building, clinical and operational systems. Flow components enable the operating model, connecting users and systems, automating processes and driving innovation.



## 6.2 Fabric

A wide range of technologies will be deployed in the fabric of the building to support a range of ancillary services. In future these technologies will be managed under a common set of principles and standards to ensure that they perform to their maximum and operate as an integrated whole. Integration of these technologies is key to their role in delivering integrated care successfully.



The Building Information Modelling (BIM) system is implemented from the outset to capture data and inform decision making across the entire construction process. Information from the BIM, along with other sources of data, then feeds into the Building Management System (BMS) to enable proactive monitoring of performance, management and alerting of the wide range of systems and services that form part of the building structure including heating, security, lifts, the pneumatic tube system and automated guided vehicles.

The Digital Twin system takes data from both the BIM and BMS to generate a digital model of the hospital and the technology systems deployed within it, including technical and building infrastructure, equipment, devices and sensors, controllers. Many aspects of digital hospital technology will feed into and shape information held in the BIM, the BMS and be the Digital Twin systems to ensure a holistic view of the environment. Using digital twin concepts, it will be possible to map the physical performance of the hospital in the virtual world to ensure that maximum efficiency is gained from the building in support of direct patient care.



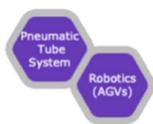
The fundamental elements upon which any digital technology deployment relies are those of hosting and communications. Robust data centre hosting space is still required for core networking and some other critical components. However, the majority of traditional compute and storage infrastructure will be provisioned 'on demand' as remotely hosted, cloud-based 'as-a-service' technologies. This will not only

significantly reduce the footprint required for on-premises hosting but allow for the use of third-party services that have excellent 'green' credentials.

Furthermore, Passive optical LAN (POLAN) technology will be deployed across the hospital. This provides a fully fibre-based local area network (supporting both wired and wireless capabilities) from core switch to outlet sockets on the wall. POLAN has a smaller overall footprint removing the need for traditional comms or hub rooms. Passive optical splitters are deployed within ceiling voids or plant rooms for fibre distribution and fibres are terminated on optical network terminators (ONTs) closer to active RJ45 outlet sockets and wireless access points (WAPs). LAN infrastructure is also supplemented with deployment of a private 5G mobile network antennae technology providing complementary high speed, low latency connectivity across the hospital and beyond.

Unified Communications services run across the network providing seamless audio, video and instant messaging communication capabilities for one-to-one to many-to-many connectivity. This technology will enable staff and patients to communicate with one another in an effective and secure way including support for remote consultations, reducing the need for direct face-to-face consults for medicine and surgeries, and all the logistical challenges that entails. Sufficient space and equipment will be made available across the hospital for these technologies to be deployed and used to greatest effect.

Remotely hosted, IP-based telephony services, such as those used within the existing hospital environment, will support fixed and mobile communication. Users will have a single number through which all communication is managed irrespective of whether they are using a fixed or mobile device. Switchboard capability will be provided as part of this platform but will be hosted and manned offsite. Cyber security will be maintained with advanced AI based intrusion detection/prevention systems, advanced malware protection, data loss protection, advanced anti-virus and anti-malware systems.



Transportation of a variety of artefacts around the hospital in a prompt and timely manner is critical to achieving the operational efficiencies and levels of care intended for the new digital hospital – and robotics are the envisaged solution.

Embedded technologies such as the pneumatic tube system (PTS) will be used for the transportation of pathology samples and medications. Intelligence will be built into the pathology ordering system to allow multiple pathology orders to be 'netted' and collected in the minimum number of tubes.

Direct interfaces to pathology analysers will identify the specimen and results will be passed back to the EPR system automatically after validation. Automated guided vehicles (AGVs) will also be deployed in support of a range of capabilities such as the movement of linen, meals, delivery of post and other bulky items and the collection of waste. Where possible, supplies for specific destinations will be packed off-site to help reduce space requirements in the hospital and reduce re-work. There will be clear separation of service provision minimising logistics movements and crossovers with public areas.

Localised servicing and storage will be provided for AGVs in dedicated areas across the hospital building to maximise efficiency and use of space. AGV systems will be integrated with lifts and door management systems to enable navigation across all areas of the hospital. Lift control will also be integrated into 'emergency and crash' management features to ensure lifts are available to transport patients rapidly to theatre, ICU or other urgent treatment locations taking priority over less urgent needs.



A variety of sensor equipment will be installed in selected locations across the hospital building. These will not only monitor environmental conditions such as temperature, humidity and CO2 levels, but will also detect occupancy and motion.

This will allow the building management system to automatically adjust the environment based on parameterised thresholds, the number individuals and the activity within a defined space. This will enable dynamic adjustment of temperature and air quality to help reduce power consumption - for example, switching off heating or air conditioning where a room is empty.

Surveillance / thermal cameras and motion sensors can also enable detection of patient movement, or lack thereof, and where a patient is perceived as being at risk of falling, alert the clinical staff to intervene before a fall does occur. This has the potential to prevent consequential harm, increased length of stay and additional cost. Sensors built into refrigerators and other such equipment enable 'Internet-of-things' (IoT) connectivity and allow for proactive monitoring and alerting to ensure they are operating within specified ranges.



Deployment of detection equipment will also support Real Time Location Services (RTLS) and RFID solutions used to locate equipment, staff and patients throughout the hospital building. For example, it will be possible to locate the nearest mobile

xray machine and, if required, request a porter to deliver it to a specified location. It will also be possible to locate the nearest member(s) of staff with relevant skills (e.g. the crash team) and to track patients in real time, either from a security perspective or from a scheduling perspective.

RTLS and RFID technologies will also enable enterprise Asset Tracking and management to be used to locate and help secure all technology and equipment, supporting tracking, maintenance and disposal. These concepts will apply to all assets and technology such as laptops, network equipment, AGVs, robots and portable imaging machines. A more streamlined approach to asset tracking and management also enables a reduction in equipment storage space for certain device types, which can be provisioned on a just-in-time basis.



Infection Control is an important part of the operational process across all hospital areas. Various technologies will support the process of infection control including Mobile Disinfectant Robots. These robots will be part of the regular cleaning cycle, preventing and reducing the spread of infection using UV-C light

technology to disinfect specific areas. These robots will link to occupancy sensor information to ensure treated areas are unoccupied. RFID tracking technology will also enable current and historical location information of patients and staff to be used as part of an in-house 'track and trace' capability.



Deployment of Smart Grid technology across the estate enables analysis and management of power provision and consumption to maximise energy savings. Additional controls can be enabled within the BMS to help drive these efficiencies further, enabled by a distributed network of Smart Controllers, Smart Lighting and other automatically controllable devices. Inputs will include ambient conditions, occupancy, scheduled usage and other automatically generated and manually entered criteria.



The Control & Command Centre brings together the various controller and management technologies into an overall physical Hospital Operations Hub, which is supported by a distributed set of federated, and where possible virtual, control and command technologies. The central system will integrate with a range of feeder systems and orchestrate and optimise operational flow of patients and staff through the hospital from the digital front door to the digital transfer of care. An associated Analytics Platform supports the management of the core building infrastructure and integrates and aggregates data from a range of different building-related systems into one platform.

This enables analytics that provide real time insight into the operation of the building combining distinct types of asset and maintenance data with performance data. Outputs form the basis of new and improved energy and asset performance services. The use of data analytics and simulation enables better operational quality for the hospitals and the operating conditions.



The Smart Parking system links to number plate recognition cameras at car park entrances, recognising the patient's vehicle from a previous visit and automatically identifies the nearest accessible space, taking automatic payment from the patient's registered phone.

### 6.3 Footprint



Integration Gateways (the Trust Integration Engine (TIE)) will enable connectivity between a wide range of clinical and administrative systems internally and with external services. Investment will be made in Medical Device Integration and Enterprise Service Integration to ensure that technologies link seamlessly with one another and support the delivery of direct and indirect patient care to the maximum. Without this level of integration providing a single view of a patient's journey and a single view of the performance of the hospital will not be possible.



Robotic Process Automation (RPA) will enable repetitive tasks to be configured within administrative and clinical systems to be carried out automatically. This will initially focus on automation of processes within finance and HR but is ultimately likely to extend to include interfacing and integration with medical equipment and other embedded controllers. For example, patients receiving drugs and nutrition via infusion pump drivers linked to the EPR system will automate this process and medical staff will be alerted when bags need changing. Digital Transfer of Care (DTC) will help drive the complex process of patient discharge, ensuring a seamless pathway out of the hospital. It will assist in coordinating across multiple different resources and services to ensure the correct measures are in place for

the patient in the process of discharge and that they have the correct ongoing support and services once discharged.



The Digital Workplace component brings together different technology devices, systems and services that allow staff to connect to clinical systems and communicate and collaborate with colleagues. Both mobile and desktop computing devices will connect to the hospital network and systems from any location, inside the hospital and externally, in a secure manner. Access to desk top solutions such as MS-Office will be provided on a fully managed and self-service basis, with applications delivered to end-user devices via controlled catalogue style concepts and assets will be placed under full life-time management.



Our patient will enjoy a totally different, digitally enabled experience when interacting with the new hospital. However, it is recognised that for some patients this method of interaction may not be their preferred choice and hence support and alternatives will be provided to minimise the risk of exclusion or inequality. For those that do choose the digital experience there will be a number of embedded technologies available to help them navigate their journey through the hospital, minimising the amount of time they will need to wait within the hospital itself and therefore reducing the waiting areas footprint of the building.

The Digital Front Door is an overarching framework of technologies that engages the patient from the outset. Pre-admission information will be sent electronically and, where possible, history and physical information will be patient-entered and augmented when they attend. On arrival, Digital Wayfinding will enable patients to use applications on their own mobile device to 'check-in' and be guided to the right department. Alternatively, they can use Self-Service Check-in Kiosks that will deliver a similar experience using 'airport-style' check-in capabilities and Digital Signage to provide directions (see below). If there are unforeseen delays in the schedule patients will be informed through applications and screens to allow them to wait in areas of their choice.

Visitors will also be able to use similar Digital Wayfinding technology and applications to orientate their way around the building and access visiting times relevant to the patient with whom they are associated. Access to internet services will be supported for their personal devices. Updates and automatic appointment time adjustments will be communicated allowing patients and visitors to relax and enjoy the facilities that the new hospital reception offers, rather than spending time in traditional hospital waiting rooms, both improving patient experience and reducing space requirements.



Digital Signage, provided through wall-mounted digital screens in public areas, will provide general patient information and similar screens closer to treatment rooms will provide more specific details on waiting times and other relevant information. Staff will be presented with information in a similar manner via Digital Whiteboards that summarise bed, room and ward status information as well as patient admission, status, discharge and transfer information, all updated dynamically from the EPR.



Biometric Identification Systems will be embedded throughout the hospital and within a variety of devices enabling access controls to ensure that only authorised individuals

are permitted to access those systems and services. This will include staff access to areas within the hospital, systems and devices, authorising / approving a range of processes (e.g. prescribing or medication administration, use of dispensing machines for uniforms and replacement compute equipment, and cashless payment services) and can also include patient access to services.



Integrated Bedside Terminals for day-case or inpatient visits will enable patients to access their notes, control their local environment (temperature, blinds and so on), communicate with clinical staff, access the internet and entertainment systems, and order meals suitable for a range of dietary requirements and preferences.

Patients will also be able to use their own devices to access the internet and applications relevant to them. The Clinical Collaboration solution enables communication between clinician staff across the hospital and with patients. The solution enables clinicians to contact and communicate with colleagues. It also links to nurse call alarms within inpatient rooms allowing initiation manually or automatically via connected devices, to alert the relevant member of staff who can then address the potential issue.

Remote Monitoring can also connect into the Clinical Collaboration solution and be configured to alert the relevant clinician should predefined measurement thresholds be exceeded on a patient's wearable monitoring device or collected via a patient-entered data. There are a wide range of approved applications that support the remote collection of clinical data (e.g. to support diabetic care and arrhythmia) and a number of applications that provide support and guidance to patients to help them live with a wide range of conditions. Knowledge of these applications and when best to use / prescribe them will become part of the way that care is delivered.



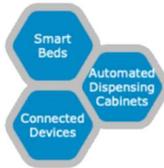
## 6.4 Flow

As referenced in the introduction above, the EPR system is fundamental in delivering the envisaged digital future of the hospital, enabling a fully electronic record and providing one of the main components in support of ultimately achieving HIMSS Level 7 accreditation. The EPR will be tightly integrated with departmental systems to support effective order entry and results reporting capability as well as online Electronic Prescribing and Medications Administration using closed loop medication management principles. Where possible, Voice Recognition and natural language processing tools will be used to simplify data capture and automate clinical coding.

As the medical record will be completely electronic at the point the new hospital opens all clinical care will be transacted through the chosen EPR and departmental systems with no space required for permanent on-site storage of records. All relevant historical paper-based care records and other paper records coming into the hospital from external sources will be scanned, stored within the Electronic Document Records Management System (EDRMS) and made available via the patient's electronic record.



SSO Proximity Readers will be embedded within a wide range of systems and simplify staff access to those systems. Technologies that are used for security identification services mentioned above will also, where possible, use SSO technologies for purposes such as cashless payment for staff meals, access to uniforms from 'vending machines' and other relevant applications.



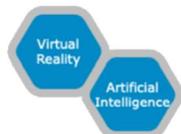
Smart Beds are a specific type of connected device and include technology that enables patients to be constantly monitored for motion, weight and other physiological factors, integrating to the EPR and other monitoring and management systems, providing a feed of data and enables alerts to be generated on predefined criteria and thresholds. A broader range of medical equipment will also provide feeds of data as connected devices, linked to the EPR to help acquire data in the most efficient way. These will include ICU and other patient monitoring equipment, anaesthetic equipment, thermometers, blood pressure monitors and syringe drivers.

Automated Dispensing Cabinets and Dispensing Robots are linked to the electronic prescribing and medications administration system as well as pharmacy stock control and medications management systems, ensuring a safe and efficient means of delivering and tracking medication used for each patient.



The Advanced Analytics Platform capabilities will be deployed as part of the Hospital Operations Hub (Control Command Centre) and will combine in real time the performance of the hospital from a clinical care perspective and also from a building management perspective. From this hub it will be possible to analyse patient throughput, identify bottlenecks in process and make informed decisions about how best to utilise the staff and facility to maximise the delivery of care. For example, it will be possible to identify patients waiting for TTO drugs prior to discharge, look at the impact of emergency admissions on elective surgery and using artificial intelligence techniques consider impact of LOS and identify candidates for discharge.

Smart Scheduling enables the forecasting of resource requirements across a range of artefacts including rooms, equipment, devices, patients and staff. Scheduling of events will have an associated set of resources that will need to be coordinated to be in the right place at the right time. This can be linked to building control systems, location-based and asset management services, and staff rostering as well as tracking patient progress on arrival and even predict potential cancellations and no-shows ahead of time to improve efficiency of operational flow.



The use of Virtual Reality (VR) and Augmented Reality (AR) will be used to assist in the education, training and delivery of care. Artificial Intelligence (AI) will be used to augment radiology and pathology diagnostic services as will the use of telepathology and teleradiology. Data analytics and AI will provide insight to help improve operational efficiency and also be used to drive research. As appropriate, virtual reality and AI will be used to improve the delivery of care.

## 6.5 Transformation

The digital technology embedded within the new hospital environment and the associated working practices, operational flows and patient engagement represent a significant advance over the existing hospital. The level of change required is significant. To ensure that maximum benefits are delivered and that risks are minimised a significant level of investment will be put into a range of transformation activities including education, training, process design, change management, implementation planning and programmatic controls. This will require access to sufficient space, methodology, technology and investment including plans for a 'model office' environment within which digital technologies and medical devices can be connected to building infrastructure for the purposes of testing, familiarisation and training.

The patient will need to be at the heart of this and co-design the processes, space and layout that best meets their needs. Consideration will also be given to the skills and resources required to implement and sustain such change and the opportunities provided, by establishing a digital and agile working environment as the norm.