In this section we provide an overview of the proposed Green Infrastructure plan for the Knowledge Quarter, its distinctive layers and how it would meet needs and benefit the regeneration plan.

4. Creating the Learning Landscape

4.1 Elements of the learning landscape

Drawing upon the original Framework plan, and our baseline evaluation of the area and its Green Infrastructure assets, we have developed an outline plan framework.

Investment in Green Infrastructure for the Knowledge Quarter has been identified as a critical component of its regeneration.

The potential exists not just to improve the public realm and transform the image of the area, but to meet and complement a much broader range of needs and individual strategic objectives – from complementing NHS investments to inspiring greater uptake of natural sciences in the Universities.

The aim of the plan framework is to create a learning landscape which would be used to target investment in order to realise the multiple benefits of Green Infrastructure.

Establishing the green grid:

Incorporating a natural edge into the public realm of the main connecting routes within and between the Knowledge Quarter and surrounding areas;

Enhanced connections with surrounding neighbourhoods

A continuous thread of street trees to create valued streets

Building up the mosaic:

Incorporating within the green grid a mosaic of naturally attractive and biodiverse green spaces and buildings designed around the needs of a range of different users;

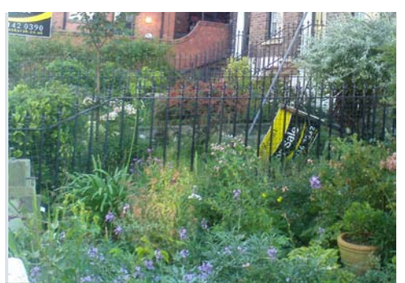
A natural edge to frame spaces, crossings and intersections

Enhancing buildings and skylines with green roofs and facades

Inspiring natural backdrops to courts, quad-rangles and squares

Careful design of health settings, spaces and views

Protecting and valuing special parks, gardens and streets



Bringing colour and vibrancy to private and communal gardens

Wellsprings of knowledge:

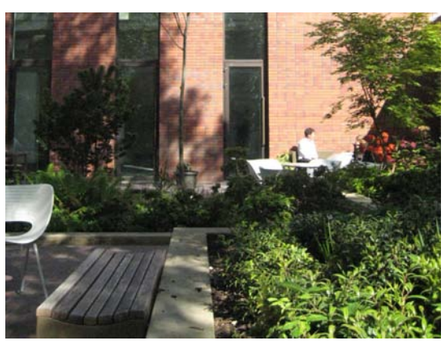
Recognising and capitalising upon the potential of Green Infrastructure as a knowledge centre for universities and as a tool to inspire future generations to learn about natural sciences.

Creating a web of knowledge and research into green infrastructure

Inspiring the next generation of scientists with the 'living laboratory'

4.2 Design principles for the learning landscape

Design and delivery of the Knowledge Quarter Green Infrastructure plan should be informed and steered by a set of overarching design principles which underpin the overall approach.



Urban design and vitality:

Green Infrastructure should be designed to contribute to its urban context, creating safe and permeable routes that respect basic rules of good urban design:

- Animation: Routes through spaces should be permeable and generate enough activity and footfall to ensure that there is sufficient informal surveillance at all times;
- Interface: The interface between buildings and landscapes should present a clear transition, with people able to choose which landscape they want to use, and when;
- Legibility: The extent and purpose of landscaped spaces should be readily apparent and people should be given a variety of routes through an area with all routes terminating in other routes;
- Framing: The spacing and height of natural elements should be considered in order to frame streets and spaces, drawing on guidance such as that provided by English Heritage.

A comfort zone for urban life:

The incorporation of plants and water in urban spaces should contribute positively to comfort and shelter from the elements, as well as providing health benefits in response to specific needs, but should not detract from the primary functions of these spaces;

Ecological function over form:

Trees, spaces and features should be designed and specified to contribute positively to the creation of functional and biodiverse habitats that minimise edge effects and increase the extent of habitats available;

Doing things ecologically:

Ecological solutions should be found for engineering problems, thereby making the institutional landscapes work harder and provide more benefits. This could include the use of Green Infrastructure to reduce the need for cooling in buildings, provide shelter from wind chill and manage run-off. Ecological landscape management can also reduce maintenance costs;

Make connections with nature:

Opportunities should be created for positive experiences of nature, including the creation of informal recreation routes and spaces, the use of ‘edible landscaping’ and with a specific emphasis on formal learning about nature and natural processes.

4.3 Sub-regional context

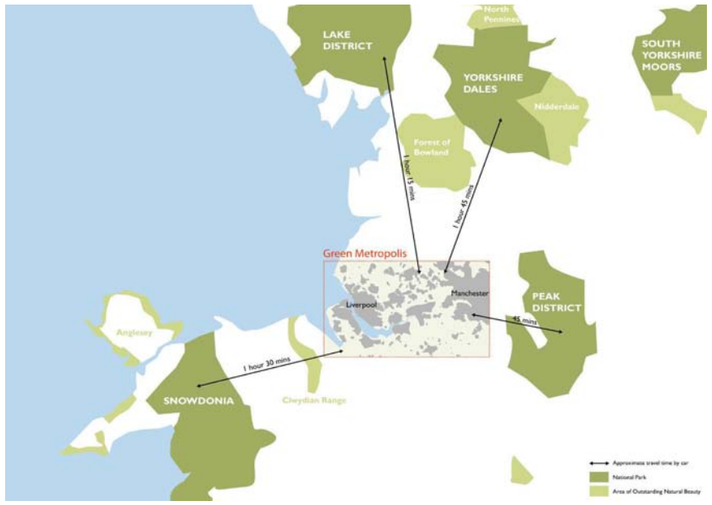
The Knowledge Quarter is embedded within wider networks of city and sub-regional Green Infrastructure across Liverpool and Merseyside.

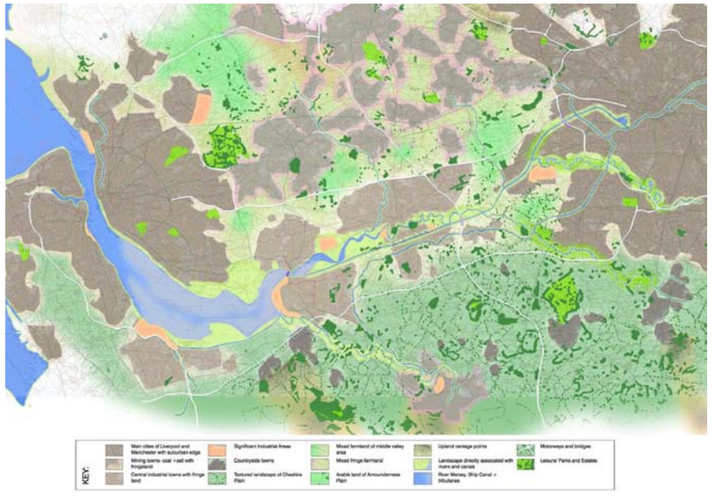
The Knowledge Quarter is part of a wider focus on Green Infrastructure across Liverpool and England's Northwest. We have been able to identify two major initiatives that provide a wider context for investment to enhance the Green Infrastructure of the Knowledge Quarter.

Mersey Parklands 'Green Metropolis'

The Northwest Development Agency is sponsoring joint regeneration thinking across the territory between the Liverpool and Manchester city-regions. One of the unifying concepts is for a major regional park, linking recreational and cultural assets.

Green Infrastructure is central to the emerging plan, with the idea of the Mersey conurbations acting as a 'Green Metropolis' surrounded by National Parks, and connected internally by green/blue links and fast rail services. Mersey Forest, co-authors of this report, are leading in taking forward this initiative.



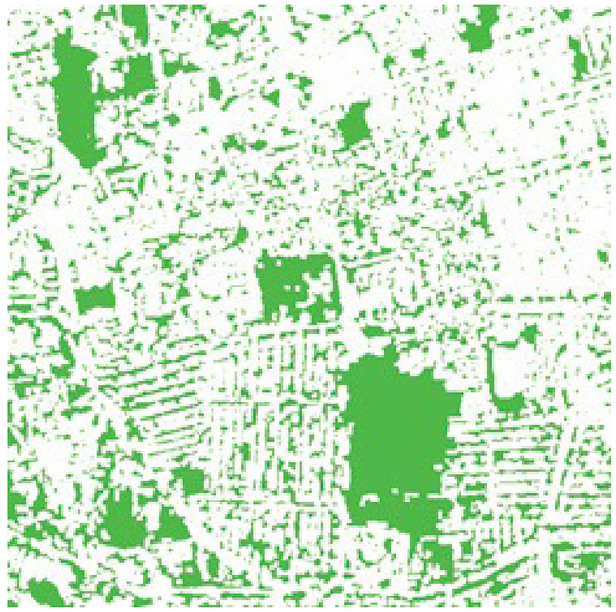


Liverpool Green Map

Concerned that there is no official system for mapping green infrastructure, CABE has selected Liverpool, Gloucester and the London boroughs of Hackney and Islington as examples, using aerial photographs to map Green Infrastructure.

Liverpool's green map shows the band of civic parks running north to south, with large open spaces to the east. Vegetation spreads along railways and roads in the west, with green belt in the south. The importance of private garden space to the city's overall GI base is revealed.

CABE see the maps as a challenge to conventional perceptions: normal maps show places as made of concrete and tarmac with some green punctuation; Green Infrastructure maps are the inverse. Once again, the Mersey Forest have played a lead role in mapping the city's GI using GIS techniques to differentiate different types of green area.



Wider context

Everton Park
Nature Garden

Cycle friendly
link to Croxteth Park

City
Academy

Newsham Park

Kensington
Library

Botanic Park

Liverpool
Digital

Wavertree
Technology Park

Link to Smithdown
student halls

Toxteth
Library

Sefton Park

Prince's Park

4.4 Making wider connections

The Knowledge Quarter plan has the stated aim to reach out to surrounding communities, using public realm improvements as a catalyst to regrow the city and connect people to opportunities.

The Knowledge Quarter will use Green Infrastructure to enhance connections with, reach out to, and support investment in surrounding inner city neighbourhoods of Everton, Kensington, Edge Hill and Toxteth. This is vital because of the acute deprivation of these wards as reflected in their IMD scores, which are within the worst 1% in the country.

This would therefore begin the process of breaking down real and perceived barriers between the Quarter and local communities. It would also integrate the Quarter into the city's existing network of Green Infrastructure assets and educational facilities, which include:

- The ring of parks: Victorian parks such as Sefton, Prince's and Newsham Parks, along with newer spaces created following clearances such as Everton Park, have created stepping stones for biodiversity in the city, but are under-utilised as recreational spaces by neighbouring communities despite acute under performance against the health IMD indicator.
- Existing learning landscapes: A number of educational resources are associated with these parks, including heritage such as the Botanic Garden at Wavertree, and the more recent investment in a nature garden in Everton Park.
- Education facilities: Links could be made with outlying education facilities including Toxteth and Kensington Libraries, the City (Environmental) Academy, Liverpool Digital and Wavertree Technology Park.

It is therefore proposed that clear routes are defined connecting these parks and knowledge locations to the Knowledge Quarter, with Green Infrastructure forming a green thread along these routes. This would include both major routes such as Kensington, Wavertree Road and Prince's avenue and secondary routes such as Shaw Street, Bowler Street, Gladstone Road and Windsor Street. These could be made more attractive using a common palette of public realm improvements, as well as making them more attractive as leisure routes for walking and cycling.

In a number of locations just outside the boundary of the quarter there would be mutual benefit to investment to improve Green Infrastructure assets. We have identified Everton Park in particular as requiring further attention in order to enhance its role as a major public park for use by people living and working in the Knowledge Quarter, and to meet specific needs such as recuperative space associated with the Royal Hospital, and recreational space for students and staff at Hope University.

In order to maximise its potential as a piece of Green Infrastructure Everton Park would benefit from a comprehensive redesign in order to:

- Address severance caused by the junction at Islington Square;
- Enhance the legibility and accessibility of the park and its entrances;
- Create more attractive walking routes which follow the contours and encourage greater footfall;
- Introduce focal points for activity such as cafes or tearooms;
- Use development and new building lines along the eastern perimeter to increase supervision;
- Make better use of spectacular views across the city to the Irish sea and Welsh mountains.

The investment would increase the value of this underutilised asset to the city, and would complement the needs of the Knowledge Quarter.

By linking in the existing learning landscapes and educational facilities there is also the potential create a wider network to inspire interest in science. This would complement and seek to harness the benefit of investment in Green Infrastructure and is explored further in Section 4.11

Key benefits from a wider approach

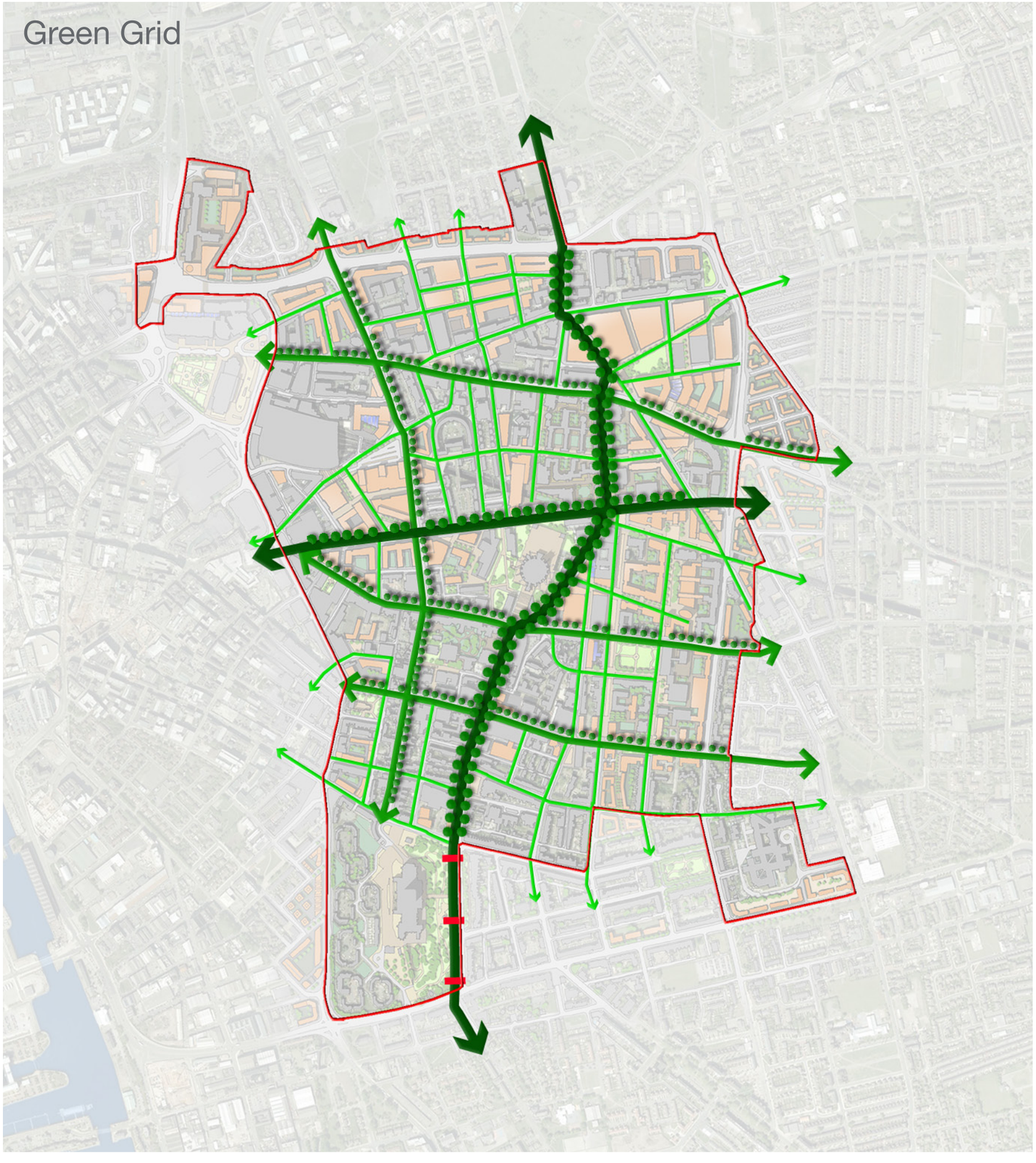
- Quality of place: Real and perceived barriers would be broken down in order to re-instate links with neighbouring communities;
- Recreation and leisure: Connections with surrounding inner city neighbourhoods would be enhanced;
- Health and wellbeing: Existing open spaces and connections would better support leisure activities and health facilities;
- Economic growth and investment: A wider network of learning landscapes and facilities would support a science-based economy;

Design principles

- The Green Infrastructure of the Knowledge Quarter should be linked into the City's wider network in order to maximise the potential for biodiversity, break down real and perceived barriers, and realise its regeneration potential;
- Green Infrastructure elements such as mature street trees, permeable parking bays and kerbside planted areas should be integrated into the palette of public realm design;
- Improvements in legibility, footfall and visual interest should inform a redesign of Everton Park so that it reflects its location and significance in the city's network of Green Infrastructure assets;

Implementation issues

- Investment would need to be justified based on the value to the wider regeneration of the city and the Knowledge Quarter;
- A palette of public realm improvements would need to be designed and agreed, to include Green Infrastructure elements;
- Management of the existing learning landscapes as part of a linked network would require co-ordination between the City, its maintenance contractors and any future structures established to manage the quarter;
- Establishment of a structure to co-ordinate and align activities and investment by stakeholders with landholdings, including the Universities, the NHS and RSL's.
- Linkages between educational facilities would flow from development of wider science-based outreach programme for the Knowledge Quarter;


Green Grid

4.5 Defining high quality streets

A continuous thread of mature street trees will form a fundamental part of the palette of high quality improvements to the grid of streets connecting the Knowledge Quarter to the rest of the city.

Mature street trees create a setting for investment and value creation in regeneration areas. They do this by upgrading the streetscape in a way that people instinctively respond positively to. This positive influence is in turn then reflected in property values and perceptions of an area.

Furthermore, a central aim of the Knowledge Quarter plan is to humanise and reclaim the traffic congested main streets. Street trees have the benefit ofimproving air quality by trapping particulates from vehicle exhaust – a major issue along arterial routes through the Quarter – damping down noise pollution and reducing wind chill from the Irish sea. They therefore have a value as a piece of living and breathing ecological engineering.

The legacy of street trees planted in the Georgian streets of the Knowledge Quarter demonstrates their value in creating some of our most attractive and desirable streetscapes. They also provide a reference for appropriate tree species. In order to realise the benefits investment is required in mature trees in order to quickly change the streetscape, and to minimise the potential for damage.

The Knowledge Quarter plan proposes improvements to a number of key connecting streets, for which pavement dimensions and street tree species would need to be adapted in order to create, if not a continuous canopy, then at least a sufficiently recurring feature of the public realm:

- The Golden Spine and Digital Corridor: The former linking from Toxteth library along Hope Street to Islington Square via the Cathedrals, RLPO, Everyman and JMU Art Academy. The latter linking from the Adelphi through a series of strategic sites to Liverpool Digital on Edge Lane.
- East-west and north-south links: A series of streets comprising:
  - Parliament Street;
  - Canning Street/Duke Street;
  - Falkner Street (re-instate lost links);
  - Hardman Street/Myrtle Street;
  - Mount Pleasant/Oxford Street;
  - London Road/Pembroke Place;
  - London Road/Prescot Street;
  - Great George Street/Berry Street Renshaw Street/Lime Street;
  - Rodney Street/Clarence Street/Seymour Street;
  - Crown Street (re-instating lost links).
- Internal pedestrian links: These would be next in priority providing important lower level links such as Chatham Street and Dansie Street.

Pavement widening in key locations to reclaim public realm from the roads would facilitate street trees. Trees would switch between lining one or both sides of streets depending on the available pavement width.

Key benefits from defining the streets

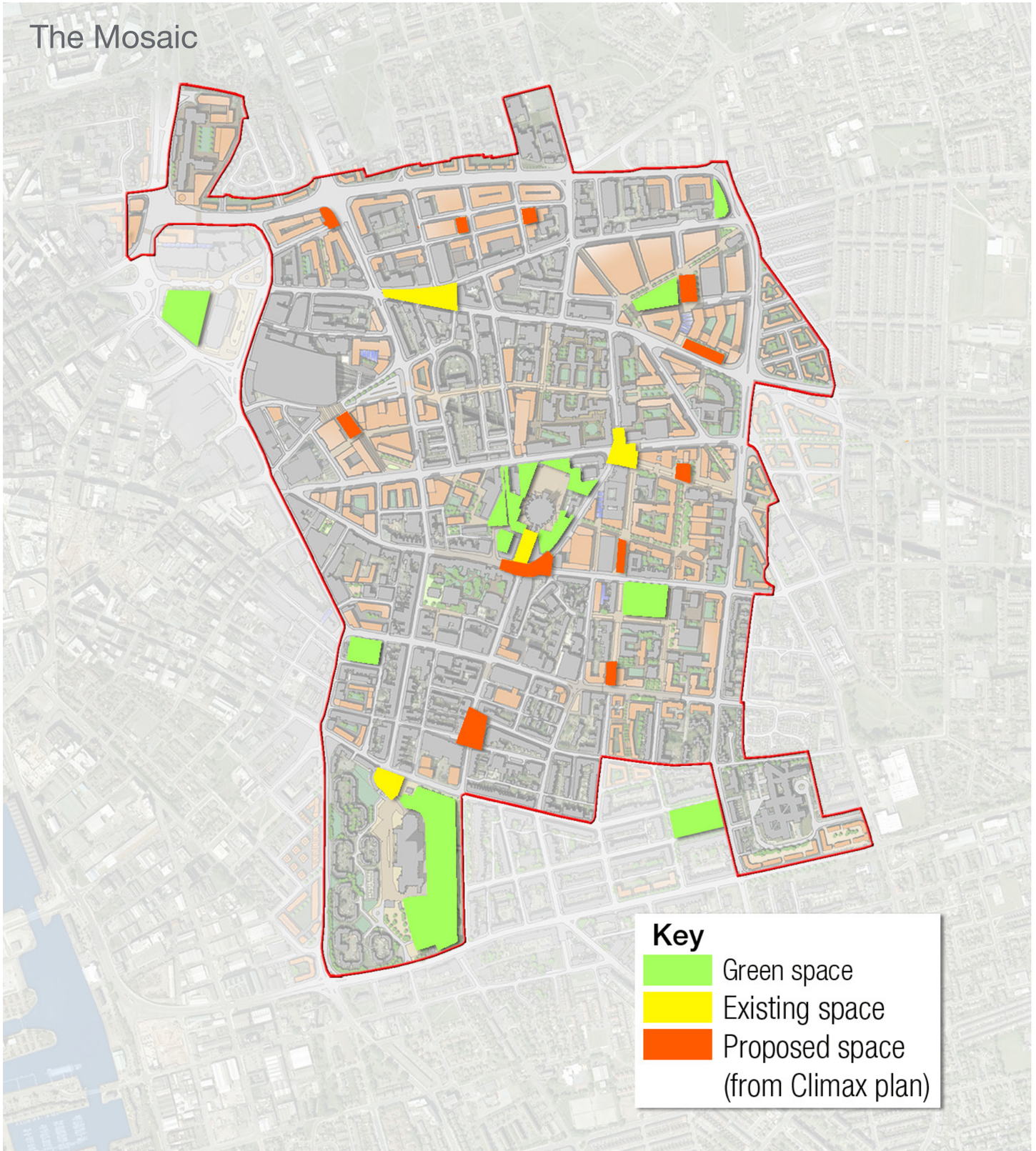
- Land and property values: A positive setting would be created for investment and property value creation in regeneration areas;
- Health and wellbeing: Air and noise pollution associated with vehicle traffic would be reduced and cooling would be provided;
- Quality of place: More attractive and desirable streetscapes would be created and would be assets for the city;
- Land and biodiversity: A continuous tree canopy would function as an urban forest linking together larger greenspaces;

Design principles

- Street trees should form a central element of the public realm design palette, with reference to the Knowledge Quarter's Georgian streets;
- Pavement widening to reclaim public realm from roads should incorporate street trees as a key feature;
- Species should be planted as mature standards where possible – defined by the BSi 3936 as an overall height >4m and stem circumference of >20cm - with species selected for hardiness, appearance, safety and low maintenance;
- Consideration should be given to the final canopy dimension to ensure that street trees are appropriate to the pavement width available.

Implementation issues

- An appropriate rhythm and target density of street trees will require agreeing for stretches of street, to be integrated into public realm designs;
- Dialogue is required with the City Council's street maintenance contractors in order to agree the approach, including specifications and maintenance;
- A palette of tree types will be required suited to the environmental conditions along the main streets, referencing native and heritage tree species;


The Mosaic
Key
Green space
Existing space
Proposed space
(from Climax plan)


KAASWINKEL

4.6 A backdrop for exchange

Spaces, crossings and intersections that will act as focal points for the life of the Knowledge Quarter will be framed by a natural, green edge in order to create attractive spaces.

The Knowledge Quarter public realm plan emphasises key spaces, crossings and intersections. These locations will act as gateways and arrival points for people coming to the district. As focal points for the life of the Quarter it is therefore important that the public realm is attractive and can support a range of activities and an intensity of use.

Green Infrastructure could play a number of roles in making spaces more attractive. Contemporary public realm design has a tendency towards the stark use of materials and hard surfaces. The drive for clean lines and reduced clutter can result in windswept and impersonal spaces unless the approach is complemented with elements of vegetation and permeable surfaces.

Whilst recent investment in the public realm around the Catholic Cathedral at Mount Pleasant and the University campus has demonstrated commitment to early investment, there has been a limited integration of Green Infrastructure around such key intersections. Vibrant spaces such as Monument Place at the intersection of London Road could also benefit further from additional framing by Green Infrastructure.

Mature street trees should be introduced where possible in order reduce exposure to wind and rain from the Irish Sea. They would also buffer and enhance the outdoor seating areas of cafes and restaurants from traffic. Seating with backdrops of street trees and planted permeable surfaces would create attractive, cooler settings for outdoor activities during the summer months.

Key benefits from framing public space

- Economic growth and investment: Key public spaces that form gateways and arrival points would be made more attractive:
- Land and property values: The attractive framing of spaces would enhance property values in and around key locations;
- Quality of place: The functionality of these spaces as comfortable and attractive places to meet would be enhanced;
- Climate change adaptation and mitigation: The amount of hard surfacing would be reduced and opportunities for larger trees created;

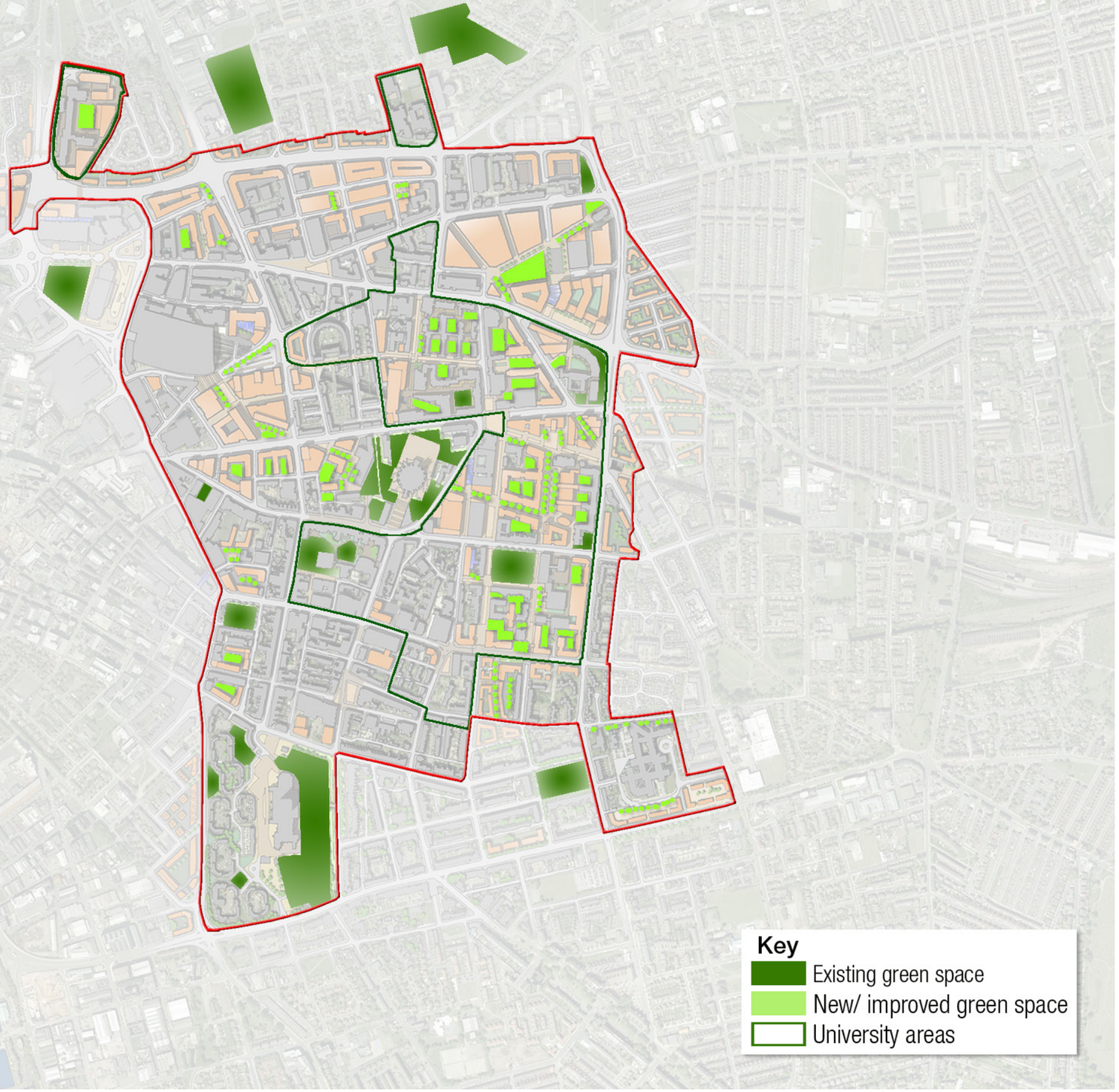
Design principles

- Green Infrastructure should be used to frame desire lines and routes, complementing the definition of space;
- Locations which support retail and leisure activities should be a priority for the incorporation of Green Infrastructure in order to reduce exposure to the elements and create conducive spaces for sitting and meeting;
- New combinations and varieties of trees and planting and the incorporation of water should be encouraged in order to create visual interest;
- Pavement widening to reclaim public realm from roads should incorporate street trees as a key feature;
- Species should be planted as mature standards of at least ten years, with species selected for hardiness, appearance and low maintenance;

Implementation issues

- Green Infrastructure requirements should be incorporated into the brief for the design of all new public realm investments;
- Dialogue is required with the City Council's street maintenance contractors in order to agree the approach, including specifications and maintenance;
- A palette of tree types will be required suited to the environmental conditions along the main streets, referencing native and heritage tree species;

Learning Spaces



4.7 Space for inspiration

Courts, quadrangles and squares that will provide spaces and views to inspire and create opportunities for learning, against a natural backdrop sheltered from the elements.

The university campuses incorporate a range of courtyards, quadrangles and squares that together are an opportunity to create a mosaic of spaces and tranquil gardens where it is enjoyable to linger, meet people and chat, and above all to create valued and convivial settings for research and study. At the same time these institutional grounds can also be made to work harder by providing ecological services such as drainage and cooling.

Many of the existing courts and quadrangles do not, however, appear to work well or have good characteristics as 'spaces for inspiration'. Examples include:

- Noisy adjacent uses, such as air handling plant facing onto 'the green';
- Too much overshadowing at midday by trees, such as at John Moores University's Foster Building Quadrangle;
- A lack of seating located in sunlit locations.

Parking, servicing and access for vehicles also tends to disrupt their potential role and, in some cases, dominates other uses. The original University and Infirmary buildings are a good case in point, being dominated by hard surfacing instead of celebrating the unique setting they could create.

The plan would see a greater focus on realising the potential for these institutional spaces. The design of existing and potential spaces, as well as proposed new spaces, would aim to ensure that they are:

- Conducive and stimulating spaces for study,
- Permeable and legible whilst still providing a feeling of enclosure,
- Provide suitable daylight and appropriately located seating,
- Offer distinct changes in natural soundscapes and fragrances,
- Productive by incorporating 'edible landscaping' such as fruit trees;
- Using rainwater features to enhance settings whilst managing drainage.

The potential of Green Infrastructure to create a calming and stimulating backdrop should be realised through the careful design of the spaces and the selection of species. This could include variation in the planting to reflect local and international botanical heritage, and a contrast between covered and open courts, creating different microclimates and habitat conditions. Car parking should be resurfaced using permeable green grids to soften its presence.

This could also include the greening of courts in student residences, which our site survey revealed tended to be dominated by car parking. Instead courts in new development proposals such as on Chatham Street could be designed to provide spaces and views that are more conducive to study, translating into better academic performance. Again, car parking should re-surfaced using permeable green grids.

Key benefits from inspiring natural spaces

- Economic growth and investment: The creation of more attractive, and functional GI, settings for academic departments would enhance their image and reputation;
- Land and property values: Enhanced landscape settings would enhance the property values of adjacent sites;
- Labour productivity: The creation of conducive settings for study would result in better academic performance;
- Quality of place: The creation of well considered habitat backdrops in each space would a series of distinctive and functional spaces;
- Land and biodiversity: A large number of courtyard habitats would create a mosaic of habitat types;

Design principles

- Green Infrastructure should be used to frame courts, quadrangles and parks but should not shut out daylight;
- New naturalistic combinations and varieties of trees, planting and water should be encouraged in order to create visual and sensory interest;
- Covered and uncovered spaces should be used to create a variety of habitat conditions, with planting reflecting the Quarter's distinct international heritage;

Implementation issues

- Green Infrastructure requirements should be incorporated into the brief for the design of new and remodelled courtyard and quadrangles;
- The Universities would need to agree on the approach, its potential benefits and how it might affect current uses such as servicing;

Suggested Intervention Framework