

An architectural rendering of a modern, two-story brick building. The building features a prominent glass-enclosed ground floor, likely for retail or public use, and upper floors with large, rectangular windows. The brickwork is a warm, reddish-brown color. The building is situated in an urban environment with a paved plaza in front, where several people are walking. A cyclist is also visible on the right side of the image. The background shows other buildings and trees, suggesting a city setting.



proton partners international:
paddington village, liverpool

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Introduction

This Design & Access Statement is in support of a full planning application for a new Cancer Centre for Proton Partners International within Paddington Village, which lies to the east side of the Liverpool Knowledge Quarter. The proposed building sits on the footprint of plot 6.

The following pages describe the context of the application and details of the decisions taken during the development of the design.

The aim of this document is to illustrate how the design for the Cancer Centre sits comfortably within Paddington Village and links into the Liverpool Knowledge Quarter. The intention is to achieve a form for the new PPI building that sits comfortably in relation to the Kaplan building (which recently gained planning approval) and is sympathetic to the proposals for the remainder of the site.

JDDK have worked in close conjunction with Oobe (Landscape Architects), Fairhurst (Civil and Structural Engineers / Planning Consultants) and Desco (Services Engineers) to fully understand the constraints and opportunities offered by the site and to respond accordingly.

Within this document all key aspects of the site are considered, from the site's location in relation to the proposed wider Paddington Village and the Liverpool Knowledge Quarter, to the detailed requirements of the technology that is used within the building.

The intention is to create an attractive external environment within which the Cancer Centre can sit comfortably.

The aim of this document is to:

- outline how the concept of a Cancer Centre sits comfortably within the aspirations of Paddington Village and the Liverpool Knowledge Quarter;
- outline the rationale behind the design and outlines the key processes that are undertaken within the building - this will demonstrate how the form of the building is inherently linked to the functions that are carried out within the building;
- demonstrate how the design of the Cancer Centre sits comfortably within the overall masterplan that has been prepared by Ryder Architecture and does not conflict with any potential future developments that may arise.



About PPI



Proton Partners International

Proton Partners International is a limited company formed by UK-based international cancer and healthcare specialists. The company was established to address the need to transform cancer care treatment in the UK, particularly through the provision of Proton Beam Therapy.

Proton Partners International is in the process of building five cancer treatment centres across the UK, one at Paddington Village and the others in Reading, Northumberland, Newport and London. PPI aims to open the first centres in the UK to offer Proton Beam Therapy, which will be open to private and NHS patients. We are working with world class leading providers to equip the new centre Paddington Village to the highest specification and plan, through academic affiliations, to create outstanding and innovative cancer treatment facilities.

There are currently no operational proton therapy facilities in the UK, however the demand for more specialised cancer care is growing. There are some 40 operating proton therapy centres operating in the world today, less than 10 being in Europe. At present, UK patients requiring Proton Beam Therapy need to travel abroad for treatment, mainly to the USA or Switzerland. The opening of a centre in Liverpool will be a significant step forward for cancer treatment in the UK and will also see the establishment of a major cutting-edge high technology facility in the early phases of Paddington Village.

Treatment at the PPI Cancer Centre Liverpool

The unique treatment being offered at the site is Proton Beam Therapy, as this will be the one of the first such facilities in the UK it is described in some detail below. In addition, the proton therapy will be offered alongside and in combination with conventional radiotherapy and chemotherapy.

What is Proton Beam Therapy?

Proton Beam Therapy is a procedure that can target a patient's tumour with submillimetre precision whilst sparing nearby healthy tissues and minimizing side effects as a consequence. Conventional radiotherapy with X-rays, which is widely available at cancer centres across the UK, uses radiation to destroy cancerous tissues by transferring energy from the radiation beam to the affected tissues. The equipment and targeting systems have evolved and improved over the years and they are effective in controlling many cancers. However, the X-ray beams used in radiotherapy deposit energy along the entire path that the radiation follows, from the skin on the side that it enters the body, through any organs and structures in front of the target tumour, and similarly to structures beyond the tumour until the radiation leaves the body. Therefore, during Radiotherapy with X-rays, healthy tissue in the area around the tumour will also receive significant radiation doses. In some cases, the danger from these side effects prevent radiotherapy being used; and in others the radiotherapy is carried out with the understanding that it will cause significant damage to critical organs.

The advantage of treatment with protons is that we can control where the proton releases the bulk of its cancer-destroying energy with a much higher level of precision. Due to a physical characteristic known as the Bragg Peak, protons can be energised to the level necessary to release most of their energy at a pre-determined depth within the body. This allows the maximum amount of energy to be released at the tumour site, whilst minimising energy transferred on the entry pathway and releasing negligible amounts beyond the target tumour.

The proton beam is directed to conform to the shape and depth of a tumour, while sparing healthy tissues and organs even where these surround the tumour. With this ability to target only the tumour and not the surrounding healthy tissue, doctors are able to provide treatment for cancers in locations where the side effects were previously seen as too high risk to allow treatment to take place. Examples of such sites include the brain and spine of adults, and many additional sites in the treatment of children.

below: interior of a typical proton therapy suite



In summary, Proton Beam Therapy offers the use of greater precision in the treatment of cancer, allowing the treatment of some cancers where conventional radiotherapy would be too dangerous. The precision targeting of the energy also brings the potential ability to increase the dosage of each treatment, resulting in a reduced number of treatment sessions required to cure the patient.

How are the protons generated for Proton Beam Therapy?

To start the process protons are extracted from hydrogen gas injected into a synchrocyclotron (a special type of cyclotron), where they are accelerated to the high speed required to deliver their energy at the required depth within the patient's body. After leaving the synchrocyclotron, the protons are steered by magnets through a beam-transport system to the treatment room. Within the treatment room the proton delivery gantry can revolve around the patient to allow the beam to be delivered to the tumour at the required angle. A further set of magnets in the gantry serve the purpose of sweeping the proton beam which, together with the energy selection, shape the proton treatment in three dimensions.

What are the risks and how are they reduced?

There are many cyclotrons in academic or therapeutic use in the UK. Whilst the protons give up their energy at shallow depths in materials they come into contact with during routine cyclotron operation and proton beam therapy other secondary emissions such as neutrons, which in turn produce gamma rays, will be produced which require more substantial shielding.

Careful design of the facilities by expert physicists using computational modelling ensure the construction of the shielding (concrete or steel) will meet and exceed all current legislative requirements with regards to radiation safety to the public, staff and patients both inside and outside the centre. PPI follow the same UK regulations and meet the same safety requirements as all other users of ionising radiation in the UK (such as dental X-ray sets, NHS hospitals, airport X-ray scanners, etc) which are set to ensure that doses to all groups of people (staff, patients and the public) are kept as low as reasonably possible. Once the centre is constructed careful monitoring is carried out to ensure it has been built to the required specification and detection systems are installed to continually monitor the situation and ensure the facility is safe at all times.

What about the other equipment that will be used at this clinic?

PPI will also offer a range of conventional cancer therapy at their Liverpool clinic including chemotherapy and radiotherapy. These treatments will be supported by state of the art imaging using both CT (computerised tomography) and MRI (magnetic resonance imaging). All of the equipment involved in these processes is routinely present in medical facilities in UK and PPI is committed to ensure that their installations will fully comply with all UK regulatory requirements and safety standards.





The Wider Masterplans



Paddington Village

The photograph to the right hand side shows the approximate location of Paddington Village (within the red line boundary). Paddington Village sits in close proximity to the Liverpool Knowledge Quarter. This £1billion flagship expansion site sitting at the eastern gateway to the City Centre, has been earmarked as 1.8m sq ft of science, technology, education and health space.

Paddington Village site will be developed in three phases: Paddington Central, Paddington South and Paddington North, with phase one due to commence in the coming months, with the imminent construction of the Kaplan building, which will provide student accommodation.

At 30 acres, Paddington is a sizeable urban village, inspired by the sense of community you'd find in the likes of Greenwich Village in New York.

The aspiration is that it will not be a great place to live but a great place to work, discover and socialise, with state-of-the-art workspace, labs, cafés, restaurants, shops, accommodation, a hotel and teaching, examination and events space.

Ryder Architecture are currently working on the masterplan for Paddington Village, and planning permission has been granted for the first building on the site which will provide student accommodation.



Knowledge Quarter Mayoral Development Zone

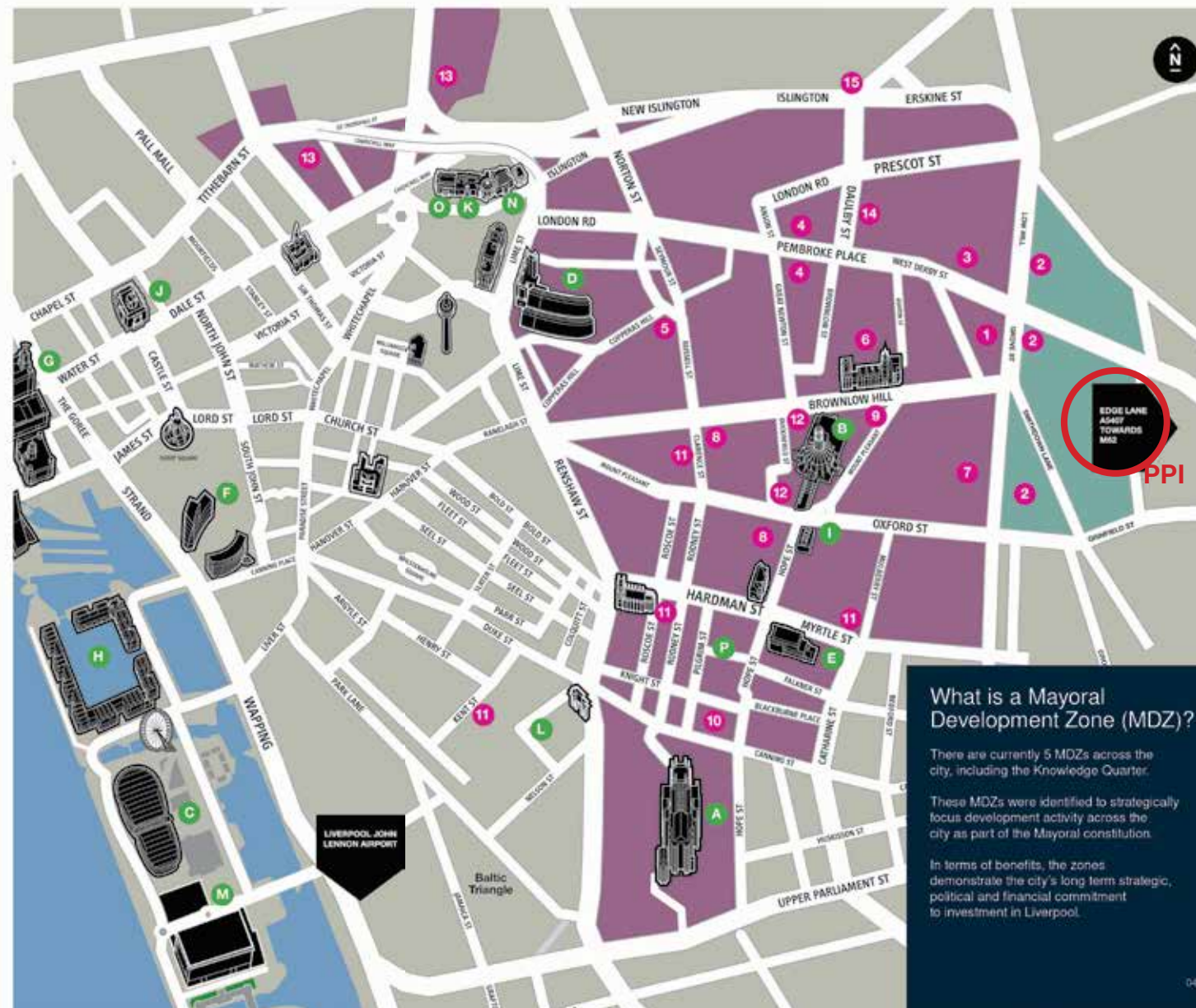
Discover our key sites and buildings

- 1 The University of Liverpool Health & Life Sciences Campus, including the Liverpool Bio Innovation Hub and Biobank
- 2 Paddington Village
- 3 The Royal Liverpool & Broadgreen University Hospital and The Clatterbridge Cancer Centre
- 4 Liverpool School of Tropical Medicine
- 5 Sensor City
- 6 The Victoria Gallery and Museum
- 7 Materials Innovation Factory
- 8 Liverpool John Moores University, Mount Pleasant Campus
- 9 University of Liverpool, The Foundation Building
- 10 Liverpool Institute for Performing Arts (LIPA)
- 11 City of Liverpool College
- 12 Liverpool Science Park
- 13 Liverpool John Moores University, City Campus
- 14 Liverpool Life Sciences Accelerator
- 15 Liverpool Hope University Creative Campus

Discover places of interest

- A Liverpool Cathedral
- B The Metropolitan Cathedral of Christ the King
- C The Echo Arena & Convention Centre
- D Lime Street Station
- E Liverpool Philharmonic
- F Liverpool One
- G The Royal Liver Building
- H Albert Dock
- I Everyman Theatre
- J The Town Hall
- K Central Library
- L China Town
- M Exhibition Centre Liverpool
- N Walker Art Gallery
- O The World Museum
- P Unity Theatre

- Knowledge Quarter Mayoral Development Zone
- Paddington Village (Part of the MDZ)



Fitting in with the Mayoral Development Zone

Paddington Village and the adjacent Liverpool Knowledge Quarter are shown in turquoise and purple respectively on the zoned map to the left hand side. The approximate position of the PPI Liverpool site has been highlighted with a red circle

These two areas have been identified as a strategic focus for new development within Liverpool and will be areas of investment.

The proximity of the Knowledge Quarter and Paddington Village to the University, the M62, John Lennon Airport and Liverpool City Centre make it an ideal location for PPI Liverpool.

PPI will sit on plot 6 within the current Paddington Central Masterplan.

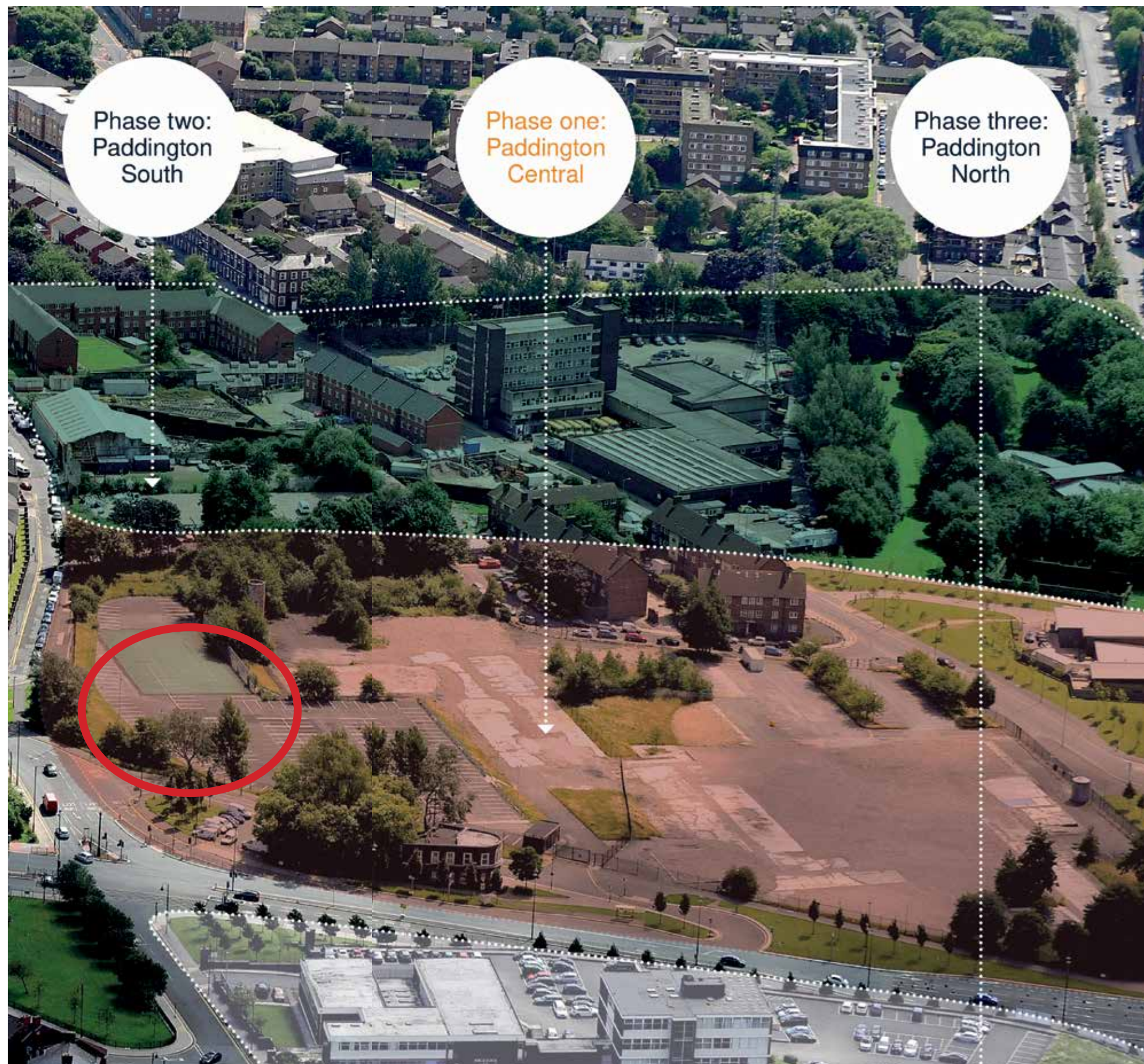
Fitting in with the Masterplan

The site of Paddington Village was previously home to Archbishop Blanch Church of England High School; the school has relocated and the buildings have all been demolished. The aerial photograph below shows the site as it looked in 2000, with the original school buildings included. The aerial photograph to the right hand side shows how the site looks today, with the majority of the buildings demolished.

When Liverpool City Council identified the Paddington Village site as part of the Mayoral Development Zone Ares Landscape Architects looked at the original masterplanning for the site. The red line boundary on the photograph to the right hand side shows the extent of Paddington Central, which forms Phase One of the masterplan development.

The following pages outline how PPI looked to integrate within the Paddington Central Masterplan.

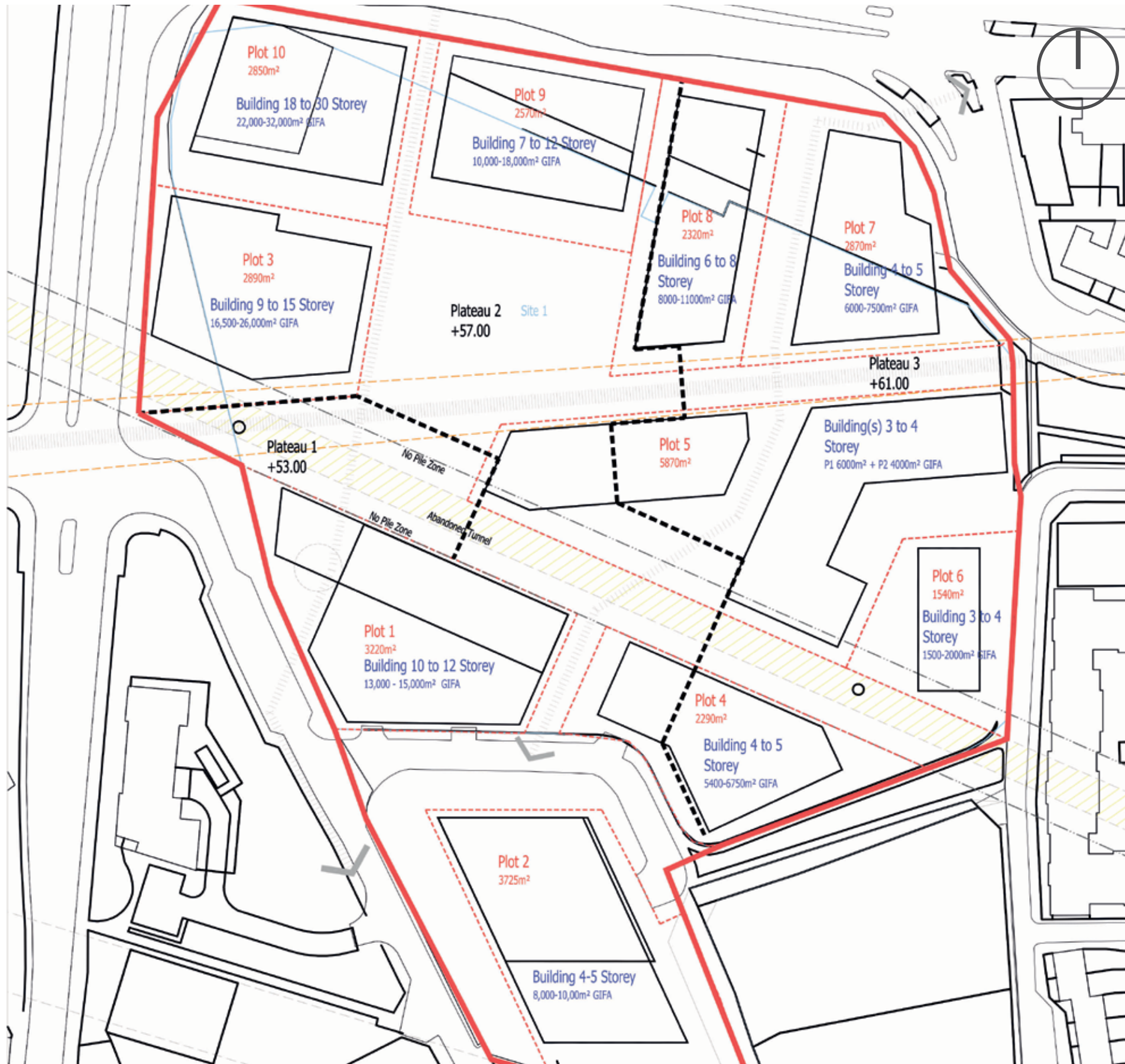




The Phases of Paddington Central

The image to the left shows the approximate delineation for the three different phases of Paddington Central - the approximate position of the PPI site has been highlighted with a red circle.

The PPI site sits within Paddington Central, which will form the first phase of the development.



The Original Paddington Central Masterplan

The layout to the left shows the original site plan for Paddington Central - PPI were initially interested in looking at the site which is currently occupied by the Mount Vernon pub. In mid December a site visit was arranged to look at the Paddington Central area and gain an understanding of which areas would be suitable for PPI.

Part of the consideration, when looking at site options, was the existence of the Williamson Tunnels in the surrounding area. The following page shows some information on the possible locations of the existing tunnels.

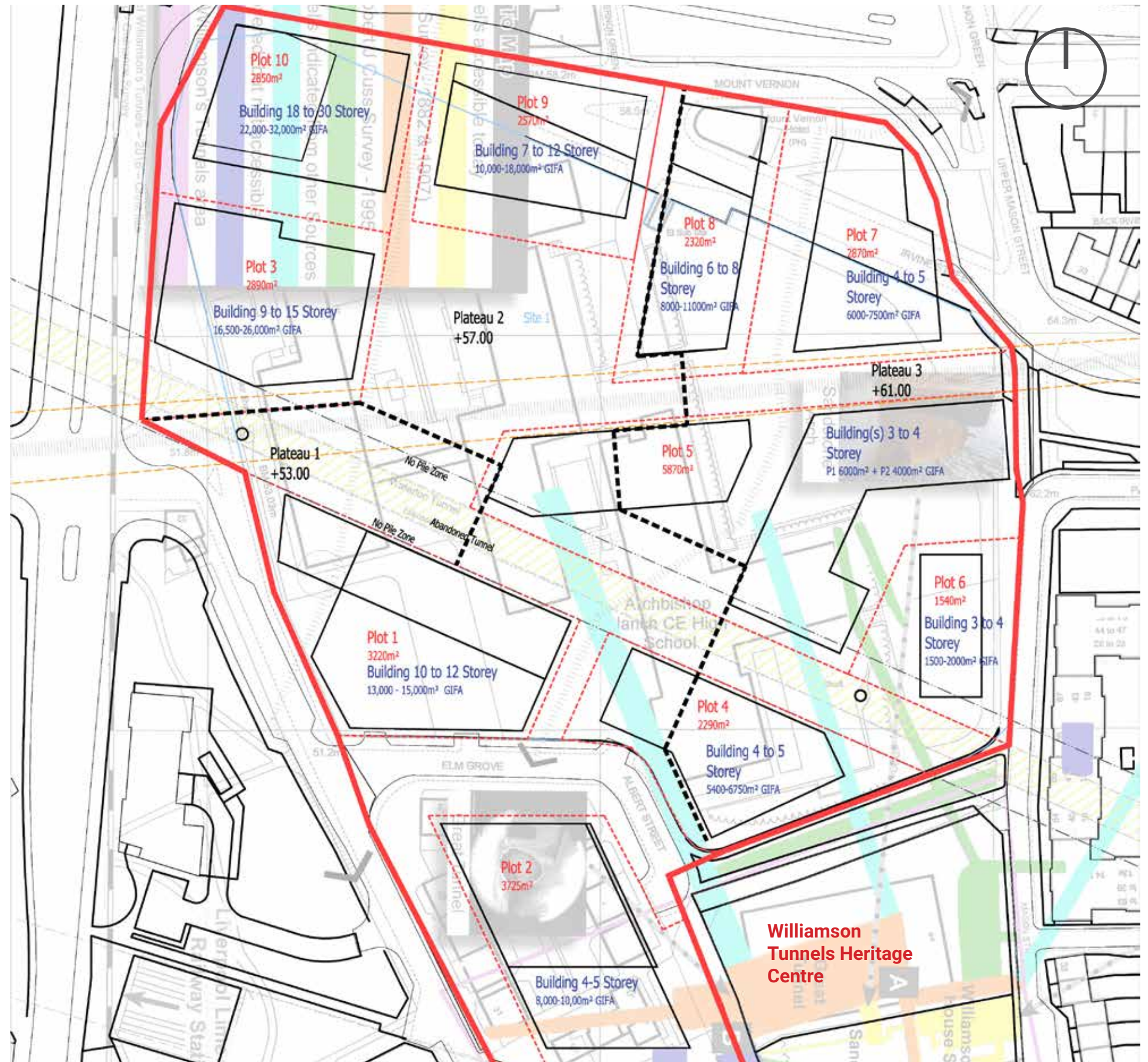
Following the site visit we looked at several options for the location of PPI Liverpool and these are outlined on the following pages.

The Williamson Tunnels

The Williamson Tunnels Heritage Centre is a tourist attraction in Liverpool dedicated to 19th Century philanthropist Joseph Williamson and sits adjacent to plots 4 and 5 on the Paddington Central site. The drawing to the right shows the original masterplan overlaid on the map indicating the approximate tunnel locations.

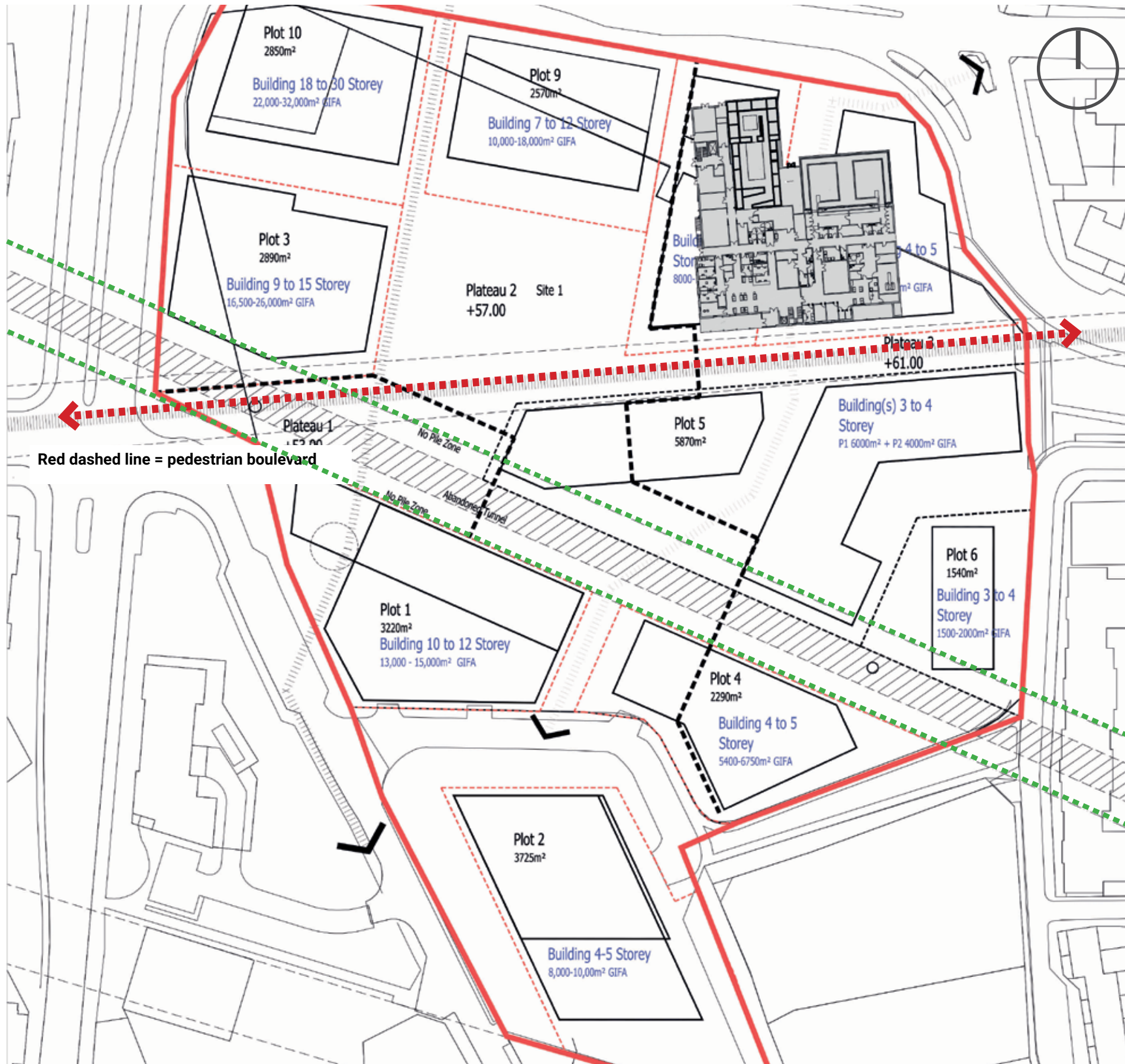
Opened in 2002 the Williamson Tunnels Heritage Centre has welcomed over 100,000 visitors into the underground world created beneath the streets of the Edge Hill district of Liverpool by Joseph Williamson, a wealthy tobacco merchant who employed many hundreds of men in the construction of a huge and elaborate underground labyrinth of tunnels, chambers and passageways.

Below is a photograph of part of the tunnel network which stretches around the area.



The Site Options





Option 1

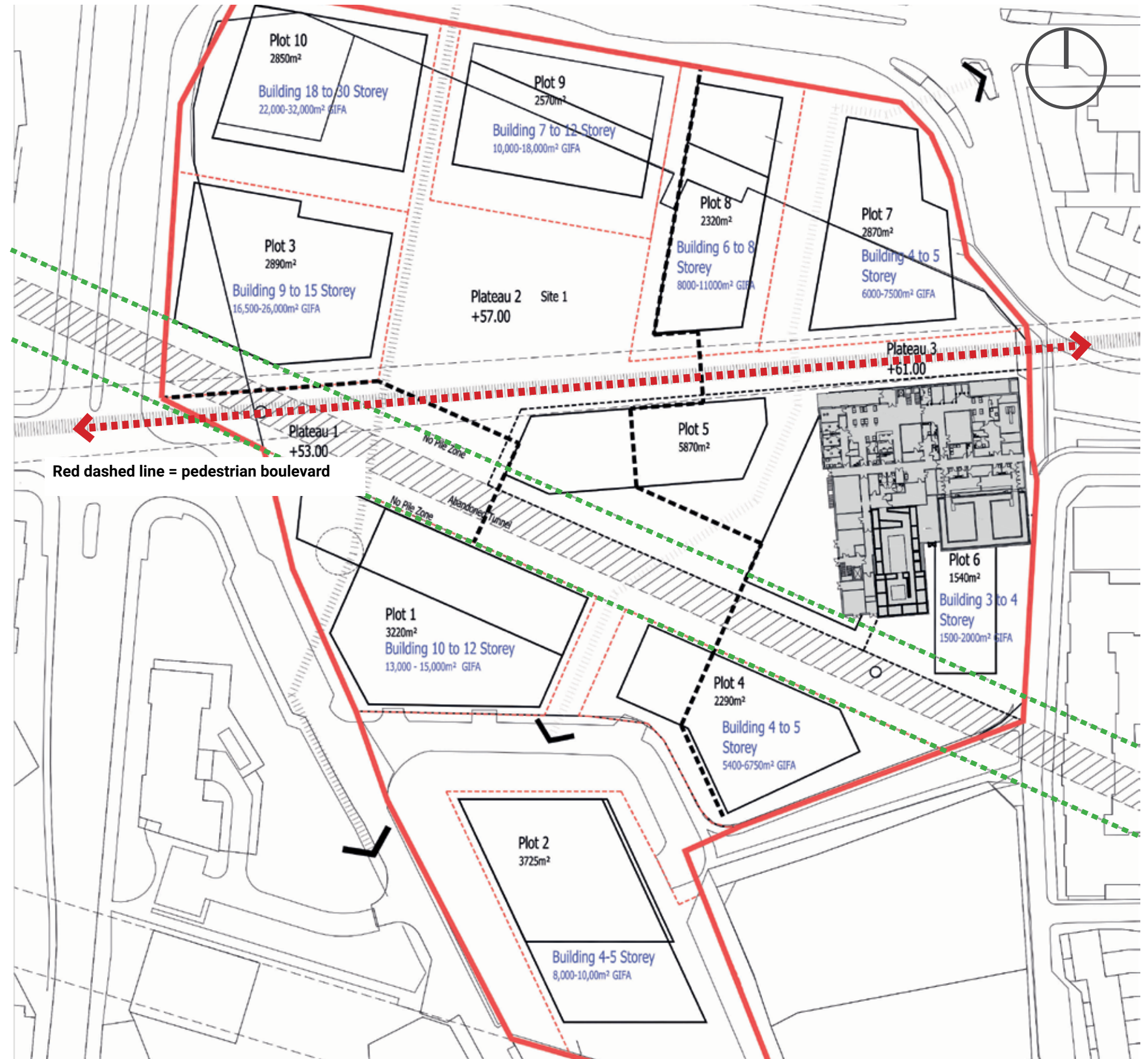
This option looked at placing the building onto the site of the existing Mount Vernon pub.

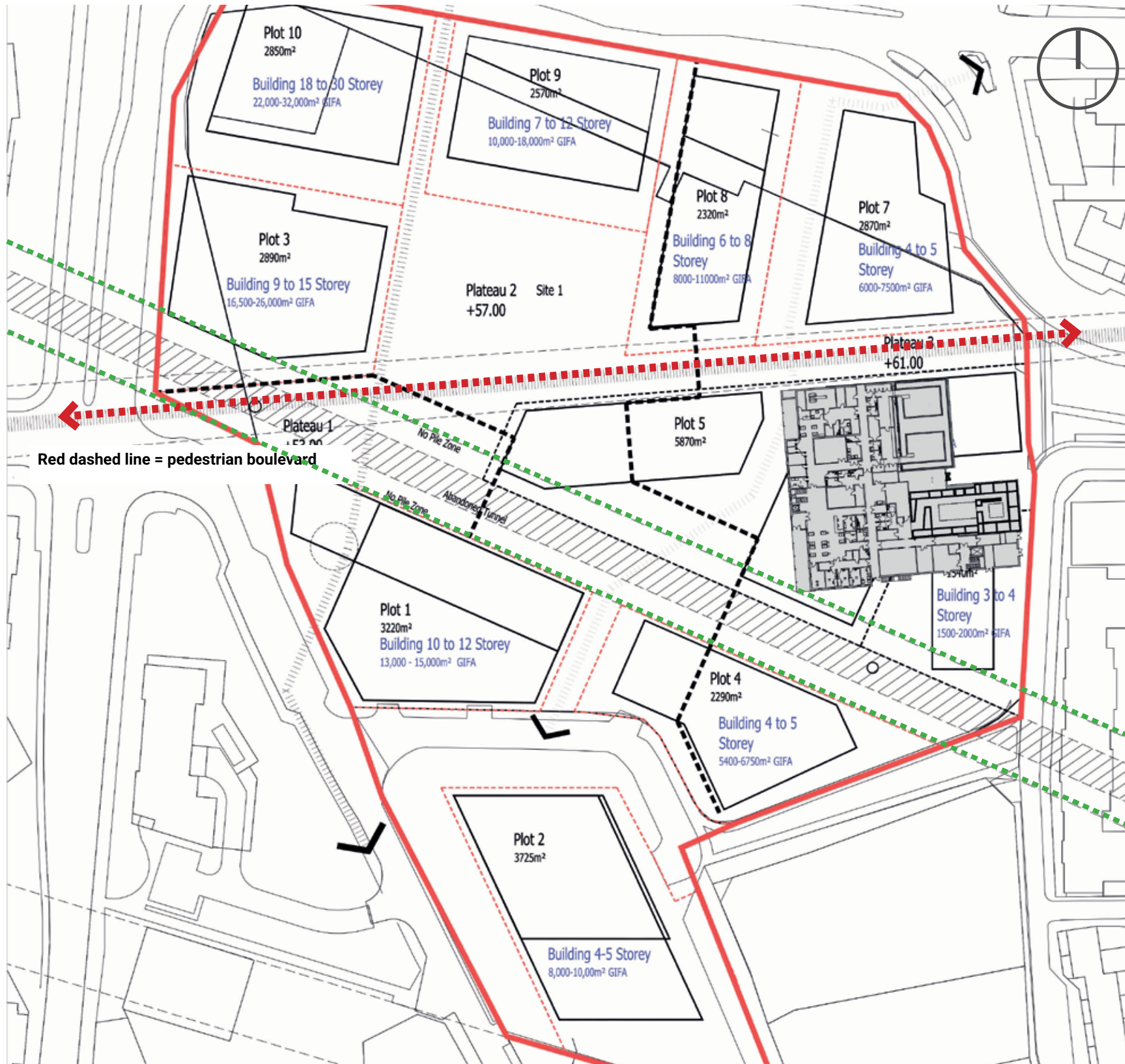
- The PPI building sits on plots 7 + 8
- Plot 7 was not large enough to accommodate the PPI footprint on its own, so it was necessary to take up two of the plots identified on the masterplan
- The PPI building fronts onto the pedestrian boulevard that forms the circulation spine for the development; the downside of this is that the building backs onto Mount Vernon Road
- From the Williamson Tunnel records it appears that there are no tunnels under this part of the site
- This keeps the building away from the 'no build zone' which extends beyond the existing abandoned railway tunnel (this is the area between the two green dashed lines).

Option 2

This option places the building on plots 5 and 6 of the proposed masterplan.

- The building fronts onto the pedestrian boulevard
- The building is pushed towards the eastern boundary due to the need to keep the proton vault construction out of the 'no build zone'
- The tightness of the site makes it difficult to create an external frontage between the building and the pedestrian boulevard
- The building gets very close to Mason Street (to the east) which makes it difficult to deal with any changes in level.





Option 3

This option places the building on plots 5 and 6 of the proposed masterplan, however the building was rotated through 90 degrees so that the front elevation looks towards the Metropolitan Cathedral of Christ the King.

- The side of the building now sits parallel to the pedestrian boulevard
- Rotating the building allows us to pull it further away from Mason Street and create a larger service yard



The Preferred Option

Following a meeting with Liverpool City Council on 11th January 2017, it was decided that Option 3 was the preferred solution.

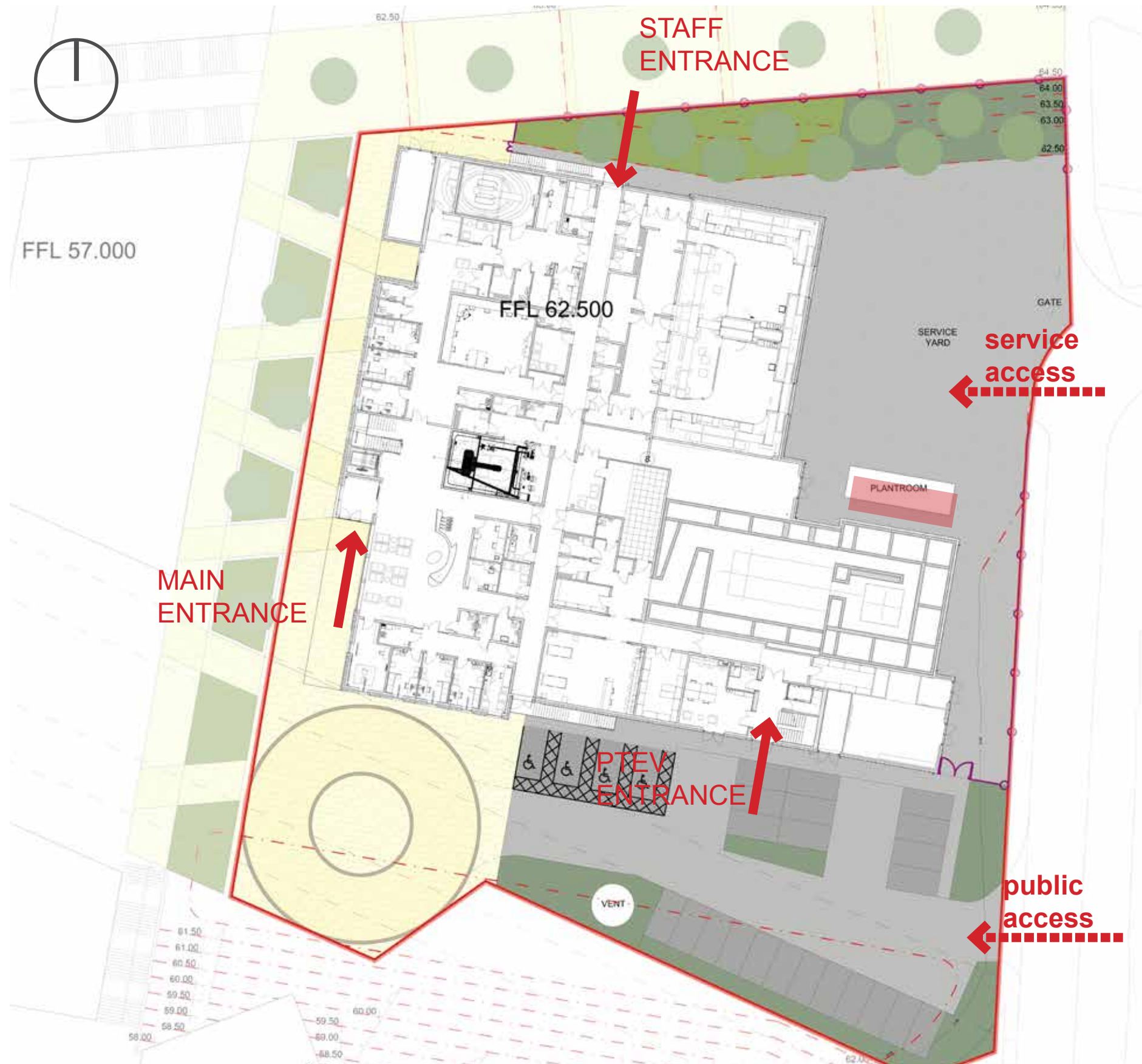
Ryder Architecture were then appointed to look at the wider masterplan with particular focus on resolution of the change in level across the wider site. The plan to the left hand side shows the most recent masterplan layout, with the PPI Liverpool building sitting on plot 6.

The layout creates a service access from Mason Street as well as a public entrance and drop off point for the PPI building.

About the Layout







SITE PLAN

Principle Design Considerations

- The layout is based upon PPI Northumbria and Reading (which are currently on site) and the room sizes, relationships and configurations have been thoroughly tested with MEI (American Advisors to PPI who have worked on several similar facilities) and PPI clinical staff to ensure that the patient flow works throughout the building.
- The building is positioned so that the main areas of construction sit outside the no build zone above the abandoned railway tunnel.
- The PPI building looks towards the Metropolitan Cathedral of Christ the King and a landscaped strip is provided between the public boulevard and the side of the PPI building.
- The vaults face towards the rear of the site and are at the furthest point from the pedestrian boulevard, consequently reducing the visual impact of these from the pedestrian routes and keeping the scale at the building entrance as low as possible (this is helpful in 'humanising' the point of entry and putting visitors at ease).
- There is a logical access to the service yard created and the service yard also sits comfortably between the building and the boulevard with a screen of trees and a decorative fence to minimise its visual impact.
- A separate entrance is provided for the public which helps to create a drop off point with accessible parking sited as closely as possible to the main entrance. The site provides a total of 24 parking spaces for use by visitors.
- An area has been identified for a stand by generator (shown hatched in red) so that the building can remain operational in the event of power failure.

The Patient Journey

The layout of the proposed PPI Cancer Centre is based upon the patient journey through the building and the relationship between the different spaces is of critical importance.

The 3d drawing opposite outlines the circulation pathways within the PPI building in Northumbria and identifies the key personnel who would be undertaking the journeys.

The circulation pathways highlighted on the diagram opposite are:

- chemotherapy
- diagnostics
- radiotherapy
- proton therapy
- consulting
- IBA staff
- clinical staff

The layout of the PPI Liverpool Cancer Centre is very similar to that shown the right, but the footprint at Liverpool has been increased to include a second linac and an MRI facility, which increases the number of patients that can be treated within the building.

