

2.9 Existing Travel and Transport

2.9.1 Active Travel

The existing active travel routes around and within the site boundary are as indicated on the diagram opposite.

While there is some existing provision for active travel such as footways and cycle routes, the environs of the hospital are difficult for pedestrians and cyclists to navigate as the area is vehicle-orientated in its design and cars are given the most consideration. The likelihood is that this discourages people from engaging in active travel due to concerns around safety, ease and complexity of routes.



1 Shared bus and cycle lane on Anlaby Road



2 Pedestrianised area outside St Stephen's shopping Centre



3 Footpath and bus stops along car-dominated Anlaby Road

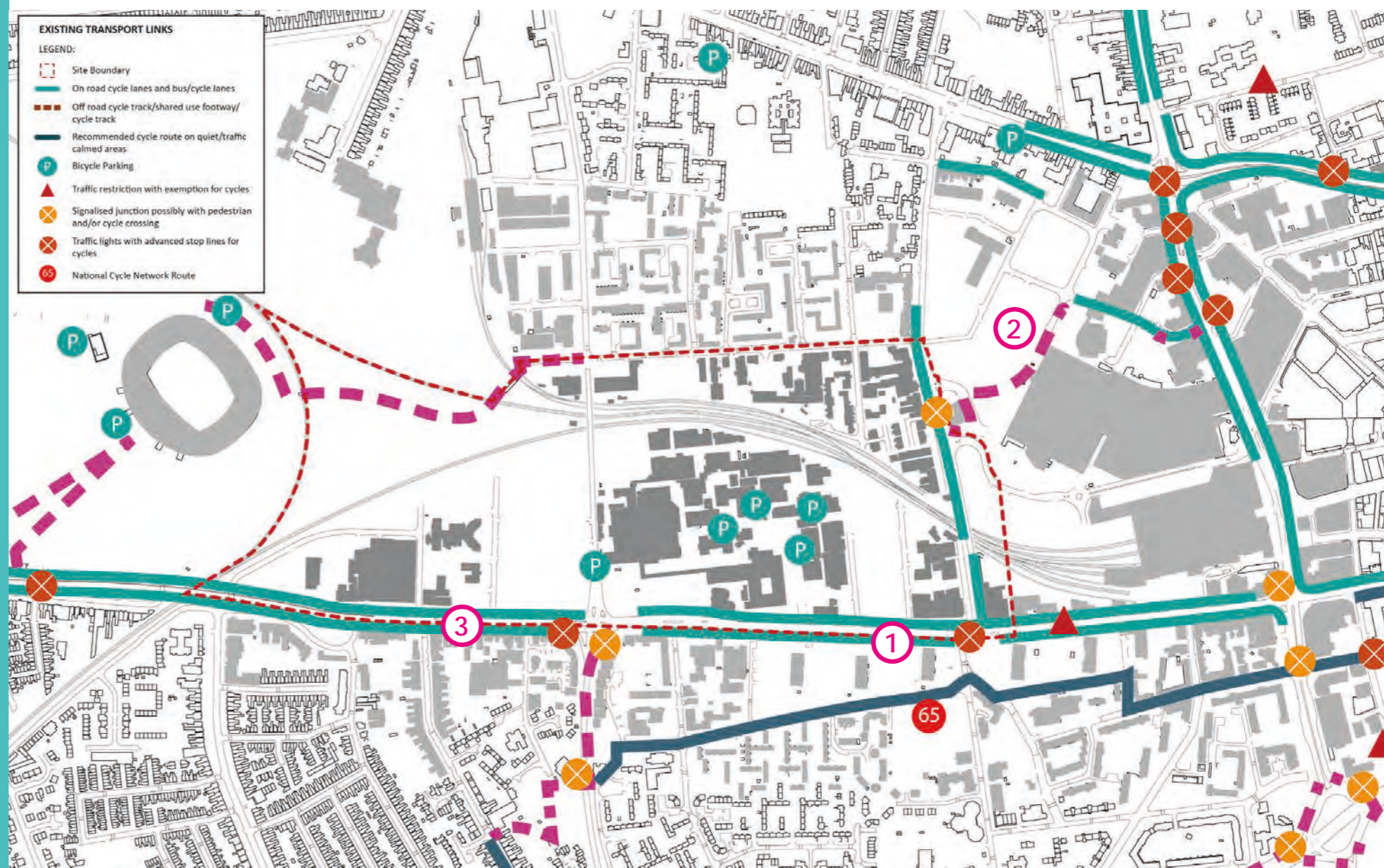


Figure 2.34: Diagram showing existing active travel routes & facilities, and photographs taken on site

2.9.2 Transport Links and Routes

The existing travel routes for buses and bicycles around and within the site boundary are as indicated on the diagram opposite.

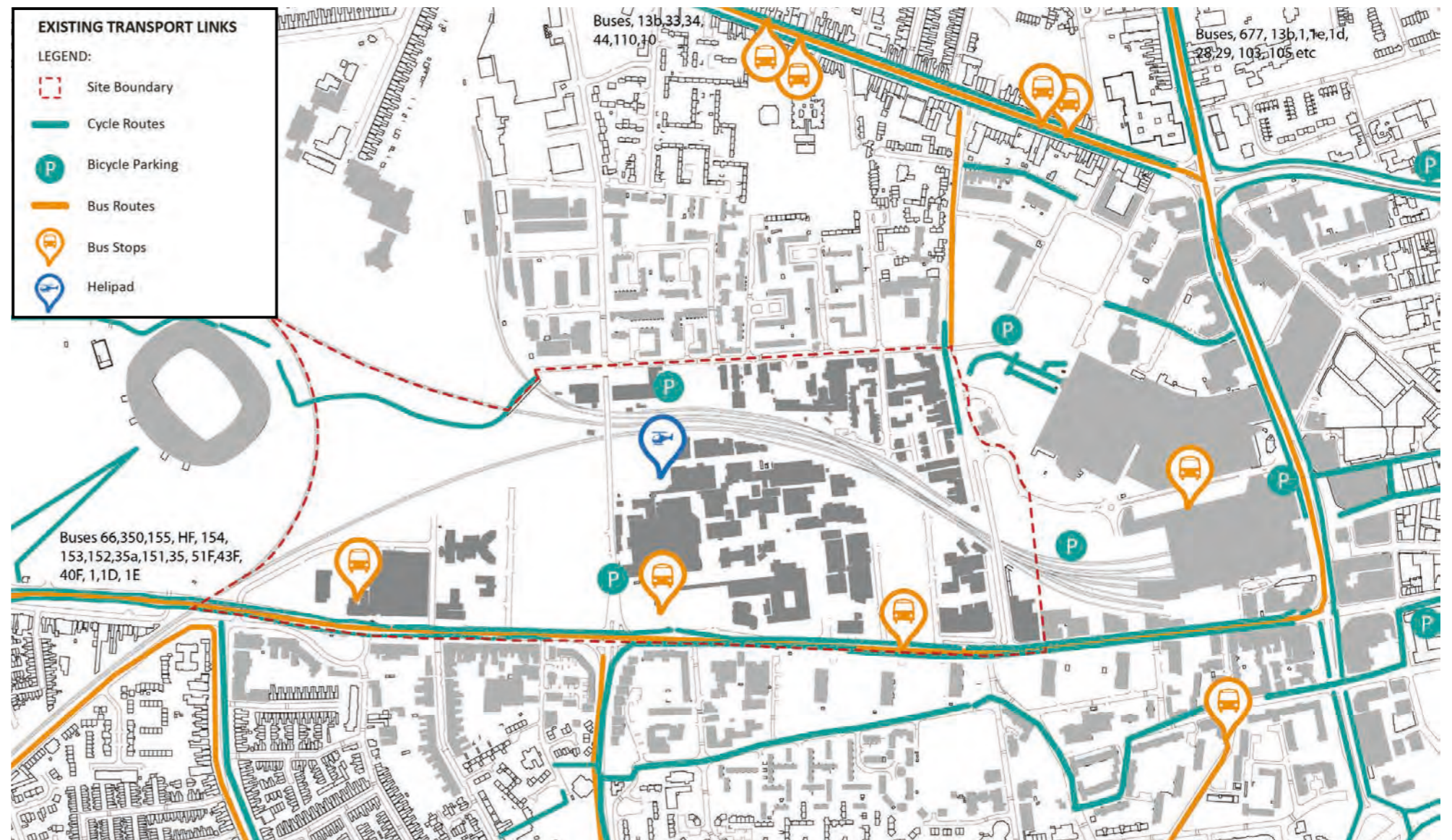
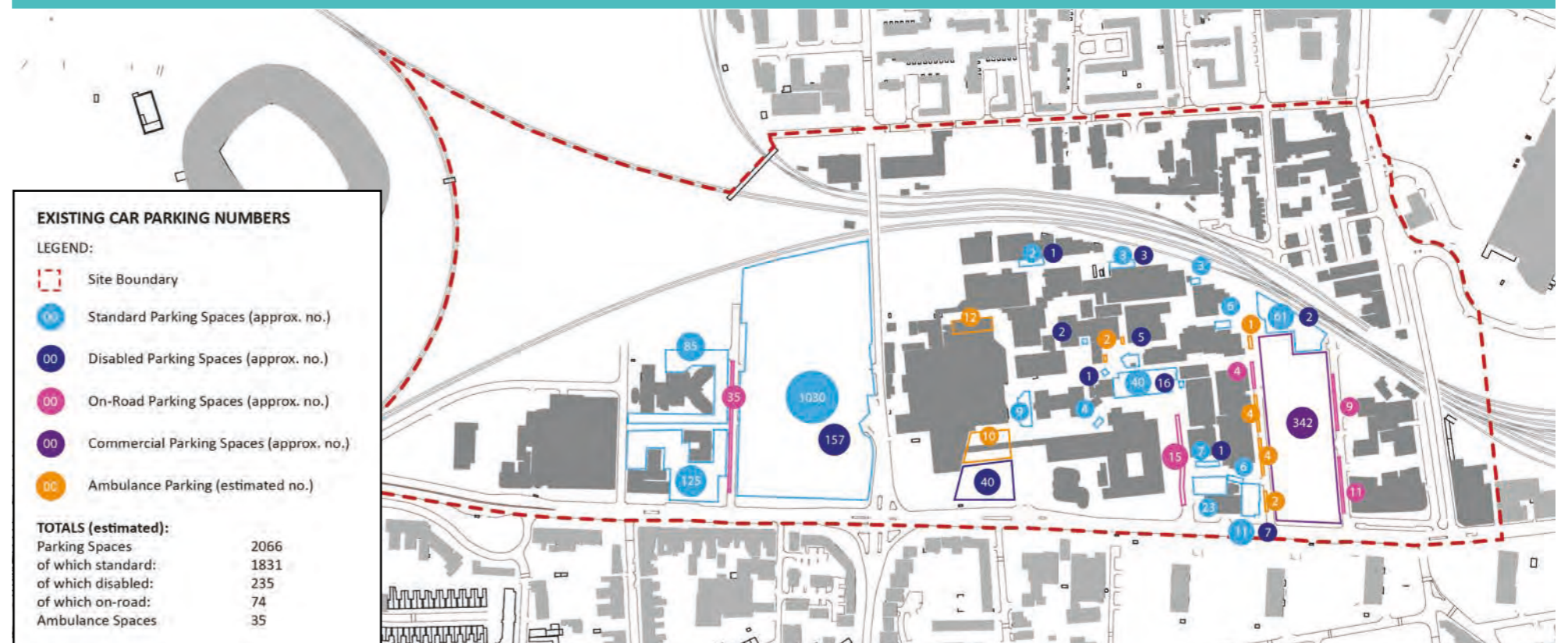


Figure 2.35 (above): Existing vehicular transport links
 Figure 2.36 (below): Estimation of number and location of existing vehicle parking spaces on the site

2.9.3 Existing Car Parking

The adjacent diagram shows approximate figures and locations for car parking on the HRI site currently, including hospital car parks, staff spaces, on-street parking and commercial car parks. Within the masterplan study, Curtins have commissioned a transport survey to capture existing parking numbers and uses. Where there is a slight discrepancy between HRI numbers, numbers indicated opposite and Curtins numbers, the Curtins data should be referred to as the primary figure.



2.10 Existing Utilities across the Development Area

We have commissioned a search for the existing utilities across the proposed development area. This is for two reasons:

1. To confirm if there are any critical utilities crossing the development area, which may need to be diverted.
2. To consider where connections into the existing utilities can be made for the proposed buildings

We have described the Hull Royal Infirmary (HRI) infrastructure based a site visit with the estate teams and desktop study of the information available.

The full Envirocheck report is appended at the end this report. The following summarises the existing utilities across the development.

2.10.1 Power

There is a local electrical substation located on Anlaby Road providing power to the site.

The Envirocheck survey also highlights some electrical mains crossing and connecting into the site, which are coming from a location outside the extents of the survey, it is assumed that this supply is located somewhere in the residential area south of the site.

Several disconnections will be necessary throughout

the site due to the demolition of some old structures and the addition of the proposed buildings and the exact locations of these can be developed in the later design stages.

It is also noted that some electrical mains cross the railway tracks and may be at risk of disrupting the operation of Network rail lines during construction.

There is an external plant room containing backup supply to the hospital building housed on Argye street and care should be taken not to disturb the incoming and outgoing cables of this plant.

2.10.2 Telecoms

Both Cityfibre and Openreach are present on the site. Openreach cables and boxes run along Anlaby Road and Arnold Street. Cityfibre cables also run along Anlaby road, as well as Fountain Street, and Londesborough Street on the other side of the Network Rail lines.

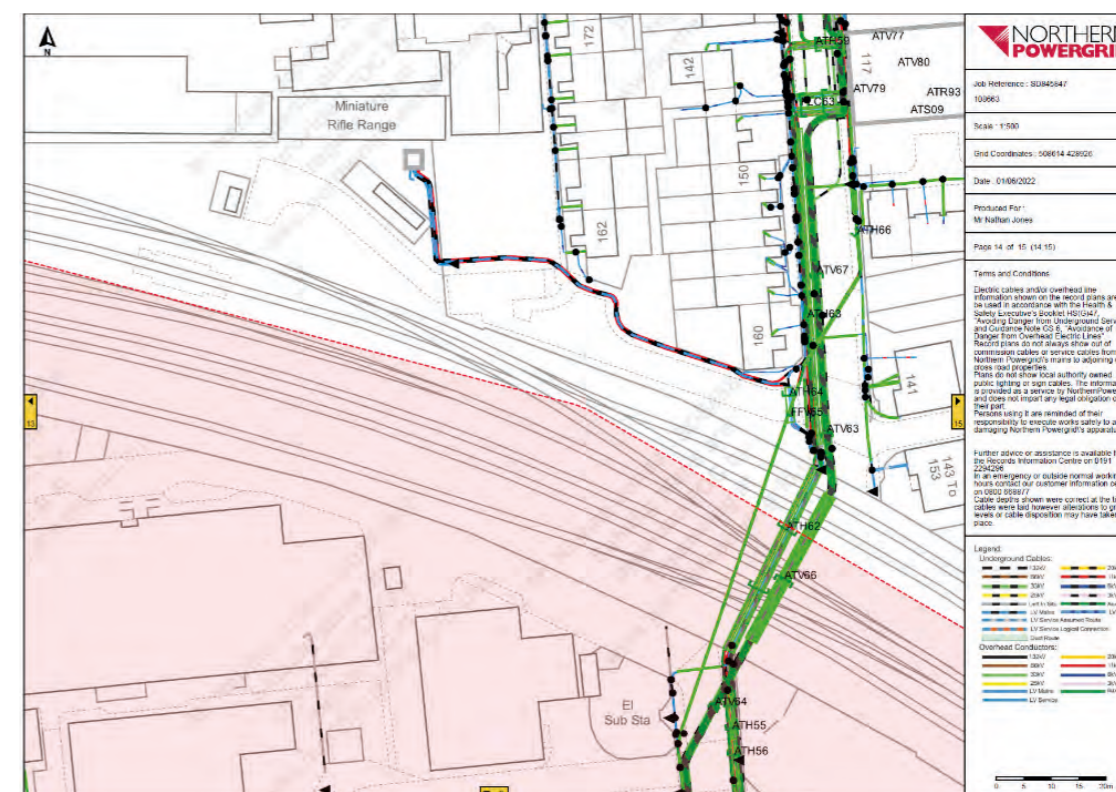
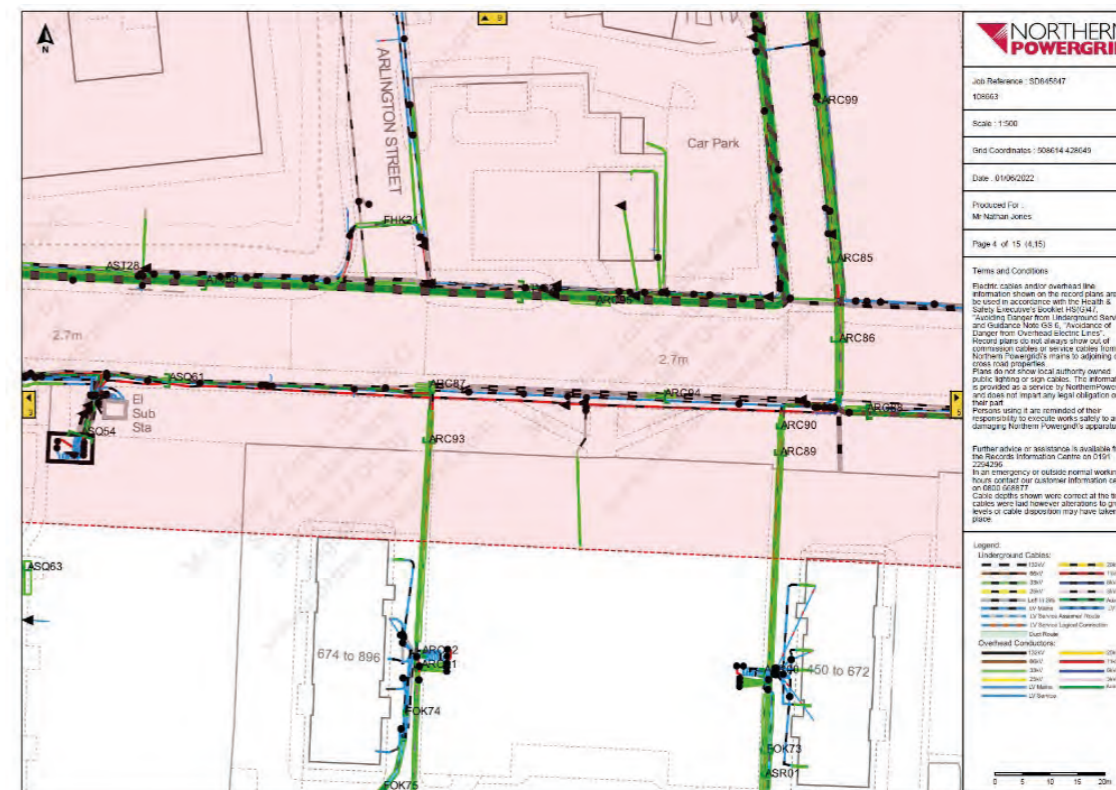


Figure 2.37: Key Power layouts from Northern Powergrid

2.10.3 Water

There are three water trunk mains running below Anlaby Road. One on the southern side serve the residential buildings to the south of the development area.

The remaining two mains both serve the development area and the HRI. Each road off the main road is served by the water mains.

There are two cross connections connecting the northern trunk main to each of the other two trunk mains in Anlaby Road (central and southern). The central trunk main connection to support the HRI mains is clear, and is at the Lansdown Street. The second cross connection between the southern mains and HRI mains is further west but is identified as assumed on the received Yorkshire Water information.

There are also several abandoned mains, particularly around the junction on Anlaby Road and Argyle Street.

For the future development north of the railway there is a water main running down Londesborough Street serving on the larger east building in the proposed area.

2.10.4 Gas

There are two Low Pressure (LP) gas trunk mains running below Anlaby Road.

The trunk main on the southern side is the larger of the two. This originates further east from Ice House Road. At the junction with Anlaby Road the 600mm gas main branches off including the 450mm main that continues along the south side of Anlaby Road, and the 300mm gas main running along the north side of the road

Branches off the 300mm LP gas main run up the roads off Anlaby Road to serve the various existing buildings in the proposed development area. Similarly there are branches serve various HRI buildings.

There is a Medium Pressure (MP) gas main running down Argyle Street. The MP gas main crosses the railway line north of the existing car park, runs east alongside the railway at the north end of the car park, then curves across to run south down Argyle Street to the junction with Anlaby Road.

The MP gas main then branches off to serve the HRI and to connect to the 450mm LP gas main on the south side of Anlaby Road.

The interpretation of this connection from the Northern Gas network drawings is that this connection is a backup supply into the 450mmLP gas main, should its main supply fail or require temporarily diverting.

For the future development north of the railway there are gas mains running down Londesborough Street serving the each of the existing buildings in the proposed area.

2.10.5 District Heating

Hull City are currently developing their city wide district heating. The proposed routes for this network are not available yet.

2.10.6 Network Rail

The railway runs east west to the north of the proposed development. The proposed development will include for the appropriate exclusion zone along both sides of the railway as it cross the development area.

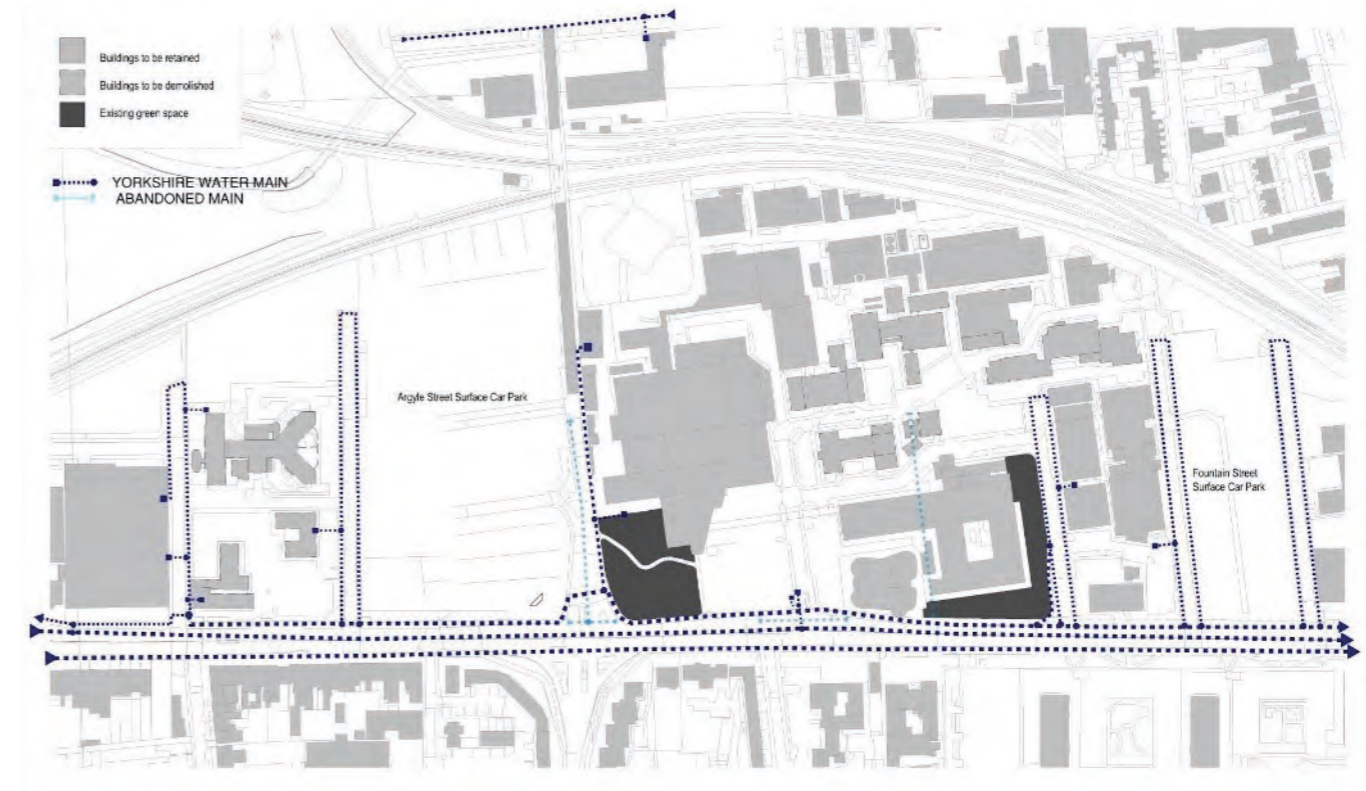


Figure 2.38: Existing Water

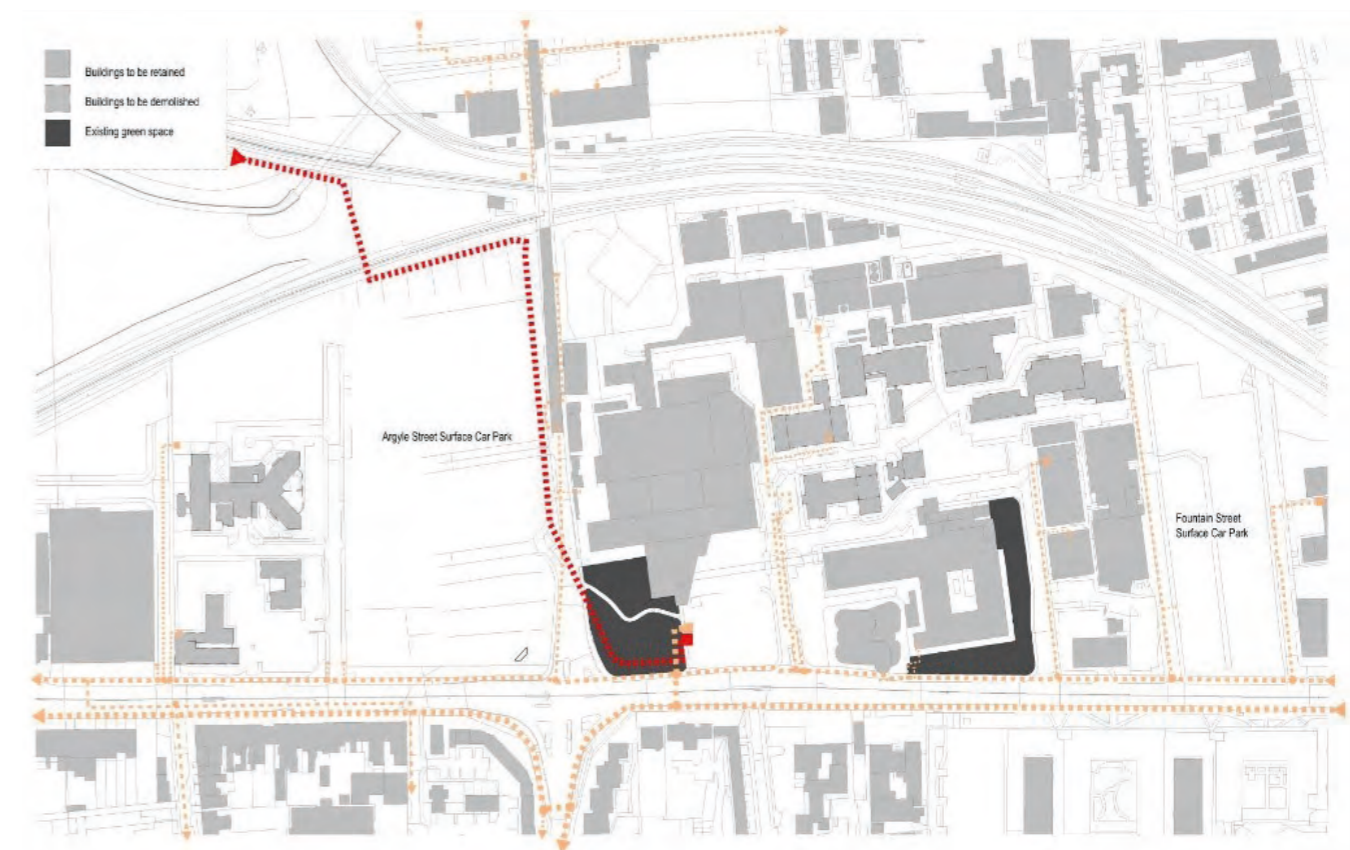


Figure 2.39: Existing Gas

2.11 Hull Royal Infirmary Existing Infrastructure

The following description of the HRI infrastructure is based on a site visit and desktop survey of the “as fitted” information available.

Overall there are Building Services engineering systems and buildings that have been recently updated and are efficient and future ready for the next decades of significant change.

On the other hand there are other systems and buildings that have been lower down in regards to the need of the recently available investment and have not been updated since their original installation in the 1960s onwards. These systems are no longer fit for purpose in the 21st century and are not able to be adapted to the challengers ahead.

The following section describes the overall installation and condition of each building engineering system.

2.11.1 Service Tunnels

All the building services systems are distributed around the HRI via tunnels. The tunnels vary in age and condition with the more recent tunnels being larger and with capacity to take additional services in the future.

2.11.2 Power

HRI has a network of private substations located on site. There are 2no. Yorkshire Electricity (YE) supplies feeding the client’s HV Substation (Secondary supply A). Secondary supply A feeds the private HV 11kV HV ring and a radial feed to Secondary supply E. Secondary supply G is also fed by a radial supply from Secondary supply D



Figure 2.40: New Service Tunnel Images

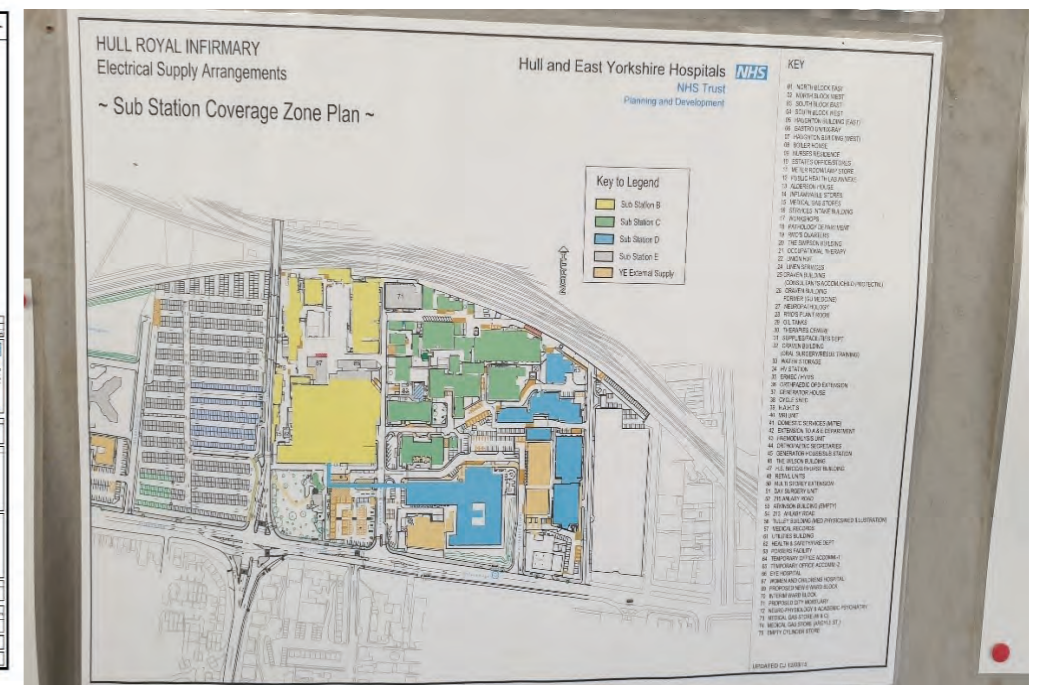
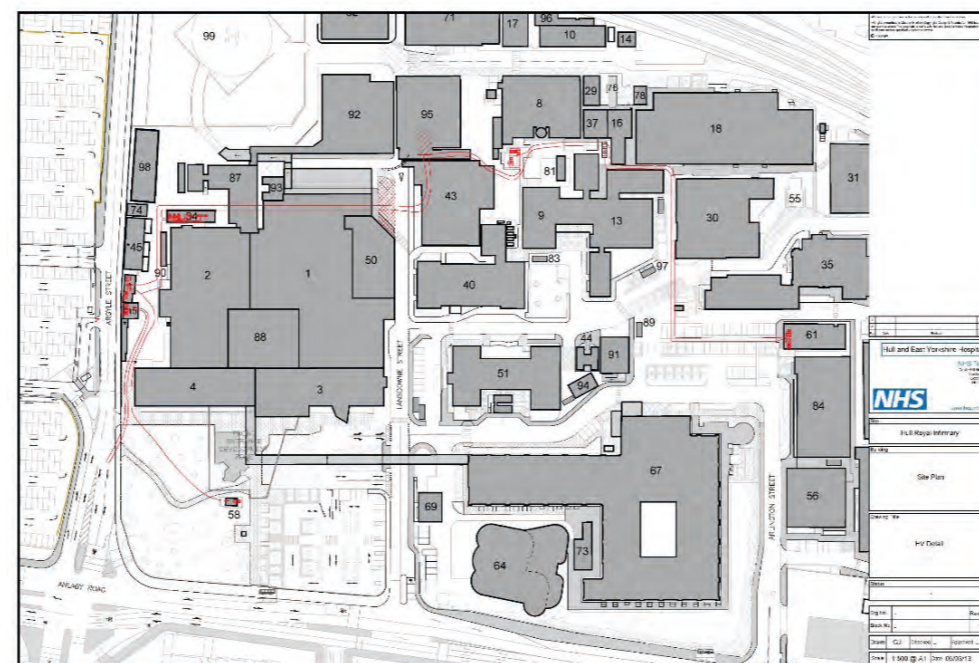


Figure 2.41: Power Supplies

2.11.3 Water

Each building or group of smaller buildings are supplied from a sub-metered main cold water supply taken from the statutory authority trunk main connections off Anlaby Road and Argyle Street.

Each building then boosts the cold water as needed. The HTM compliant 12 hour storage is provided on a building by building basis.

Supply Resilience

There are several mains water statutory authority connections serving the HRI estate, and some buildings are linked by the estate wide supply network.

There remains a significant risk that the remaining buildings on failure of their individual water supply from the statutory network will be without water after their storage tanks have been depleted as there is no alternative water source other than bringing in tanks from off site.

There is a central water storage tank next to the boiler house, however the size of this tank is not adequate for the entire estate.

Additionally the majority of the water connections are all taken from the same trunk main in Anlaby Road. However there are two cross connections connecting the HRI trunk main (northern) to each of the other two trunk mains in Anlaby Road (central and southern). The central trunk main connection to support the HRI mains is clear, and is at the Lansdown Street. The second cross connection between the southern mains and HRI mains is further west but is identified as assumed on the received Yorkshire Water information.

2.11.4 Above Ground Drainage

Each building connects the associated rain water and foul waste drainage to the below ground network as needed.

There is no separation of rain water, grey or black waste drainage.

2.11.5 Gas

The central boilers and CHP plant rooms are both served by supplies in Lansdown Street taken from the Low Pressure (LP) mains running in Anlaby Road.

The gas mains serving the central boilers continues to serve the Craven Building, Alderson House and the Therapies Centre. The CHP gas mains continues to serve the Day Surgery Unit.

There are further mains LP gas connections directly off Anlaby Road serving the Wilson building and the Women's and Children's Hospital. Another gas mains taken off Anlaby road then runs up Arlington Street to serve the Renal Unit and the Tulley Building.

The gas mains in Fountain Street is also taken off Anlaby Road and serve the Facilities building and the ERMEC/HYMS Building.

There is a final gas connection taken from Argyle Street to serve the generators. This continues to serve the Ward block, south east block (main hospital restaurant) and the helipad.

Supply Resilience

The two gas mains serving the central boilers and CHP unit may be interlinked, although this is not clear from the information available.

Otherwise each gas main serving the individual HRI buildings described above is standalone with no ability to take gas from an alternative source. However it is noted that the gas mains in Anlaby Road do have two sources of gas including the MP gas mains in Argyle Street.

2.11.6 Site Wide Space Heating

There are four gas fired steam boilers, installed in 2021. These operate in pairs, 8MW and 5MW, in duty /standby rotation.

Each boiler has dual burners for oil and gas, as required to provide full resilience. None of the boilers are future hydrogen gas enabled.

The steam is delivered across the HRI to serve Plate Heat Exchangers (PHX) in each building.

The secondary side of the PHX then delivers LTHW to each building to serve radiators, a limited number of radiant panels and AHU heating coils.

There is capacity in the steam network to serve the proposed Ward Block.

2.11.7 Site Wide Hot Water Heating

The Heating for the Hot Water (HWS) is supplied separately to the space heating. A dedicated Combined Heat and Power (CHP) and boiler supply the low temperature hot water (LTHW) for instantaneous Hot Water production, via PHX, in each building.

The gas fired 1.5MW CHP pre heats the LTHW and the gas fired 0.9MW boiler then completes the heating as needed by demand.

Both units were installed in 2021 and are future hydrogen gas enabled.

2.11.8 Medical Gases

The VIE plant is adjacent to the Facilities Building. The Oxygen is then distributed around the HRI via the tunnels.

The remaining medical gases are stored in three separate housings alongside Argyle Street,

2.11.9 Cooling

The cooling across the HRI estate is proved as needed with any resilience is locally provided. Cooling is provided by a combination of air cooled chillers, Heat Pumps and refrigerant based systems.

2.11.10 Ventilation

The ventilation across the HRI estate is as needed with any resilience provided locally.



Figure 2.42: Steam Boilers

3.0 Design Principles

3.1 Strategic Principles

The following pages explain overarching principles that sit within key architectural and masterplanning moves to provide a framework for future development to come forward in a co-ordinated fashion.

The study area currently lacks a high quality pedestrian and sustainable travel environment and the phased redevelopment of the area should sit within a strategic plan that allows piecemeal enhancement to take place, working towards a cohesive longterm plan that can provide connected routes, high quality spaces and appropriate levels of future development.



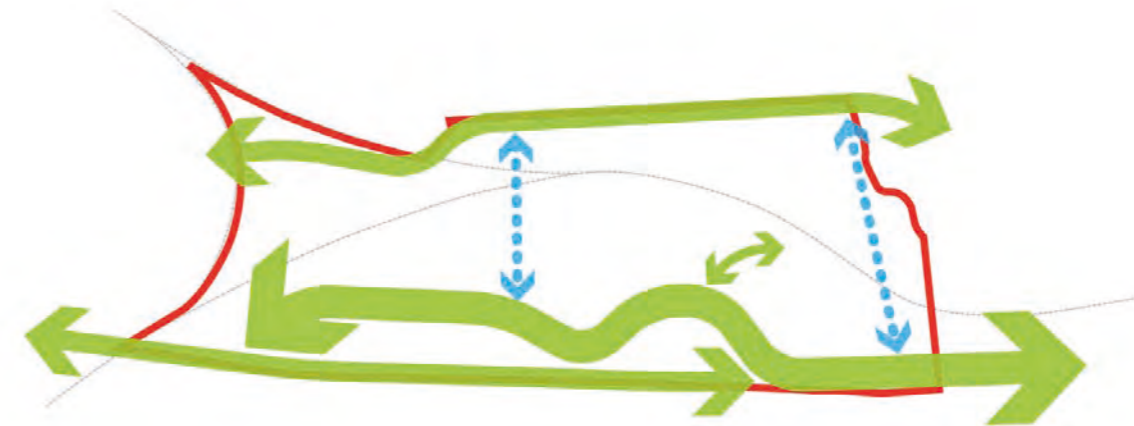
Figure 3.1: Concept image exploring the improvement of footpaths and cycleways along Anlaby Road, and incorporating landscape (which doubles as a sustainable urban drainage system for rainwater) as a buffer between pedestrians, cyclists and road vehicles.

Connected Green Network

Proposals aim to strengthen and link existing pedestrian and active travel routes through the site, and to create a series of varied green spaces which can fulfil a number of roles.

Larger urban green spaces act as gateways to the hospital campus, helping to orientate and welcome visitors and staff. Opportunities for smaller green spaces such as pocket parks and planting alongside routes, allow moments of calm and make active travel more appealing.

Along with the numerous benefits green space will provide; such as increased biodiversity, flood alleviation through sustainable urban drainage, and the proven therapeutic health benefits of landscape; these spaces and routes play a vital role in the wider masterplan.

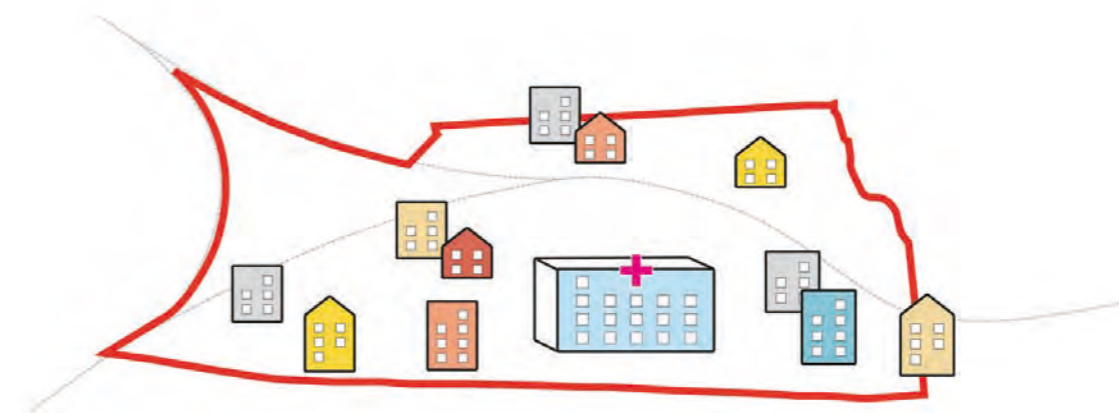


Sustainable Mix of Uses

Alongside consolidating the HRI health campus, other complementary development uses are proposed.

New plots for high-quality housing provide opportunities for dedicated staff accommodation close to the hospital, and housing with excellent access to Hull city centre and transport links.

A range of uses across the site, including healthcare, residential and commercial, builds on what is already present and encourages activation of the public realm as walkable, safe and pleasant to connect these various uses.

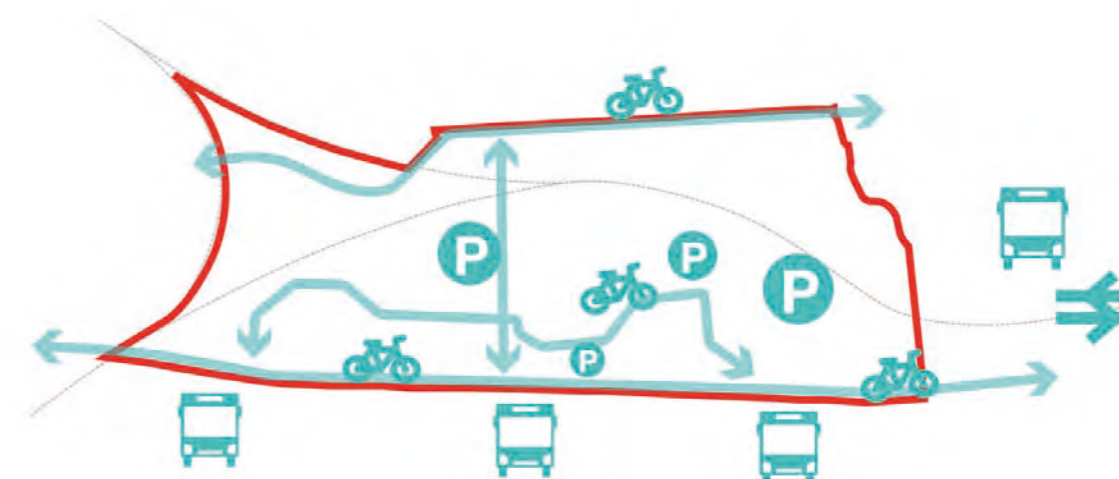


Active Travel

A key driver is encouraging low-carbon / active travel, such as walking, cycling and using public transport, as an alternative to driving.

The site's location close to the city centre and many residential neighbourhoods means that there is huge potential to strengthen its active travel links by providing better, safer and more pleasant walking / cycling routes. A Travel Plan is being developed by Hull University Teaching Hospitals NHS Trust to explore this further.

Active travel encourages a reduction in car use where possible, which has multiple benefits including less pollution and traffic, improved physical and mental health for people using active travel, and a more activated public realm.



3.2 Client Objectives

The following key client objectives have been set to enable health care expansion needs, wider sustainability issues both within and beyond the HRI estate are met. These are as follows:

- Enhance operational needs
- Bring sustainability objectives more to the fore in leading edge zero-carbon development and design including through measures to create significant modal shift for staff and visitors
- Minimising impacts on air quality
- Make the estate less of an 'island' with new and/or enhanced routes especially linking the interchange including making them more enjoyable and attractive to users
- Minimise pedestrian/vehicle conflict
- Realise housing allocation maybe including for key workers
- Creating an enhanced neighbourhood shopping centre offer
- Design to bring design unity to the quarter in terms of health building presentation
- Road frontage and key landmark locations to be addressed
- Physical and operational changes to be managed in block phases but with a long term overall vision and objectives in mind from the start
- Work with the Council and other agencies to realise objectives
- Enhance the multi-functioning health provision facilities and the visitor experience but in a way that best meets future

KEY MASTER PLAN OBJECTIVES:

Increase the amount and quality of green space, and improve the environment within and around HRI

Link existing and proposed new pedestrian- and cycle-friendly routes to make them safer and encourage modal shift

Reduce flood risk within the site and surrounding area

Determine traffic impacts and any mitigations to have a positive sustainable impact

Ensure servicing and parking provision meets future needs

Plan for an investment programme to drive forward and co-ordinate physical change within the HRI estate and its surroundings

Work to define future viable uses for the surrounding plots within the master plan area

KEY MASTER PLAN ACTIONS:



work positively to reduce flood risk



add water retaining sustainable drainage



add high quality green spaces



create car-free pedestrian and cycle routes



add cycle parking and facilities



include easy drop off for the HRI



retain parking to support future HRI/area needs

3.3 Massing Strategy

The adjacent diagram shows the number of storeys proposed for new construction as part of the masterplan proposals. These are the maximum building storeys which we believe are appropriate for each of the plots for new development, which draw from analysis of sunlight paths and the scale and character of adjacent buildings and urban realm.



Example of medium density residential apartment buildings with 3 - 5 storeys



Example of lower density 3 storey townhouses



Example of healthcare building massing with 8 - 12 storeys, and upper ward levels

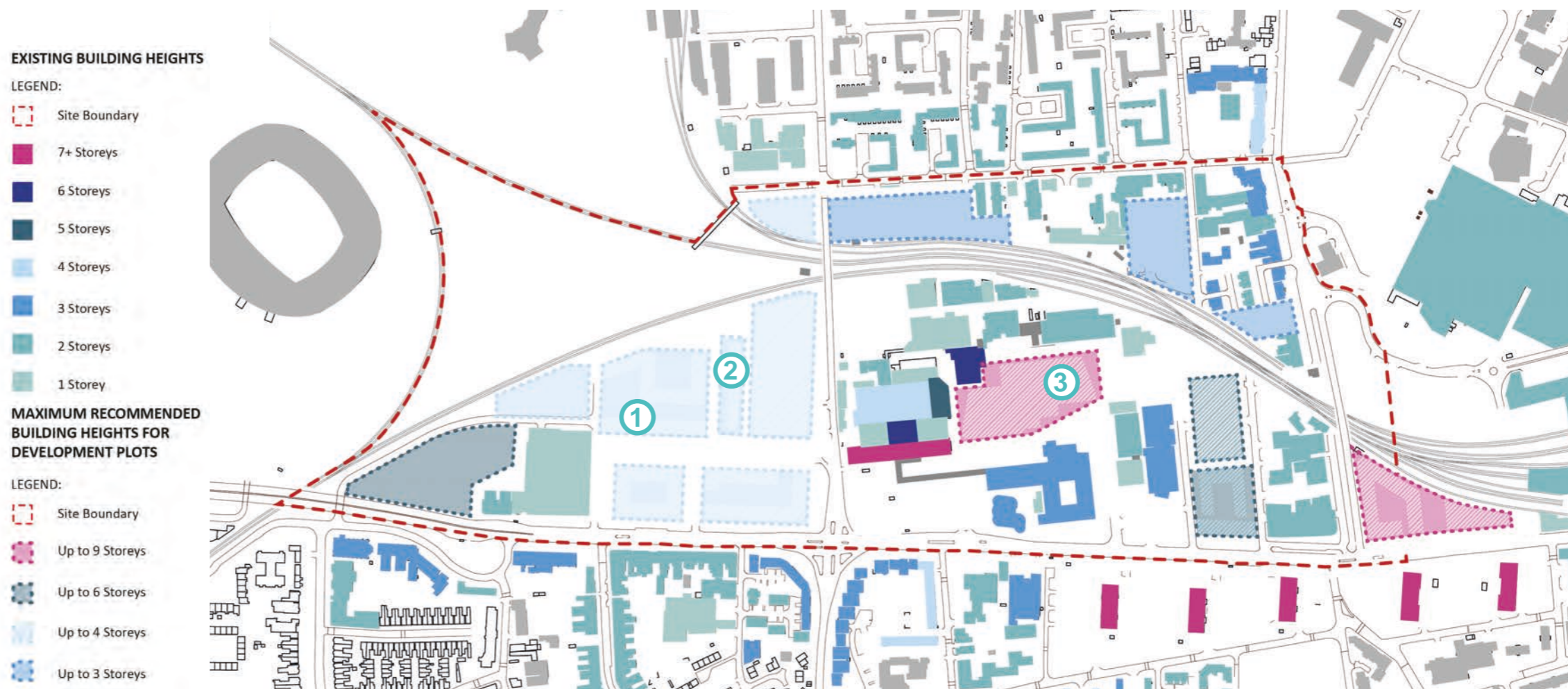


Figure 3.2: Diagram showing maximum recommended building storeys for new construction as part of the masterplan

3.4 Sustainability

Sustainable design and the promotion of sustainable behaviours through design are a key driver for the masterplan. Through working closely with key client stakeholders and following a review of best practice guidance, e.g. BREEAM, WELL Building Standard, UK Green Building Council and the Hull 2030 carbon neutral strategy, a number of sustainability ambitions, goals and targets were identified:

- Transport and connectivity
- Biodiversity and green infrastructure
- Climate resilience
- Resource efficiency and embodied carbon
- Energy and operational carbon
- Health and wellbeing
- Sustainable communities

Individual targets have been used to steer the design, and are communicated through the masterplan layout and project objectives. Moving forward, the aforementioned issues will be progressed further in the detailed design, supporting the city of Hull's journey to net zero carbon and in tackling climate change.

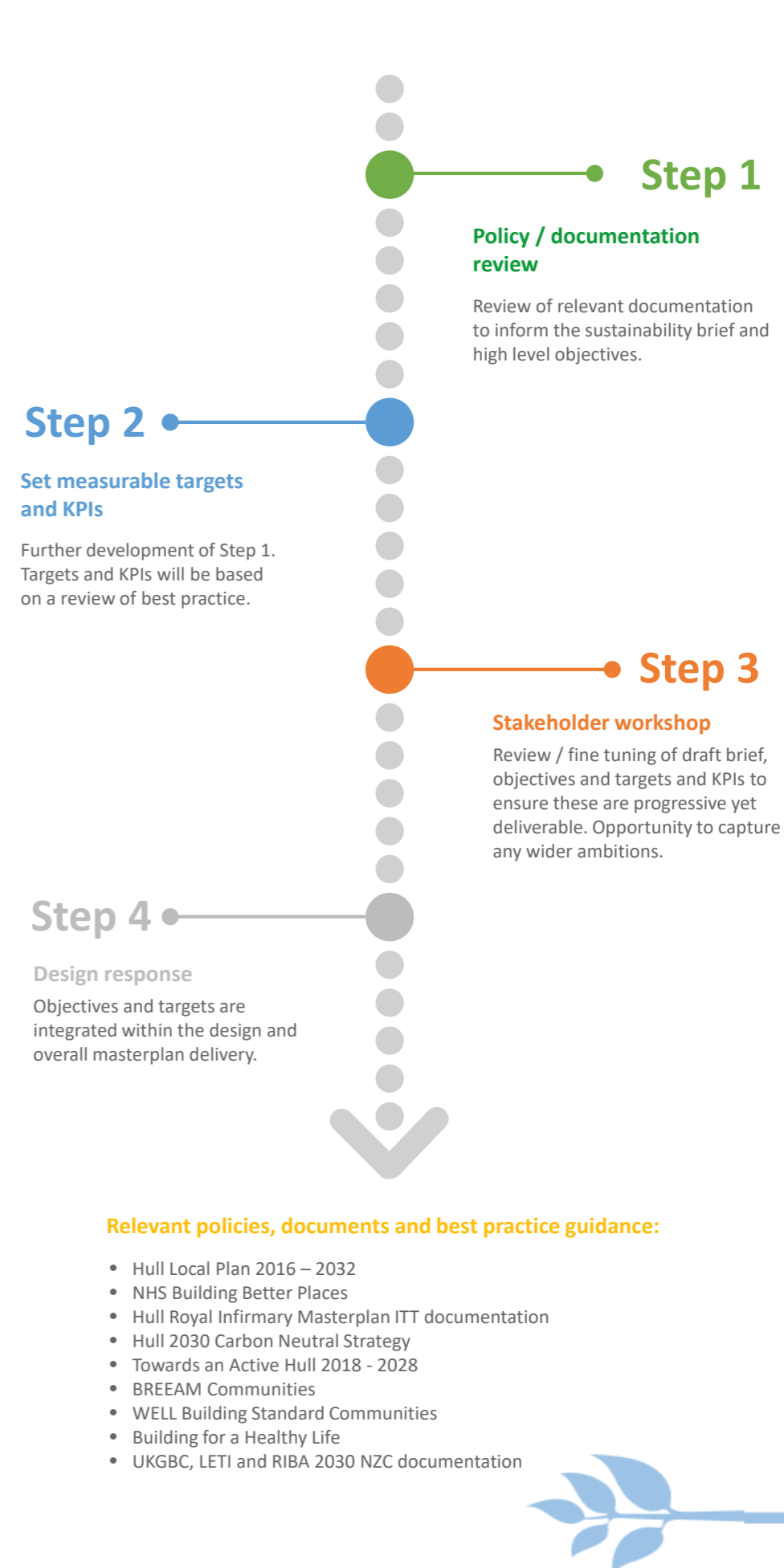


Figure 3.3: Diagram showing the methodology for the HRI Masterplan sustainability strategy

4.0 Masterplan Development

4.1 Development Approach

Initially we began to block out areas for potential uses such as healthcare, green space and new residential buildings which complemented the existing character and uses, before focusing in on parts of the masterplan to develop them further. An example of this is the proposed residential area to the west of the Hull Royal Infirmary.

In order to strategically re-connect the wider area, we began with these proposals on the trust land ownership area to the west of the HRI estate.

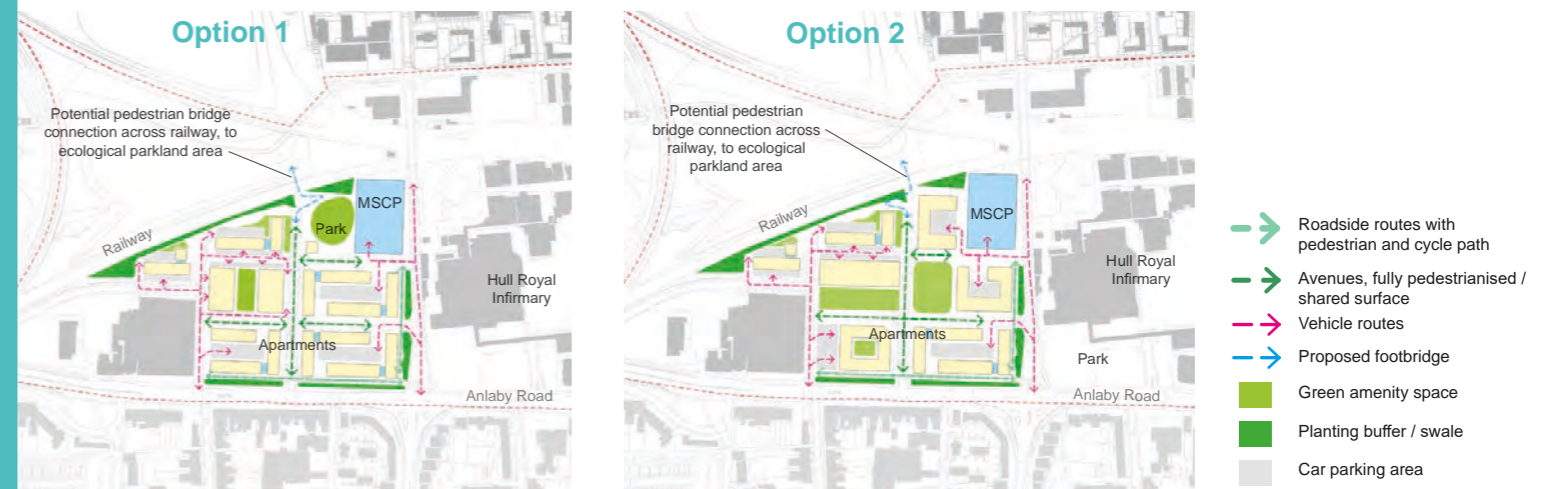
We explored the opportunity in options 1 & 2 to work with a north - south grain to enable connectivity to the green railway triangle via a new bridge link. In option 1 a more private park space for use by new housing residents creates a stepping stone to the green space over the new bridge. In option 2 the green park is placed centrally to create a new heart space for that community.

In all options the MSCP is locked into the north east corner to deal with this part of the site being harder to bring forward for other uses due to the hard barrier edges of the railway line and argyle street bridge ramping down to ground level.

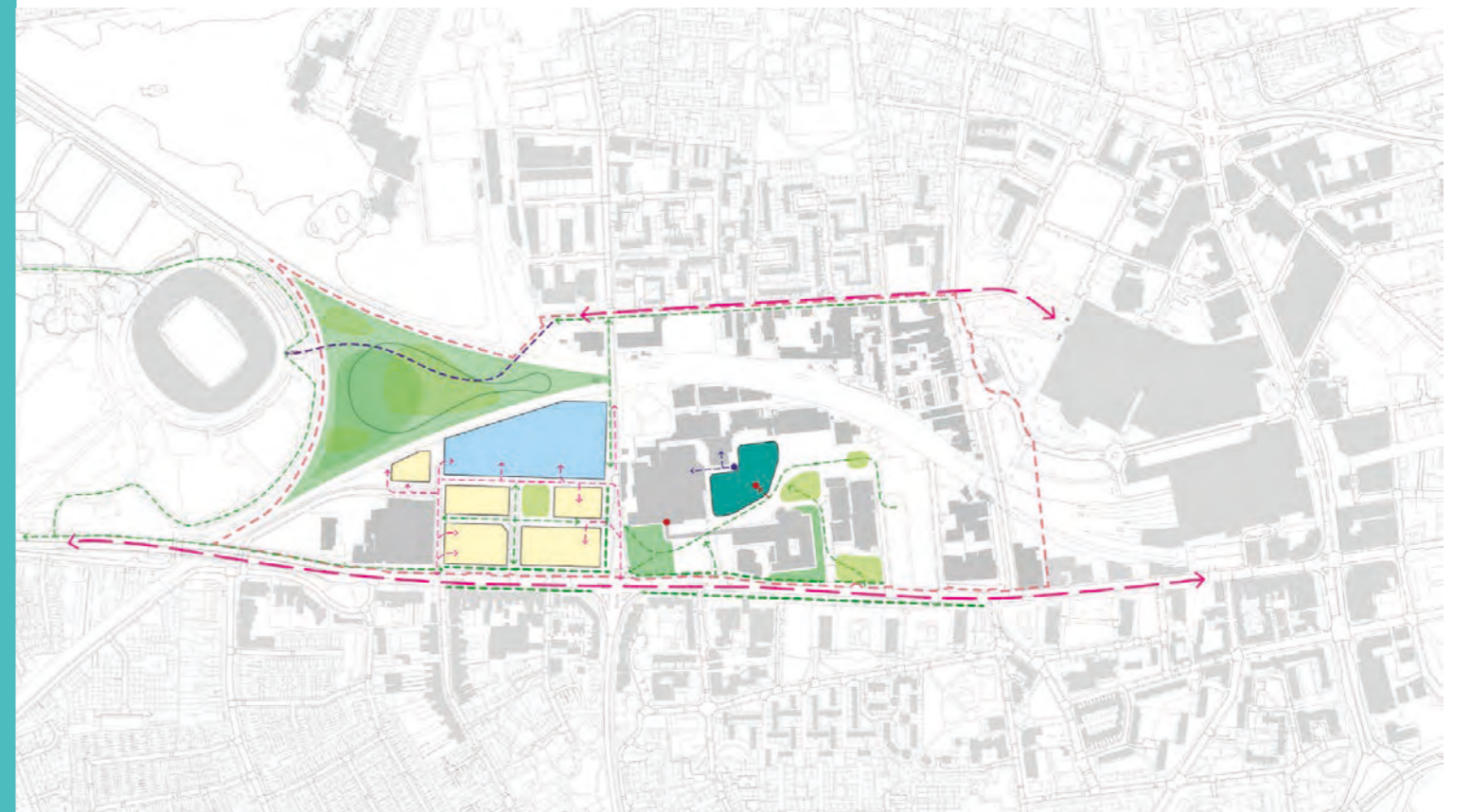
On all options MSCP size and height is to be balanced with the cost of single deck versus full MSCP alongside the restriction of the helipad flight path and landing cone requirements.

Both options 1 & 2 emphasize a north - south geometry by generating a car-free environment centrally on this orientation. This echoes the historic grain and creates opportunity to connect more directly to the railway triangle with a new bridge.

Collectively, the team felt this additional bridge link may prove to be cost prohibitive and in the event where that piece doesn't come forward, an east-west emphasis would better connect with the HRI healthcare estate. We moved forward with the intent to retain the future opportunity for an additional pedestrian bridge into the railway triangle but without this being a main driver for the orientation of public space within the masterplan.



Initial options 1 and 2 for the Residential area, exploring potential connection to the north and utilising a north - south urban grain to encourage movement from Anlaby Road



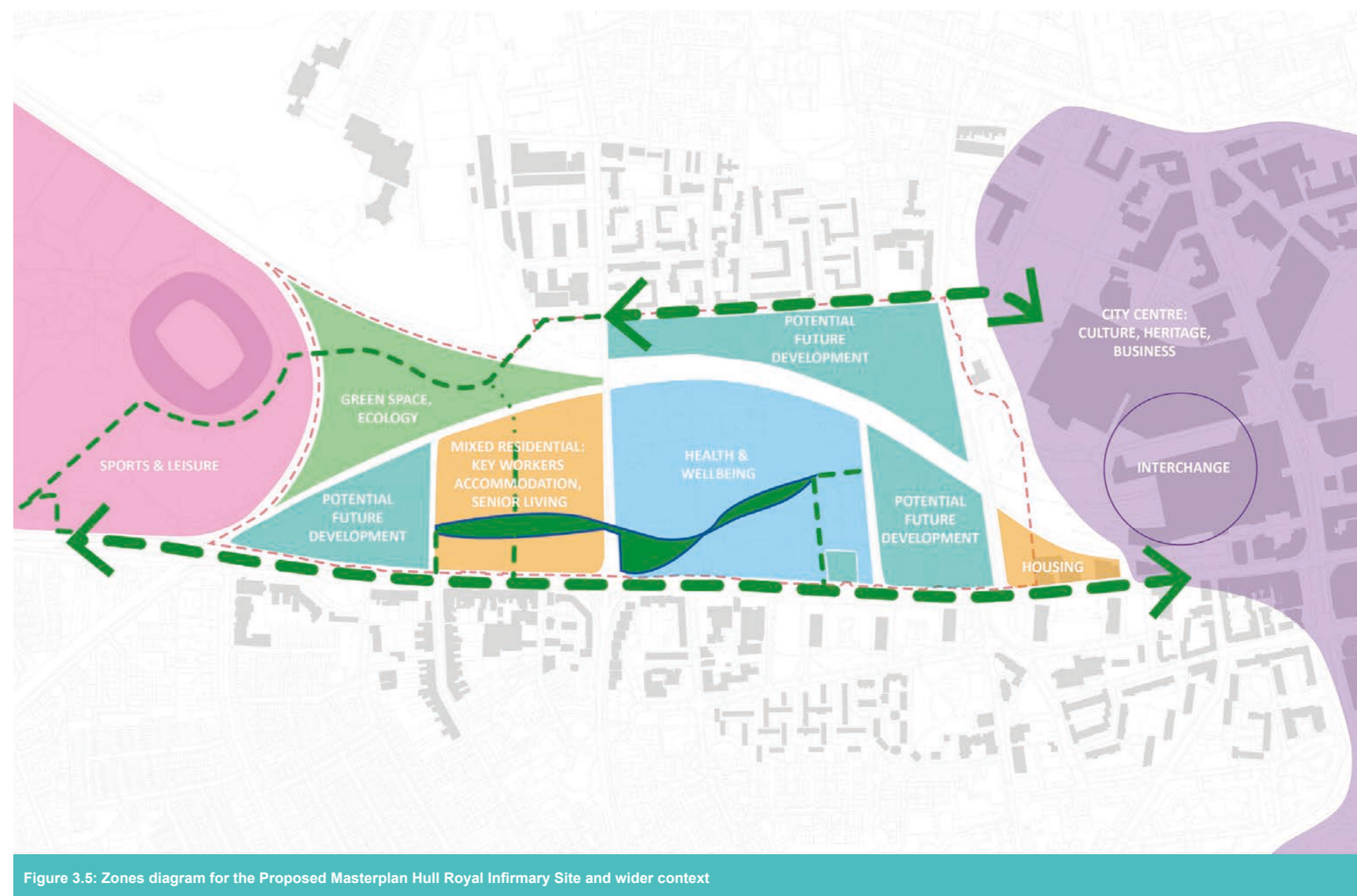
Initial block plan exploring potential laying out of different uses such as car parking, residential, healthcare and green space

4.2 Strategic Proposal

Following on from the initial options that explored a north-south orientation, we pursued the opportunity to strategically re-connect the wider area on an east-west geometry.

The highest quality green space that currently exists within the site boundary is the public space beside the new main entrance to the HRI. This “pocket park” can and should form part of a connected green route across the wider masterplan area. Connecting east-west by weaving new green spaces and sustainable travel routes wherever possible will help make the wider area:

- Feeling of connection within the pedestrian environment
- Connection opportunities for wildlife from a bio-diversity perspective
- Opportunity to spend money on increasing the quality of landscape and green environment across and through the HRI estate
- The east-west landscape route within the HRI estate coincides with the most likely area of site clearance for future re-provision of the ward accommodation, making this an appropriate area to target improvement and change.
- Connecting east-west across the mixed residential area to the west of the HRI estate will provide opportunity for a connected, car free, high quality landscape environment for key workers to occupy.
- Increasing pedestrian movement across this zone should have a future positive effect on perceived safety within and around the HRI estate.
- Sustainable travel routes can be enhanced on the adjacent east-west routes of Anlaby road and Londesborough street
- Opportunity can be retained for a secondary north-south route to connect to the railway triangle should this come forward in future.



4.3 Draft Master Plan Proposal for Consultation

The following pages summarise the masterplan which was prepared for a public consultation in Hull city centre in April 2022. This was a way of introducing the public to the project and its aims, whilst gaining valuable feedback on our proposals.

4.3.1 Aerial View of draft proposal

