

MANCHESTER SHIP CANAL

BACK TO THE FUTURE
FOR DISUSED EUROPEAN WATERWAYS

Hisham Elkadi
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Scientific
Publishing

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Manchester Ship Canal:
Back to the Future for
Disused European Waterways

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by
Hisham Elkadi (Eds.), Sara Biscaya (Eds.)

Impressum



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Preface

Regeneration of many cities is essential to enable their sustainable re-development and more importantly to maintain their viability and creativity in this global and rapidly changing world. The predominant focus of current sustainable cities literature is concentrated upon the challenges of natural adaptation and mitigation practices these burgeoning metropolises present. Cities that responded positively to change have expanded during the industrial revolution while others did not. Since its inception in over the centuries, cities have been developed based around food and material sources. Cities have evolved from walking cities to those that spread across the rivers and waterways. Cities were then expanded during the industrial revolution with the use of electricity and internal combustion engines. The fourth wave of cities were modified as a result of the cheap oil prices and the domination of car mobility. The digital technologies replaced the old industrial manufacturing centers with knowledge jobs in the following wave of cities. Cities, in this fifth wave, continued however to be dominated by car mobility. The ecological challenges and resources depletion have focused the mind of planners and city developers on sustainable growth of the sixth wave of cities, using the developed sustainable technologies. New models of eco and sustainable cities were tried. We are now on the threshold of a new wave of cities; emerging from the expansion of disruptive, smart and renewable technologies, the emphasis on health and well-being for future generations, and the implications of the fourth industrial revolution.

Russel Casson and John Berry published the first street map of Salford in June 1741. Their boast described the City's street to be large, open and well-paved with the country a bout for several miles to be populous, industrious and wealthy. The loss of trees in the Manchester areas, particularly around Shudehill, in the late 18th Century marked the expansion of the City towards the east in the following decades. Manchester-Salford started its steps towards modernity with the building of the Bridgewater Canal in 1759; linking the Duke of Bridgewater's colliery in Worsley to Manchester. The history of the Manchester Ship Canal and its surroundings is dotted with continuous implementation of new ideas that linked new technologies to economic prosperity and contemporary living. Manchester Ship Canal made Manchester the third busiest port in Britain in the early 19 Cen-

tury and contributed to the City's economic wealth. The 'big ditch' became the pride of Manchester; its ingenuity, contemporary, and industriousness. The Canal did also symbolize the courage of the Victorian age in transforming the physical environment. The Manchester's docks, actually on Salford land, were expanded closer to the City providing adequate housing and living environment. The first industrial estate was also to follow in 1896 with the development of Trafford Park. The innovation of the canal and the industrial estate attracted American investments. In the early 20th Century, the American style gridiron pattern residential village was developed to house employees. Ford Motors was next to develop their first manufacturing site outside United States and started production in 1911. The second World War also gave a boost to the region around the Canal. War production and employment rose to 75,000. Over the years, manufacturers include Ciba-Geigy, Ford, and Rolls Royce. Until mid 20th Century, the development of the area around the Ship Canal provided excellent example of innovation led contemporary and prosperous employment and living.

In time that Greater Manchester is faced with a number of societal and ecological challenges, there is a need for more transformative intelligent solutions to the challenges of building a smart urban future. The ambitious plan to provide healthy environment in a carbon neutral Manchester requires a step change in our plans. Strategies to deliver the Government housing targets for all residents should look beyond the current practices and current employment opportunities. This project challenges our contemporary concept of urban living in Greater Manchester. The concept of a City, that is a settlement with sophisticated organization, administrative and amenities where most people work within that complex structures rather than in its surrounding countryside, is not anymore applicable. The Greater Manchester future of smart urban living should blur the boundaries between human and machines, between urban and rural living, between jobs and recreation, and between virtual and physical mobility.

In such time of uncertainty, the selection of an 'ideal solution' for growth by rationalising other 'planning' alternatives within the constraints of local and national governments is not viable. MSC project is generated on the assumption that there is a need first to uncover 'all' possible scenarios that might be brought forward by a 'crowd'; a crowd that not only consists of experts but rather a wide church that includes active involvement of stakeholders as well as intelligent scout gathering

of 'possible' alternatives. MSC also argues that generating a diverse set(s) of alternatives is not enough but should be accompanied by distinction between possible solutions by a 'diverse' group.

The project to develop a smart corridor across Manchester ship canal builds upon the rich history of the canal and aim to unlock its inherent heritage and industrious values. The project puts Greater Manchester back into the heart of the fourth industrial revolution as Manchester Ship Canal introduced the World to the first industrial revolution. The development of a dynamic smart urban corridor across the canal would not only be an example of smart future healthy living environment, blending urban and rural environments, but also would be a leading example of developing future jobs, physical and virtual interconnectedness, and applications .of smart urban mobility

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Fig. 1:
Manchester Ship
Canal, Aerial view

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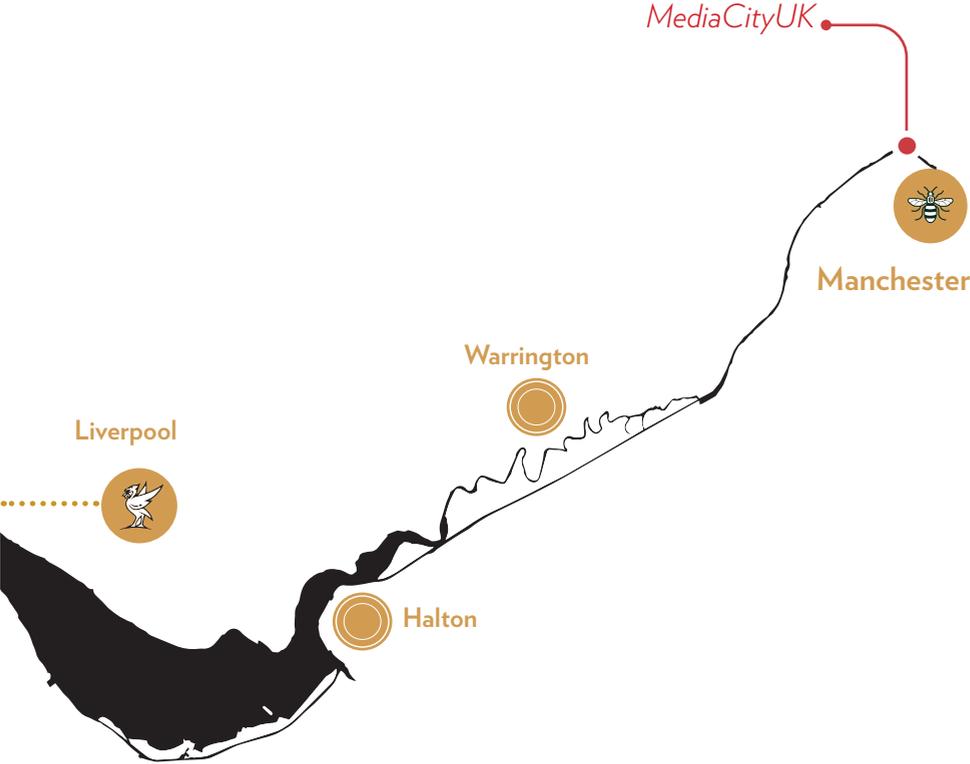


Fig. 2:
MSC Waterline

Forward

“This cultural landscape is our major and most productive creation. It is both an artefact, based on foundations of geology and climate, and a narrative, layer upon layer of our history and nature’s history intertwined.”

F.H.A. Aalen

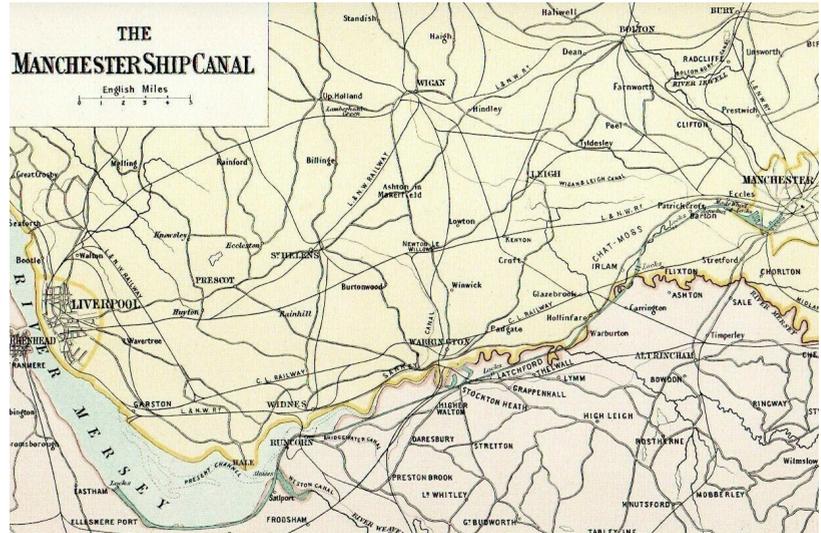


Fig. 3:
Map of the
Manchester Ship
Canal c1885

Set within the dramatic environs of the historic counties of Cheshire and Lancashire that inspired the mystical landscapes and inception of the first planned industrial estate, this project will explore the creation of a distributed Metropole straddling the 36 miles long Manchester Ship Canal. A water-filled canal framed by the historic landscapes, which for centuries has been recognized as an inspiring regeneration project has defined (since 1885), Manchester as the third busiest port in Britain. The low-lying areas throughout this region are characterized by river settlements and centuries-old agricultural patterns that persist today.

The development of Media City at one end provides a smart typology that could expand across the canal. The metropole will create smart networks between the distinct, but overlapping geographies of the river, farms, villages, business parks, and ports, allowing these areas to retain their present uses, while becoming part of a larger coordinated smart system of sites, services and ecologies. The goal will

be to design architecture and infrastructure that support the evolving programic typologies of the region while mediating the borders between the different industries, cultures, and avocations that are vying to co-exist in the region. Like urban settlements, the rural landscape is artificially shaped to meet social, and economic needs. Like the landscape, urban settlements are shaped by the geographical, topographical, and spatial conditions of the landscapes they occupy. This smart knitted metropole is a Metaphor for the complexity of human habitation and society around Manchester Ship Canal.

This project will investigate how urban/rural patterns provide differing conditions for living and working. The project is to read and analyse these urban /rural settlement structures and provide insight into the patterns of living and working that have formed them and possible development of a smart networked metropole that integrate the urban and rural socio-economic and physical infrastructures.

1. MSC- The Aim

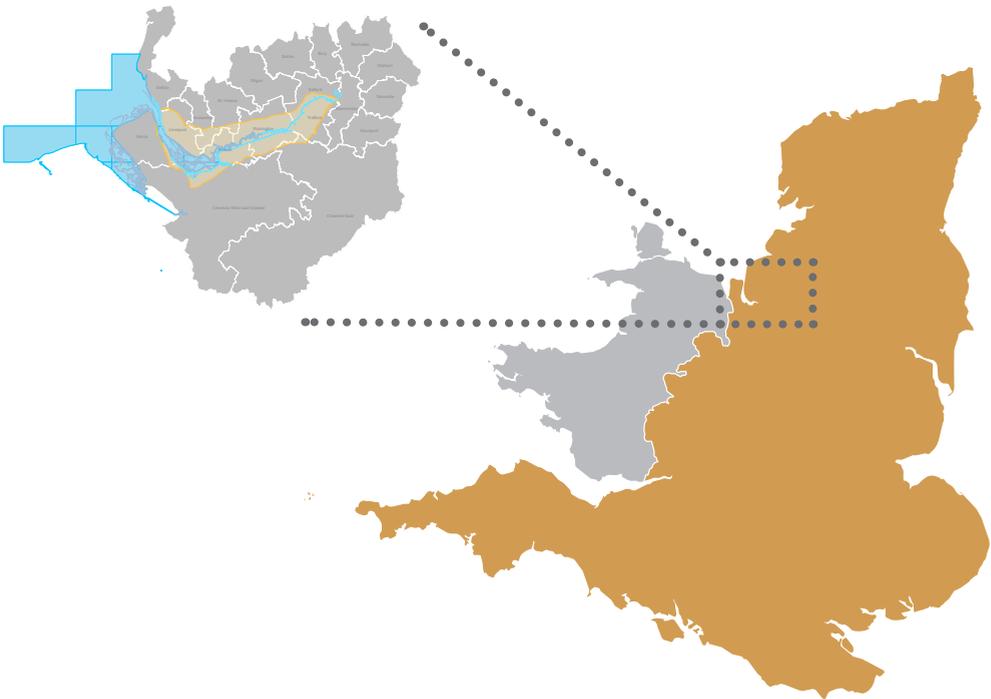


Fig. 4:
MSC Geographic
position in the UK

1

MSC- The Aim

Manchester Ship Canal as a historic, symbolic and economic link full of possibilities for the future.

1.1 A Smart Future for Manchester Ship Canal

The Manchester Ship Canal connects Liverpool and Manchester, cities that experience a rapid growth in terms of population and economy with an increase in services and industries being established along the corridor that connects them. It sits at the heart of the Northern Powerhouse strategy established by the U.K. (United Kingdom) government and in the last ten years has witnessed the establishment of highly international well-known organisations as the BBC, ITV, Kellogg, Adidas, Shell UK, RHM, dock10, Ericsson, Amazon and the University of Salford.

The development of the HyNet North West, a hydrogen energy and Carbon Capture, Usage and Storage project supporting the development of hydrogen and the current revitalization of the MSC as a viable ecological and economic solution to transport of goods from the Irish Sea to Manchester also contribute to the need for the corridor development.

The key challenges and opportunities for the MSC are about capitalising on a global economy transitioning to a knowledge base economy - using health and wellbeing, housing, jobs for the future and connectedness sectors as key catalysts creating a sustainable future - an ecologically sensitive urban environment creating a distinctive place - building on the MSC's community spirit and amazing physical asset.

With the development of MediaCity and the establishment of BBC and the University of Salford and the Northern Powerhouse strategy for the development of the North of England and Wales cities, towns and rural communities the corridor along the Manchester Ship Canal linking Liverpool to Manchester presents/provides the potential for the development of a smart typology that could expand across the canal.

The challenges and opportunities that it presents for a sustainable future-ecological sensitive urban environment based on a knowledge-based economy that can built on the MSC existing communities is the core of this project.

The goal is to design architecture and infrastructure that support the evolving smart networks of the region while integrating the roles of industries, cultures, and commercial activities that would continue to co-exist around the Manchester Ship Canal. It intends to provide for a holistic future vision for the MSC creating a

1. MSC- The Aim

vibrant canal that can accommodate a variety of services and offers for the communities alongside it whilst establishing what can make it a dynamic environment to attract business and investment to promote a healthy area to live in, to work and to visit. Through the connection of the overarching catalyst projects that address the economic, social, environmental and cultural issues, provides for a sustainable future vision of the Manchester Ship Canal.

1.2 What's Special About The MSC

The Manchester Ship Canal (MSC) is set within the dramatic environs of the historic counties of Cheshire and Lancashire that inspired the mystical landscapes and inception of the first planned industrial estate. Straddling along 36 miles long waterway connecting Manchester and Liverpool port and the Irish Sea. It was the birth of the industrial revolution in the 18th century and it can become a green and blue highway for Manchester supply based on a futuristic use of technology in the 21st century.

The MSC has evolved from a major Ship Canal symbolised by ocean-going liners, bringing the world's produce to the city on its waterway, to giant corporate projects located along the water's edge – the Trafford Centre shopping mall, the Lowry Centre arts complex, the Imperial War Museum North, and most of all the corporate skyscrapers of Salford Quays. The proposed metropole scenarios will create smart networks between the distinct, but overlapping geographies of the river, farms, villages, business parks, and ports, allowing these areas to retain their present uses, while becoming part of a larger coordinated smart system of sites, services and ecologies.

The development of Media City UK at one end of the site provides a smart typology that could expand across the canal. A number of scenarios are proposed that can create smart networks between different parts of the canal with its overlapping industrial estates, farms, villages, business parks, and ports. The vision will create a more contemporary healthy environment, while becoming part of a larger coordinated smart system of sites, services and ecologies. Although the

population of MSC urban area is above 5,000,000¹ people, yet it has a much larger catchment population that could use the MSC corridor as a center for living, trade, services and facilities, giving it a significant role as a connector between two major cities and the towns integrating the rural and urban areas.



Fig. 5:
MediaCityUK

1.3 MSC, What Future?

The project aimed at establishing a vision to develop the MSC area into a more ecological and economically competitive in the future.

Key industry, government, environmental agencies and council's have been involved in establishing a shared vision for the potential of the MSC.

The aims of the project were:

- To establish a shared vision for the future of the smart ecological urban green and blue corridor linking Liverpool to Manchester through the MSC;
- To identify key strategic catalyst projects that will provide a vision, momentum and investment for the next 20 years of growth of the MSC corridor.

¹ Office for National Statistics.GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

1. MSC- The Aim

Without a shared vision and communication amongst the different stakeholders the MSC corridor would be at risk of failing its full potential. With the growth of the cities along the MSC and as sites come up for development, as MediaCity, they would lack the ability to be seen as a valuable piece of a much bigger conundrum, one that seeks a new future for the whole corridor area.

The vision needs to be multi-faceted reflecting the interests of the different stakeholders whilst creating an overarching outline enabling the highest level of ecological and economic prosperity for the MSC. Building a strong partnership between the different MSC stakeholders, which enables the potential of the corridor to be unlocked in an integral, 'ground-up' manner, is the driving force behind the vision development.

1.4 The MSC Process

The MSC future vision consists of several elements- partnership working, project governance, workshop and scenario creating. Community input and transparent flow of this information to the community at large are the aim of this book and of the vision's future development.

There were a number of meetings and two workshops with key experts in the field from the University of Salford and other higher education institutions as well as industry stakeholders. The initial meetings were internal and focused on setting up the project aims and objectives and identify key partakers from the industry relevant to the project. After this stage the initial catalysis projects were identified as well as the required data sets for analysis. The data sets were analysed and four main themes established: health and well being; housing; jobs for the future and connectedness. A major workshop hosted by the University of Salford in its MediaCity campus took place with the different stakeholders of the MSC such as key industry, government, environmental agencies and relevant council's.

Invitees to the workshops were asked to consider the below questions within the four themes presented:

.What can happen to the MSC corridor, in a physical and non-physical sense, to make it a great place to live, work and invest?

Health and Well-being in the 21st century

How can we create/potentiate a greener environment that:

Improves life expectancy

Improves quality of life

Reduces health care costs

Housing

How Do You Visualise the Future Housing Strategy within the MSC context?

Jobs for the Future

How do we create a smart place to attract people with jobs to come to the area?

Connectedness

Can we increase our connectedness with the natural world and each other through technology?

What is the MSC Future Living?



Fig. 6:
Workshop 2

As this journey and process continues, there will be further opportunities to engage with the community, partners in government and representative bodies, as well as the subsequent workshops that will help develop towards a more defined vision for the MSC corridor.

1.4.1 The Vision

The project follows a multi disciplinary participatory workshop approach to develop a number of ecologically based scenarios. Through working cross-disciplinary partnerships the project engaged academics, different local authorities and industry partners to find potential environmental, liveability and economic drivers and enablers to establish a set of principles that guide the development of a smart urban corridor for MSC. A blue-sky approach was used in the workshop combined with data analysis of a number of pre-determined catalysts for MSC.

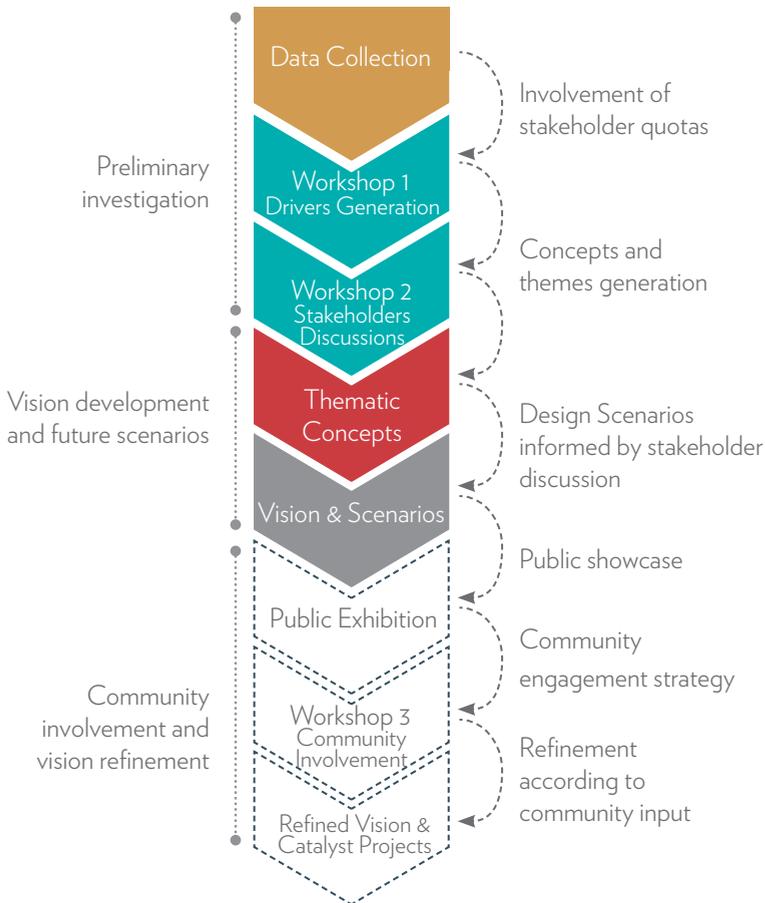


Fig. 7: Methodology Diagram

The Delphi Technique was applied in the study aiming at a consensus of opinion concerning real-world knowledge from experts in the fields that the MSC addresses with focus on developing potential scenarios of what the smart ecological urban corridor along the MSC could be.

Four iteration phases were determined to achieve consensus within a series of multidisciplinary meetings and two workshops with key experts from different fields, including urban design, ecology, engineering, environmental studies, transport, health, and social science, to identify the potential of the MSC corridor, prospective catalyst projects, and key drivers and enablers.

Participants were sampled based on their background and expertise and not simply knowledge on the subject. Socio spatial characteristics of the MSC region were analysed using the current available qualitative and quantitative data.

1.5 MSC: History and Heritage

The Manchester Ship Canal played a significant role in the history of the Liverpool and Manchester areas. Manchester was the cradle of the industrial revolution with a remarkable growth in the 18th and 19th centuries. The Ship Canal is still considered one of the most significant man made structures and endeavors since its construction 1887-1894.

Since then and until 1958 the MSC reached its peak with the amount of freight carried through it reaching the 20,000,000tons from which point the traffic on the canal decreased significantly [1].

Currently owned by Peel Holdings containers from Manchester to Liverpool contain dry bulks from coal and biomass, to aggregates and chemicals; forest bulk products intended for a wide range of industries and manufacturers throughout the UK; liquid bulks, such as fuels, oils, fats, additives or acids; metals, linking to Peel Holdings major fully-automated steel terminal in Liverpool as well as food and wine supply.

Though the lower extents of the canal are still busy with shipping, particularly around the Queen Elizabeth II Dock at Eastham and the Stanlow Oil Refinery,

1. MSC- The Aim

carrying some seven million tons of cargo, mostly oil, chemicals and grain, but sighting of a cargo ship in the old Manchester Docks area is now a rarity.

In 2006 the development and establishment of MediCity in the remains of Manchester docks in Salford Quays became the first significant urban regeneration project along the MSC.

The industrial revolution had its inception in Manchester through the visions of innovative technologies; the scenarios explore the potential visions for the future of a smart ecological urban green and blue corridor through building on the history of the MCS without disregard for the increasing speed of disruptive technologies.

1.6. MSC 36 Miles of Waterway

The MSC opened to traffic in 1894 with a total cost of £15million and 6 years of construction reaching its traffic peak in 1958 [1;2;3]. Since then it has experienced a decline in both freight and relevance in the northern landscape. This can change with a creation of a vibrant metropole linking the rural and urban areas along the canal. The increasing focus and investment plans for the North along with strong partnerships with the stakeholders and communities in the region can unlock the recipe for one of the most important and substantial urban infrastructure projects undertaken in the region in recent times.

1.6.1. MSC Public Investment

Northern Power House

The Manchester Ship Canal links two of the major centers of the UK government Northern Power House initiative to regenerate the economy of the North of England. The plan focuses on economic growth; value added per head; connectivity especially; skills and education – increase supply for high quality teacher and senior leader; additional 40,000 houses to attract talent to settle; natural and culture infrastructure to make living more attractive; promote research transfer into business; grow through support investment; support high value-add infrastructure project; pilot intellectual office in the region; trade, investment, and local engagement communication and supports [4].

The MSC corridor includes all these identified enablers for the development of the region but their full potential can be unlocked through catalyst projects.

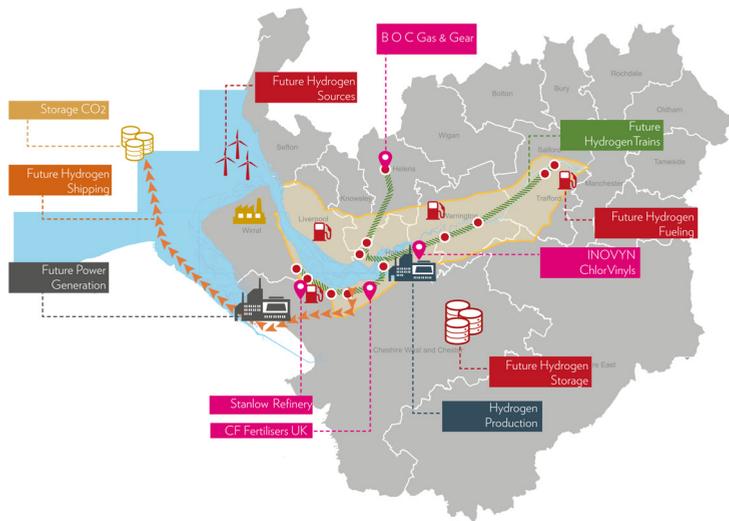
Transport for the North Strategy

The strategy development has identified four distinctive prime capabilities in the global economy: digital technology; advanced manufacturing (materials and processes); energy and health innovation. To support these potentials three enabling capabilities have been identified: financial and professional services; higher education and logistics.

The MSC corridor includes all these identified enablers for the development of the region but their full potential can be unlocked through catalyst projects.

To improve connectivity in the region there are plans to improve and expand rail transport (highspeed railroad new lines) and Road, rail and other strategic transport schemes emerging from the Freight, International Connectivity, and Strategic Connectivity Local workstreams, of which there is likely to be a significant overlap with those schemes destined for inclusion in the rail programme for Control Period 6 2019 to 2024 and the second Road Investment Strategy 2020 to 2025 [5].

Fig. 8:
HyNet Project
Prospects



Source: (Progressive Energy Ltd, 2017).
The Liverpool-Manchester Hydrogen Cluster: A Low Cost,
Deliverable Project (2017) Report.
HyNet North West: Vision to Reality (2018) Report

-  Potential Existing Sources of Hydrogen
-  Hydrogen Stations
-  Future Hydrogen Fueling

Industry, Ports / Airports

The MSC freight industry has a number of key strengths including: proximity to markets (consumer and production); land and labor favorable (compared with the South); industrial heritage; ports and airports (international and regional) have capacity and options for expansion; passenger transport improvements on rail could free up capacity for freight; the waterway and ports along it and a large manufacturing base to capitalise.

The Northern Transport Strategy (2016) has continued to develop the UK's first pan-regional freight and logistics strategy. The ports along the MSC have the potential to support economic activity and provide additional capacity, reducing pressure in other connectivity routes.

Industry / Clean Energy

“HyNet North West is a hydrogen energy and Carbon Capture, Usage and Storage (CCUS) project. The goal of HyNet is to reduce carbon emissions from industry, homes and transport and support economic growth in the North West of England.”*²

It is a unique project in the UK and in the world that aims at reducing carbon emissions through the production of hydrogen from natural gas. It is based on the development of a new hydrogen pipeline and the creation of the UK's first Carbon Capture, Usage and Storage infrastructure. This is a significant technology to achieve the 2050 carbon emission targets. The MSC has a history of innovation and the potential in the region for the development of clean energy initiatives is thriving. The physical and geological conditions of the area also provide for a unique set for this model, intended to be replicated for akin programmes across the UK. The infrastructure necessary for the project development builds on the conversion of existing industry infrastructures.

The project is expected to generate more than 5,000 jobs and a £0.9bn project [7]. The low-carbon hydrogen is intended to power industry and heat 2m homes with a long-term aim to provide fuel for trains, lorries and buses.

² From: <https://hynet.co.uk>

1.6.2 Private Investment

MediaCity

Mediacity Phase I development was the result of a partnership with Salford City Council and the Central Salford Urban Regeneration Company and Peel's to invest more than £650 million in phase one ensured the delivery of a truly transformational media community, with huge potential for future growth [8;9].

Current plan include the development of MediaCity phase II, a unique site accessible by road, short sea shipping and rail with a £138m investment to create 148,000 sq m warehousing and 280 jobs 26,000 sq m ambient warehouse to be tenanted by food and drink logistics [10].

Ambitious plans to double the size of the development by 2030 with MediaCity Phase II have been approved, with a further £1 billion of private investment to come [10].

The Quays

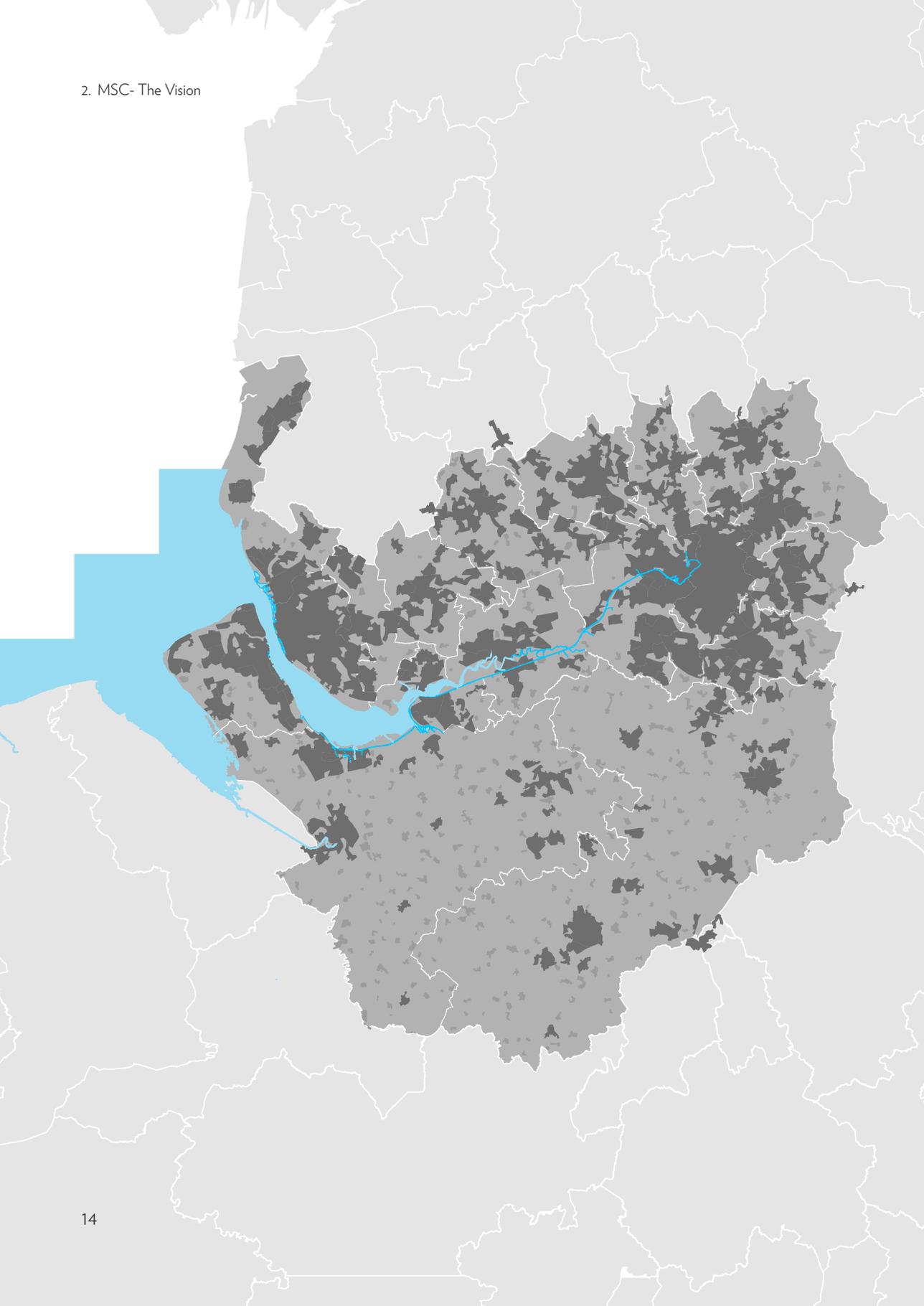
The Quays area, as currently, 6,642 sq m of new office space and 2,484 new residential units worth a total of £480m of investment. The future plans to develop the area involve a further 263,000 sq m of office space and a further 8,200 residential units - worth more than £1.5bn of private investment [11].

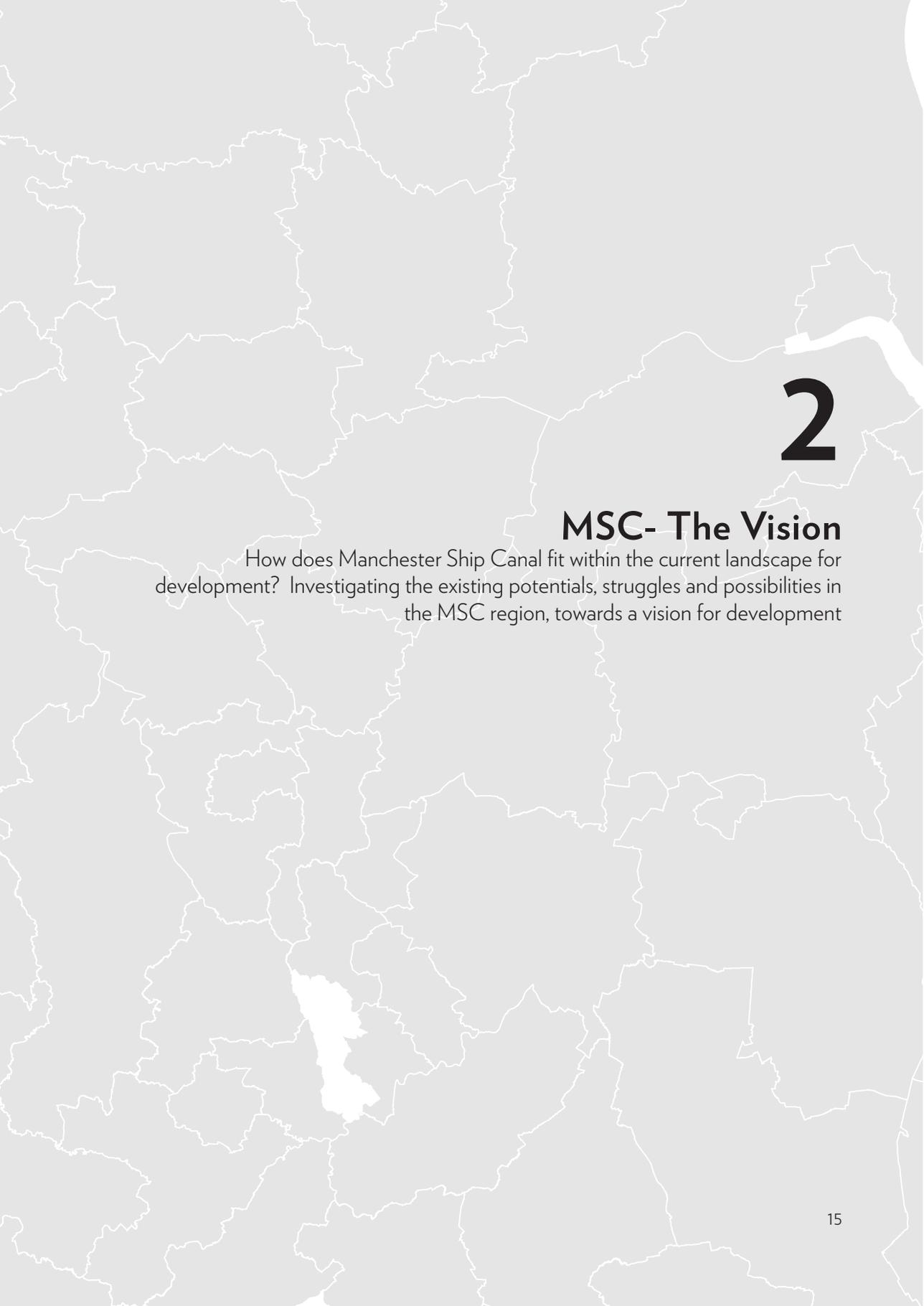
Peel Holdings

Peel Holdings, current owner of the MSC whose plans include redevelopment, expansion, and an increase in shipping from 8,000 containers a year to 100,000 by 2030 as part of their Atlantic Gateway project. A plan of £50 billion of investment over 50 years, outlined in 2011 with the Port of Salford as one of its main features [12].

The development and success of the investment in the Quays area supported by the Salford City Council, can be replicated through the creation of smart networks between different parts of the canal. The Greater Manchester Spatial Framework [11] includes plans for the development of the Manchester Ship Canal area with emphasis on economic, business, innovation future growth but also for health and wellbeing. The proposal will create a more contemporary healthy environment, while becoming part of a larger coordinated smart system of sites, services and ecologies.

2. MSC- The Vision





2

MSC- The Vision

How does Manchester Ship Canal fit within the current landscape for development? Investigating the existing potentials, struggles and possibilities in the MSC region, towards a vision for development

2.1 What's Great About MSC

There is great potential for the development of the MSC urban/rural corridor, for existing and future residents and visitor to experience a vibrant, diverse and beautiful landscape, furthered by its proximity to river, farms, villages, business parks, and ports.

The following attributes were discussed as part of the workshops as being positive elements of the MSC that need to be exploited to their full potential.

MediaCity location and development

The development of MediaCity UK at one end of the site provides a smart typology that could expand across the canal. Established in 2006 in the remains of Manchester docks in Salford Quays, MediaCity became the first significant urban regeneration project along the MSC. It is home of jobs in Today it's a home for jobs in digital, media, the creative industries, professional services and new distribution and logistics businesses. Its expansion into MediaCity Phase II is expected to create more jobs with an investment of 1billion on an unique site accessible by road, short sea shipping and rail. The affordable housing market and the leisure areas created have provided for a young generation of skilled professionals to fixate in the area.

Education opportunities

Education has become one of the biggest industries in the North West region, employing 31,085 jobs and generating 48,810 jobs outside universities contributing 1,7bn to the local economy (2017)*. Manchester only has one of the largest student populations in Europe. The University of Salford, Salford City College and the University Technical College (UTC) are established in MediaCity aiming at training young people for the media and creative industries. The total number of students at higher education institutions increased by 0.4%, from 2.31 million to 2.32 million between 2007/08 and 2016/17³.

The University of Salford has more than 20,000 students at present having grown 1.0% from 2012/13 until 2016/17⁴. The growth in education is a key indicator of a

³ Statistics from Universities UK <https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/industrial-strategy-north-west.pdf>

⁴ Statistics from <https://www.hesa.ac.uk/data-and-analysis/students/releases>

shift away from manufacturing/industry towards a knowledge-based industry in innovation and research. There is growth of people studying and working in the global digital media and communications industry.

Waterway length and current use

The MSC canal straddles along 36 miles with a strategic position linking two of the major cities of the North, Manchester and Liverpool ending in the Irish Sea. A water-filled canal framed by the historic landscapes, which for centuries has been recognized as an inspiring regeneration project has defined (since 1885). These landscapes have shape the identity for the corridor, giving it a greater context which is rich in nature, fertile in soil and fascinating in scenery.

History and Parks

The built environment and the natural assets of MSC are historically tied to the origins of the Industrial Revolution, and especially the so-called second Industrial Revolution symbolized by the Manchester Ship Canal. The increase communication between the rural and urban areas is a driver for creating an environment that brings out their best qualities.

The MSC is one of most impressive man-made structures of its age; along this waterway there are the remains of significant buildings that are part of the history of the North West region, and the wider development of early twentieth century Europe. Due to the ship canal Trafford Park Industrial estate was built which became the bridgehead from which major American companies began to penetrate European markets for the first time. It was here that companies such as Ford and Westinghouse began their expansion into Europe and accordingly world domination as the old order gave way to the new. Manchester, the first shock city of the Industrial Revolution sat at the nexus of this major global shift. Although many of the most important buildings from the world's first industrial estate have gone there are currently 3484 listed buildings, 21 listed parks and five conservation areas along the canal such in the Barton-upon-Irwell area, including the bridge, the aqueduct and the tower as well as Stockton Heath: London Road/Grappenhall Road Conservation Areas⁵, the Thelwall Village Conservation Area and the Ellesmere Port Docks Conservation Area. Liverpool was granted World Heritage status from UNESCO in 2004 due to its role as a Maritime Mercantile city reflecting the city's significance as a commercial port at the time of Britain's greatest global influence.

⁵ From: <https://historicengland.org.uk>

Population growth and movement

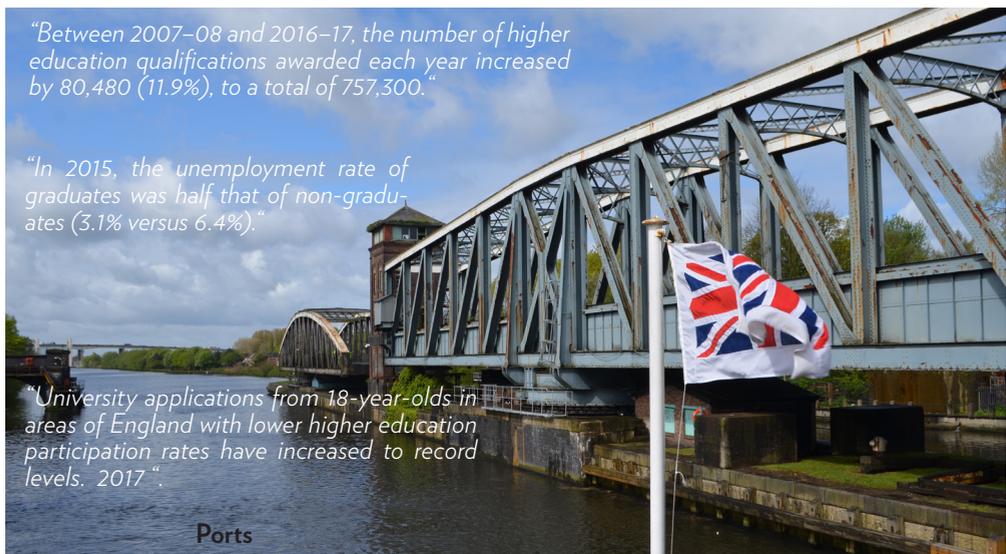
There are currently more than 5,000,000 people living in the areas along the canal. By 2026 the population change in the North West region is expected to increase by 3.4%⁶, indicating a significant movement of population and growth in the area. Up to 1500 of the UK residents have moved to districts such as Liverpool, Cheshire West & Chester and Cheshire East between 2012 and 2016⁶. This is indicative of the recent trends of people moving to the Northwest region. Liverpool and Trafford population growth is expected to rise by 6.3% whereas Manchester and Salford population should grow by 8.1% and 8.7% respectively by 2026⁶. This presents challenges but also opportunities for the area to explore and expand in a sustainable manner.

Large Catchment Population

The MSC corridor is serviced by a large population catchment area: from the Manchester, Salford, Trafford, Warrington, Halton, St. Helens, Knowsley, Cheshire East, Cheshire West and Chester, Liverpool, Wirral and Sefton districts.

This extensive and diverse catchment highlights the canal as the potential development hub for the North region

Fig. 9:
Manchester Ship
Canal, Barton Road
Bridge



⁶ From the Office for National Statistics <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsfor england/2016based>

Timeline of waterways development in the Region

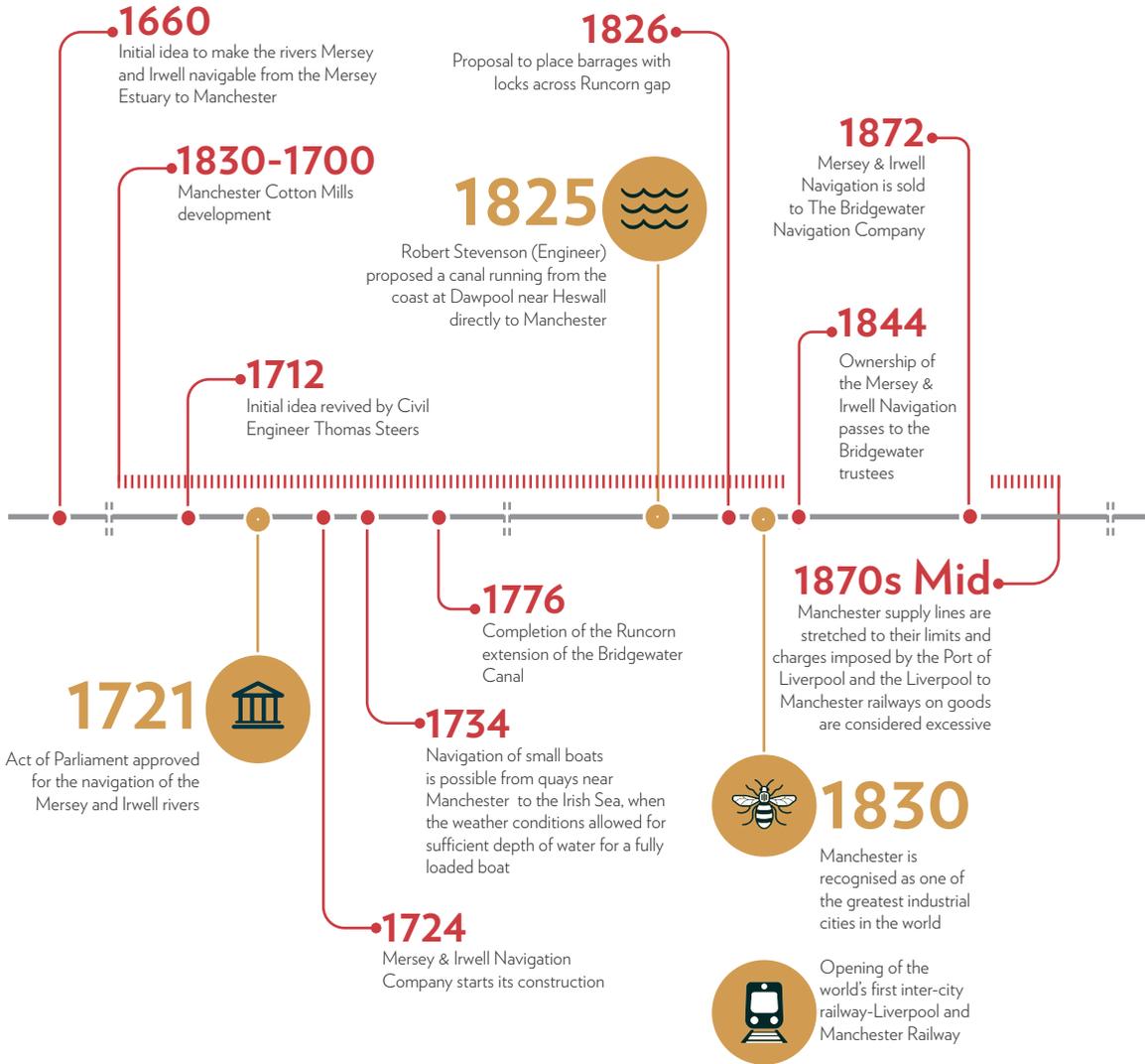
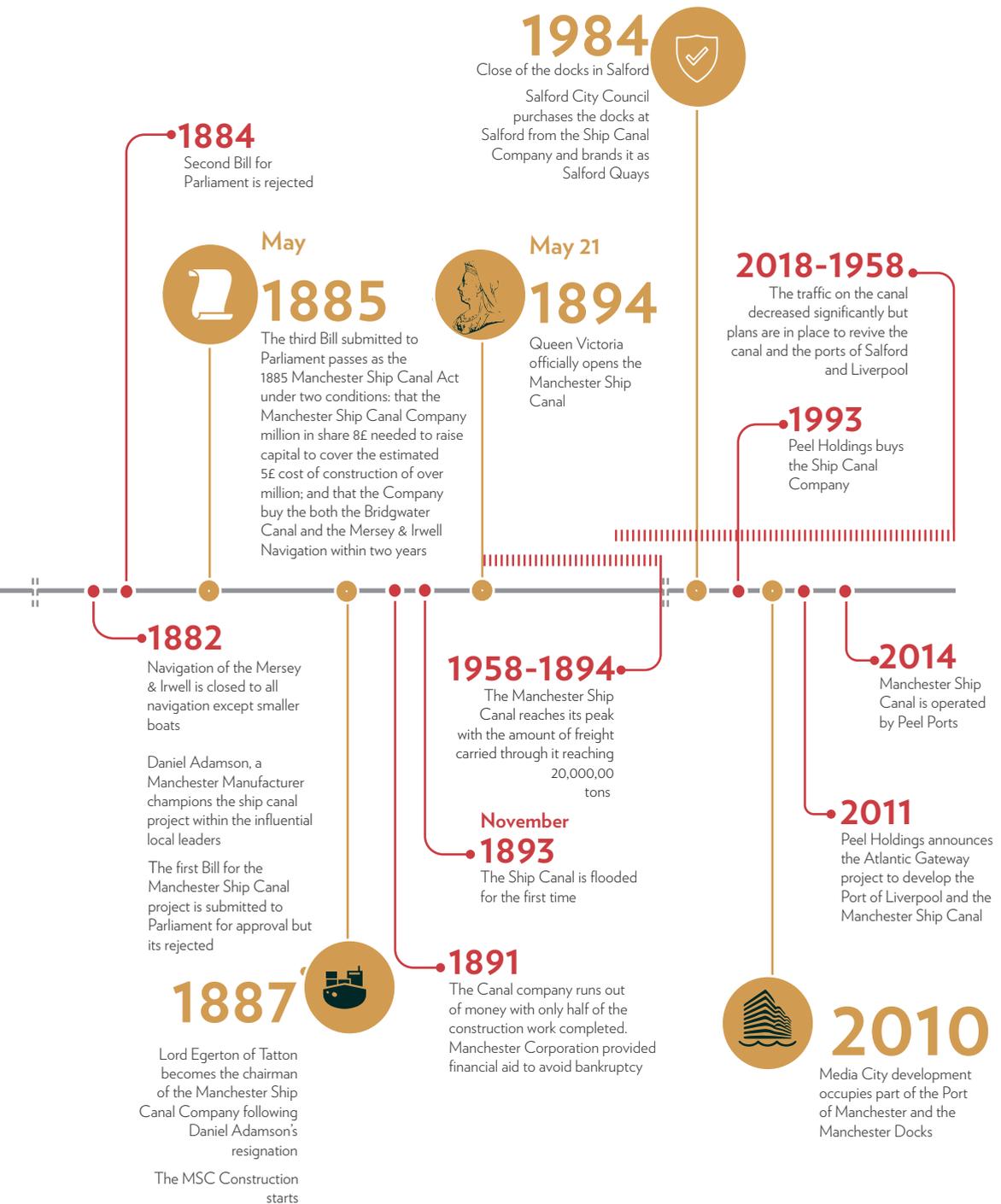


Fig. 10: Timeline of waterways in the Region



2. MSC- The Vision

Liverpool's geographical position as the U.K. entrance of goods from Ireland and the growing Americas through the Irish Sea made it a port of international importance in the 18th century. This was due, above all, to the growth of her trade with the Americas, which mainly involved sugar from the West Indies and tobacco from Virginia. From about 1740, Liverpool also became heavily involved in the Atlantic Slave Trade, which made an important contribution to her growing prosperity as a major Maritime Mercantile city. Today it is directly linked to the main motorways in the North West region as M53, M57 and M62 with a direct rail connection within the port. Benefiting from a privileged position ideally located for transatlantic trade with docks spanning both sides of the River Mersey. In 2016 Liverpool2 a new deeper-water container terminal of £400m opened, doubling the port's container capacity. Its strength lies in the diversity of its capacity and the fact Liverpool port has become a logistics hub promoting solutions for container services as well as warehousing linking to the inland logistic hub along the Manchester Ship Canal. Plans to develop the MSC include 4,000,000 sq ft of port-centric warehousing and logistics facilities to be developed over the next five to ten years⁷. Expanding from Mersey Estuary into Manchester it comprises 12 terminals with development plans inciding on the Ports of Salford, Bridgewater and Warrington with direct links to the main motorways[13].

Airports

Manchester international airport is currently the second busiest airport in the United Kingdom and a European top 20 airport, located 15min from Manchester City center with transformation plans for the next ten years and an investment of £1bn [14]. The programme will expand the airport's capacity by 50% over the next .ten years

Liverpool airport is located at 20 minutes by train from the city center and has had an increase of traffic by more then 15% between 2015 and 2016 and there are plans to develop it further up to 2050 [15].

⁷ From; <https://www.peelports.com/ports/manchester-ship-canal>
Quotes from: Patterns and Trends in Higher Education 2018
<https://www.universitiesuk.ac.uk/facts-and-stats/data-and-analysis/Documents/patterns-and-trends-in-uk-higher-education-2018.pdf>

2.2 What Needs to Change

During the major workshop, participants were asked to identify the potential aspects for the development of the MSC smart ecological urban green and blue corridor but also the things they perceived not be working. The following list was generated through this process, as a summary of the key issues that people felt needed to be addressed in order to make the corridor a truly great place to live.



Fig. 11:
Salford Quays
development area

Lack of quality affordable housing

There is a currently a high vacancy of housing along the corridor related with low affordability. Younger population with no family tend to live in central urban areas, in turn older population tend to fixate in the more rural areas. Increasing the percentage of affordable housing along the corridor through the integration of high density housing with rural and green/agricultural lands creating areas in between for community engagement with both. Reversing the trend of moving away from canal towards motorways.

Lack of a green infrastructure investment plan for MSC corridor

The current greenbelt isn't equal to green space. There is a need to consider planning decisions to explore natural capital accounting approach to ensure environmental value included in development process. Emphasis on the integration of urban and rural spaces should unlock the implementation of blue and green infrastructure for all new development through an overall MSC strategy. Investment in nature with long term thinking which includes urban agriculture and the use of flood zones for new green spaces can unlock the implementation and maintenance of a blue and green infrastructure.

Lack of an effective mobility and active transport along the MSC corridor

The poor connection between the north and the south along the corridor is a major blocker to its development, allied with a lack of active and effective transport and the local boundaries established in the area make it unattractive to innovative business and people. Transport lines to Warrington are considered to be extremely difficult.

The transport along the corridor requires radical improvements that can be based on making the canal an active transport link between urban areas. Improving access to the canal will make the areas around the watercourse appealing to investors and people. Cycling and walking lanes integration will provide for an integrated active transport system to improve the quality of life in along the corridor. The

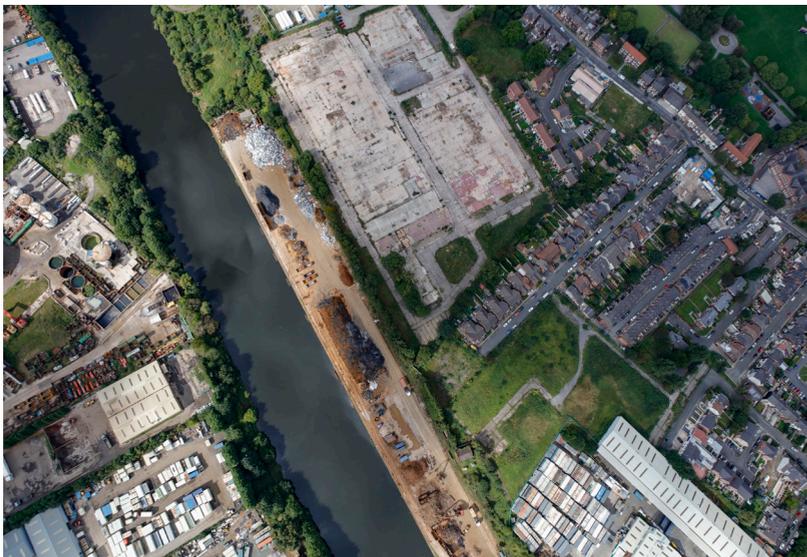


Fig. 12:
Aerial View of the
Industrial area in the
MSC

creation of a drone's highway that can transport goods can divert traffic from main roads. Car share scheme and electric vehicles implementation will also impact on air quality and active transport efficiency.

Lack of a Combined authority for MSC corridor

The lack of a combined authority that can establish agile policies to develop and implement a sustainable plan for the creation of a smart urban green and blue corridor is one of the key blockers for the region. The combined authority can be established through the engagement of all districts along the corridor to set up regulatory tools/policies on: infrastructure projects; public transport infrastructure; infrastructure environmental impact; on developers behaviour towards housing affordability and green space creation. Political will and knowledge of environmental wellbeing at high level of planning and more powers devolved to local level for driving sustainable development and unblocking the maintenance constraints. Investment catchment needs to reverse tendency to migrate towards super centres and instead to join up the whole area. Considering the effects of digital technologies through the development of a Smart City digital highway and infrastructures on greening, health and well-being.

Redesigning the city centers

The cities centres are not designed to integrate the urban with the rural areas as they are self centred and lack effective active transport networks that invite people to “live cities” for a healthier lifestyle and to cater for modern need of integration with nature.

More localism density as a direction for creative spaces, walkability increases with higher densities and more cycling and electric charging spaces for full electric vehicle system for the future are to be integrated in cities centers redesign.

Smart creative and innovative industries

The corridor has a history in manufacturing but there is a movement to move beyond that towards creative industries, education and health. Disruptive technologies are also changing our behavior on sharing and living. Whilst manufacturing is still a significant contributor to the MSC economy, this shift in employment requires innovative and contemporary thinking to allow the full potential of technologies, health and education to be realised. Robotisation, drones, virtual reality can unblock the full development of the corridor as a unique Smart Industries hub.

2.3 Trends in Regenerating Urban Corridors

The implementation of Northern powerhouse has become an opportunity for the region to think outside the box regarding its future development. How can we connect the dots to draw a big picture? What can we learn from other cities experience when facing our own challenges?

Today, there are more people living in the cities than rural areas globally according to The World bank Group [16].

Connectedness

The MSC urban landscape offers opportunity to balanced lifestyle engaging with nature and encourages outdoor physical activities, whether it may be exercise or active transport. It also means an environment that offers diverse options for personal development and work-life balance.

Manchester ship canal, as a functioning transport corridor connecting Manchester and port of Liverpool may serve as the catalyst for reshaping regional development strategy. Connecting local government and business along its catchment through a new vision incorporate state-of-the-art technology and governance to enhance its economic value. Effectively benefit from the agglomeration of local economy through revised strategic spatial planning.

Innovative industries and active mobility

Agglomeration effect is the major economic driver toward growing densely populated city regions. Large population concentration in the MSc region allows infrastructure built to be efficiently used due to its proximity to the demand. It also gathers a deeper population pool for match between businesses and relevant skills as well as frequent knowledge exchange.

Transport route and hubs for the canal waterway can be planned connecting factories to the markets, serving industrial clusters as well as commuters who work in the industries. For a regional development to be successful, the corridor development needs to guide the industry to concentrate in easily accessible locations.

Reconcile with Nature

Modern cities have been developed into large urban sprawl where private vehicles are heavily depended for travel. In a large, low density urban environment resi-

dents are distanced from both amenity and nature. In a large, low density urban environment residents are distanced from both amenity and nature. Well-planned parkland is a key solution to these problems. Green space may serve as connection between places offering environment for outdoor exercise, local access to nature, countermeasure for heat island effect, and a measure to reduce the risk of flooding.



Fig. 13:
Residential Area

New Urban Lifestyle

A current trend in favour of city centre living is shaping a new urban culture and lifestyle. How future development facilitate such trend will determine the future of the city. In modern British urbanism, maintaining health and wellbeing of the populace is one of the key public interest. It not only seeks good coverage of utilities and education but also maintaining a healthy lifestyle that consume quality, locally produced food, that encourages interaction with natural environment, and regular exercise. Health inequity within English cities is alarming. Research found life expectancy gap in London neighbourhoods as wide as 20 years. Data analysis has identified a similar pattern on various health issue in areas along the catchment of Manchester Ship Canal. Local government will play a strong role on partnering

2. MSC- The Vision

with academic to identify the issues in each constituent neighbourhood through strong, disaggregated data evidence, and with the broader community to develop actions to eliminate its health inequity issues.

New urban landscape may be more personal in scale and more accessible to essential amenities than its contemporary design. With the advancement in communication technology, approach of participation in productive activity has diversified. Offices and workshops no longer need to be centrally located due to remote access technology and cloud solutions. Internet platforms allow independent creators to publish their work from home with very low setup cost. Online skill learning platforms offer alternative route to personal growth and acquiring essential skills at personal pace. As consequence, new urban amenities will be more distributed than centralised. Streets need to be designed for shared and physical mobility than for automotive. Localised co-location workspace along the corridor will attract skilled individual to work, live, and play within its neighbourhood rather than long commute to a central location

Agile Governance

Agile governance is a reflection of the contemporary technology development lifecycle on how its concepts may be adopted to overcome shortfall of traditional plan-based policymaking. Agile approach uses short repeating iteration of public engagement and policy formulation to keep up with fast changing society and rapid technology advancement. Such approach seeks to ensure that policies are adaptive, human centred, inclusive, and sustainable for example it has been adopted by the Swedish government to test autonomous vehicles without requesting change to national and European laws. Similar approaches may be used in the MSC for alternative development and testing technology adoption such as an airspace corridor for a drone's highway.

2.4 Growing and Changing MSC

The Greater Manchester is faced with a number of societal and ecological challenges, there is a need for more transformative intelligent solutions to the challenges of building a smart urban future. The plan to provide healthy environment in a carbon neutral Manchester requires a step change in existing plans. Strategies to deliver the Government housing targets for all residents requires a look beyond the current practices and current employment opportunities. This project challenges contemporary concept of urban living in Greater Manchester. The concept of a City, that is a settlement with sophisticated organization, administrative and amenities where most people work within that complex structures rather than in its surrounding countryside, is not applicable. The Greater Manchester future of smart urban living will blur the boundaries between human and machines, between urban and rural living, between jobs and recreation, and between virtual and physical mobility.

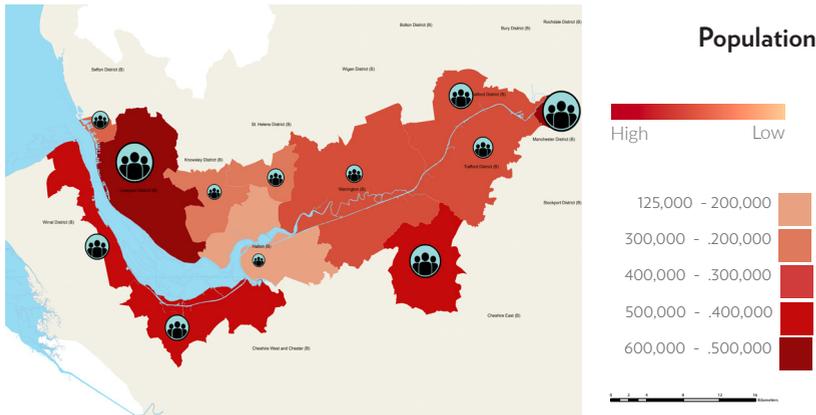


Fig. 14:
MSC Ferry from
Manchester to
Liverpool

2.4.1 MSC Population

Demographics

Liverpool and Manchester show the highest demographic indices followed by Cheshire West and Chester and Cheshire East, Wirral and Warrington, Salford, Trafford and then Knowlsey . The lowest demographic level is Halton,, also considered one of the areas with the lowest life expectancy.

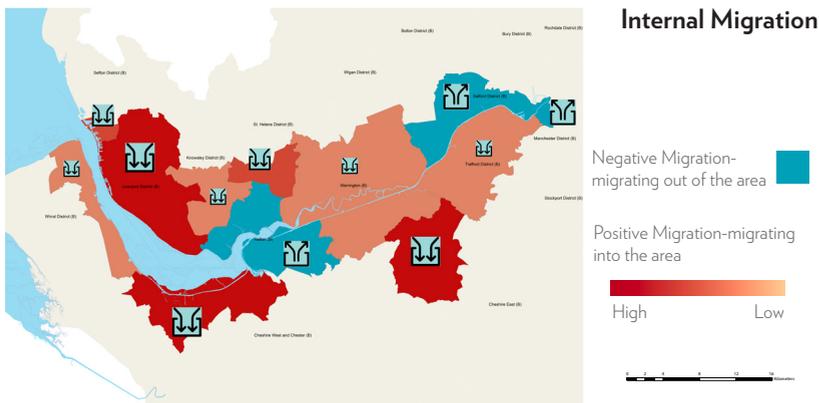


Source: Office for National Statistics. GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

Fig. 15: Population around the MSC

Growth

Salford, Manchester and Halton present the higher levels of exodus as opposed to Liverpool, Cheshire West and Chester and Cheshire East with the highest levels of migration.



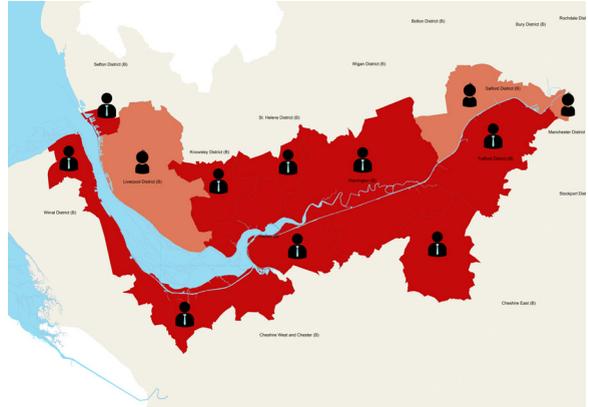
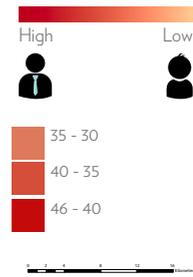
Source: Office for National Statistics. GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

Fig. 16: Internal Migration around the MSC

Ageing Population

The Age profile of along the canal is more than 40 years. Only Liverpool, Manchester and Salford districts present youthful populations between the ages of 30-35 years.

Median Age of Population

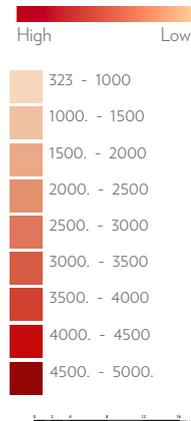


Source: Office for National Statistics.
GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

Fig. 17:
Median Age of
Population

Population Densities

Densities are highest in the city centres of Manchester and Liverpool. Salford, Trafford and Knowsley also exhibit high densities. Intermediate areas along the canal exhibit much lower densities.

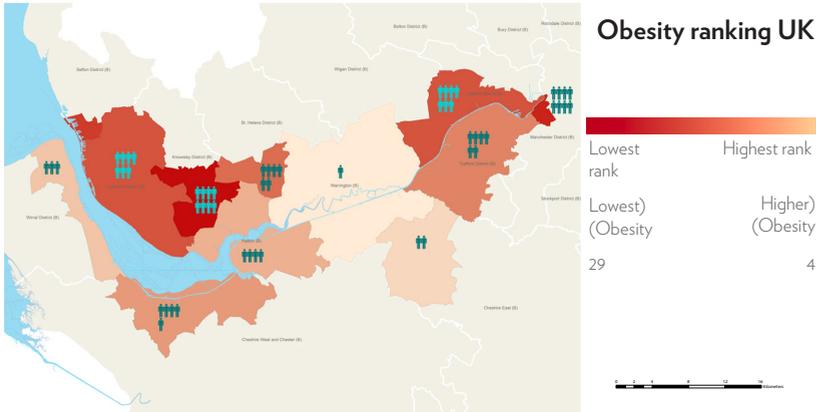


Source: Office for National Statistics.
GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

Fig. 18:
Population Densities

Obesity

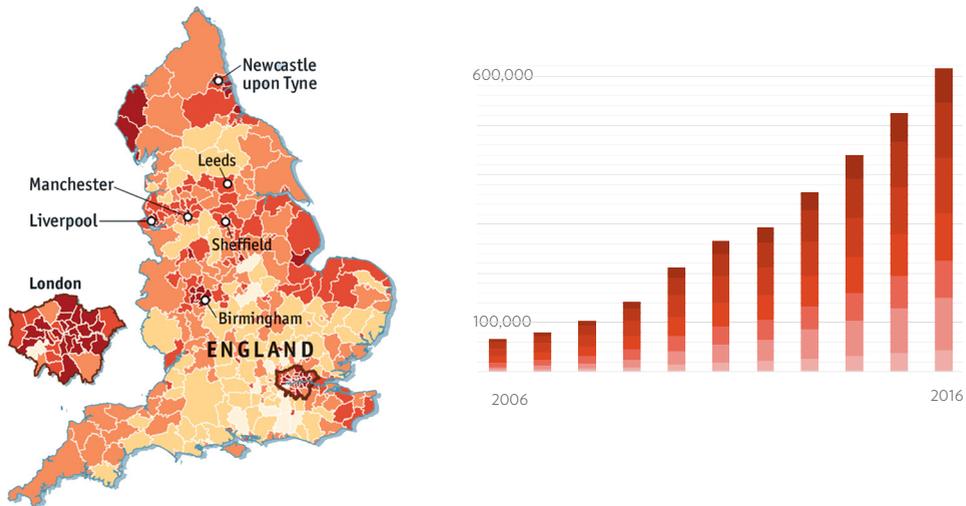
Obesity level in adults is higher in Knowlsey and Manchester districts closely followed by Liverpool and Salford. Obesity in children shows high levels in Liverpool and Manchester and Wirral and least present in Halton.



Source: Public Health England.
 GIS Dataset: Health Profiles 2015.

Fig. 19:
 Obesity Ranking around the MSC

Obesity Rise in the UK (2006-2016)



Source: Public Health England.
 Dataset: Health Profiles 2015.
 The Economist: Mapping Obesity.

Fig. 20:
 Obesity Ranking in the UK

Life Expectancy

Life expectancy is lower in Manchester followed by Liverpool, Salford and Halton then in Trafford, Cheshire West and East.



Fig. 21: Life Expectancy

Source: Public Health England. GIS Dataset: Health Profiles 2015.

2.4.2 Environment and Land Use

Flooding

Warrington and Manchester are the most affected areas by floods followed by Liverpool and Cheshire West. In Warrington more than 500 residential dwellings were affected by floods in 2016 and in Manchester the floods affected more than 400.

Flood Map

Number of flood-affected Residential dwellings:

Warrington:	507
Manchester:	423
Liverpool:	228
Cheshire West:	32

(Source: GIS datasets analysis).

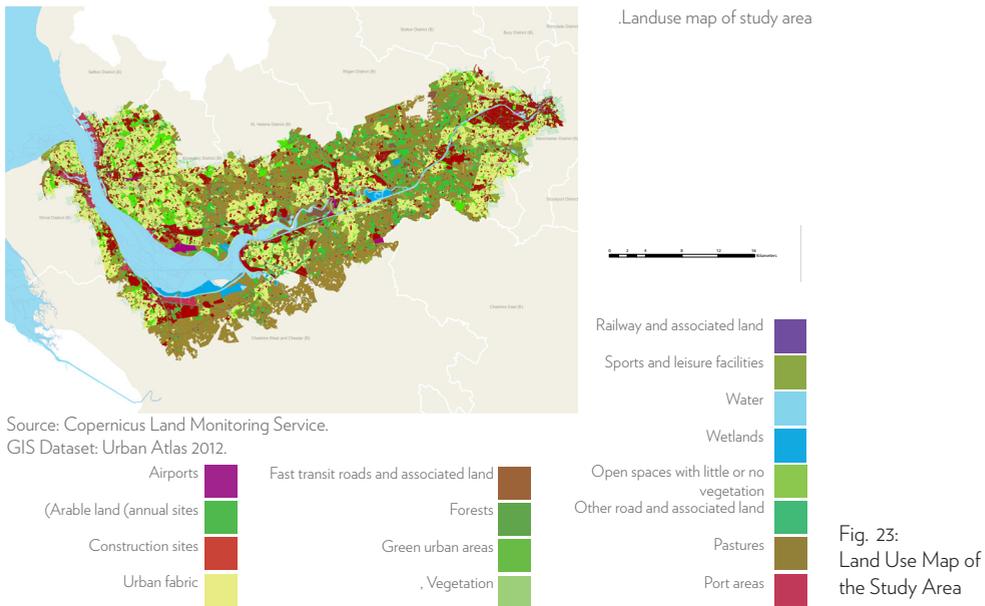


Fig. 22: Flood Map

Source: Environment Agency. Dataset: Online Interactive map 2016.

Land Use

Land use across the canal varies from port and industrial to pastures and green spaces and housing densities. The industrial and port areas spread along the canal with a concentration in Manchester, Salford and Liverpool with a significance presence in Cheshire West and Chester. Pastures are a predominant in Cheshire West and Chester, Knowlsey, St. Helen, Warrington and Halton. In all districts the land use varies largely from ports, industrial, green spaces, housing and pastures.

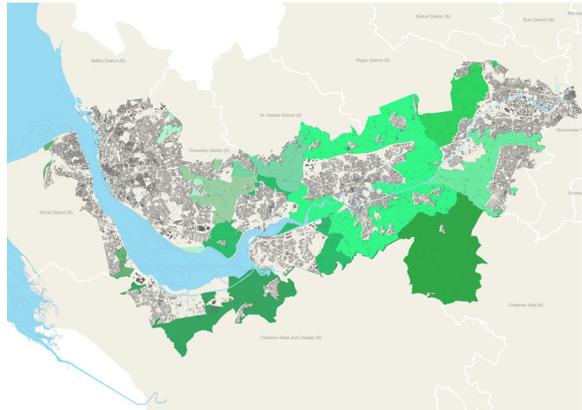


Green Spaces / Green Belt

Liverpool offers more green spaces within the city than Manchester but when combining these with layers of the maps on potential areas for green spaces in urban living and flood risk the corridor area in between Manchester and Liverpool presents a positive prospective as it can also be linked to the existing natural parks and support mitigate the flood risk.

Existing Green Belt Map

Green belt and urban green spaces
Urban settlement



Source: Ministry of Housing, Communities and Local Government. GIS Dataset: Green Spaces.

Fig. 24: Green Belt Map

2.4.3 Housing Market

Housing Affordability

The housing prices are higher in Trafford and Cheshire East though the data regarding the annual individual earnings showed Liverpool, Manchester and Halton as the districts with the highest mean/per individual. When overlaying the data of the annual individual earnings with the House prices Trafford shows a red alert sign followed by Cheshire East and Cheshire West and Chester. The most affordable areas are Liverpool, Salford, Knowlsey and Halton. When looking at the data for the whole North West region Manchester presents a striking case with the highest number of newhomes, around 15,000 in March 2018, and not a single one affordable!

House Prices / Annual Individual Earnings

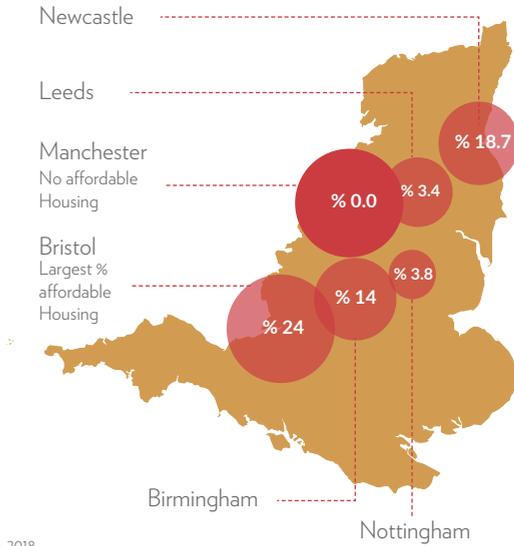
125000 - 0
150000 - .125000
165000 - .150000
180000 - .165000
220000 - .180000



Source: Office for National Statistics. GIS Dataset: Population Estimates for UK, England and Wales, Scotland and Northern Ireland: mid-2012 to mid-2016.

Fig. 25: House Prices

“Housing crisis: 15,000 new Manchester homes and not a single one affordable”

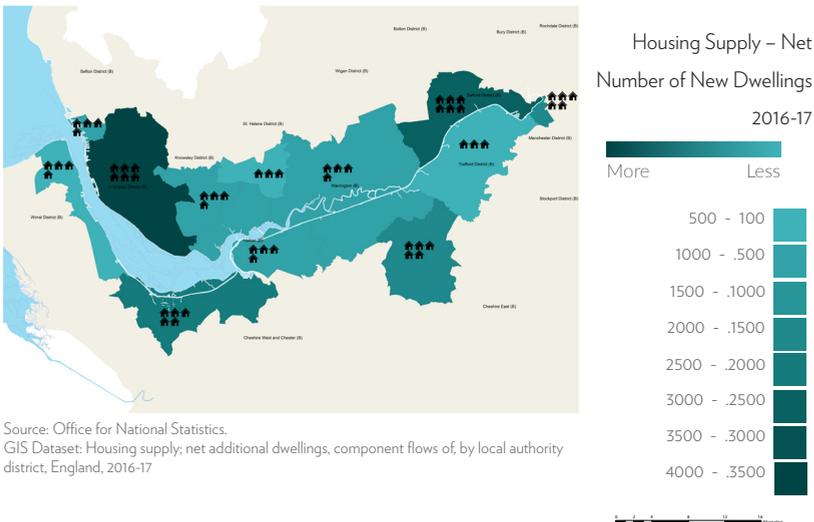


Source: The Guardian, 2018. www.theguardian.com/cities/

Fig. 26: Percentages of affordable housing in the UK

Housing Supply

Liverpool and Manchester present more vacant dwellings than any other districts yet Liverpool is also one of the districts with the highest number of new dwellings.



Source: Office for National Statistics. GIS Dataset: Housing supply; net additional dwellings, component flows of, by local authority district, England, 2016-17

Fig. 27: Housing Supply

Housing Demand

There is an increasing demand for housing in the greater Manchester area and Liverpool. The Greater Manchester plan for example includes the development of 10,000 per year during the next 20 years [11].

Based on future projections the focus of housing demand along the corridor will be on Manchester, Salford and Cheshire East.

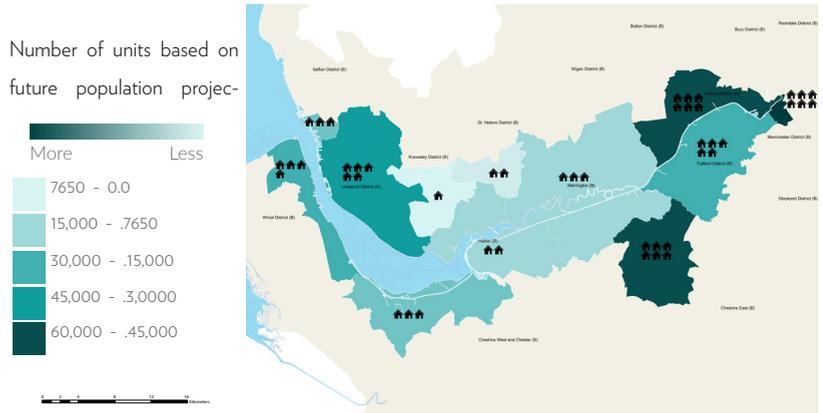


Fig. 28: Housing Demand

2.4.4. Jobs for the Future

Employment

Liverpool and Manchester are the areas with a higher percentage of working population with Manchester up to 70% and Liverpool with 68% followed by Salford with 65%.

Working Population

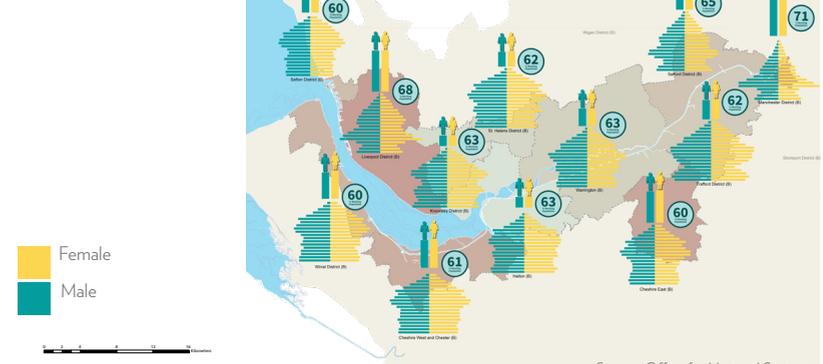
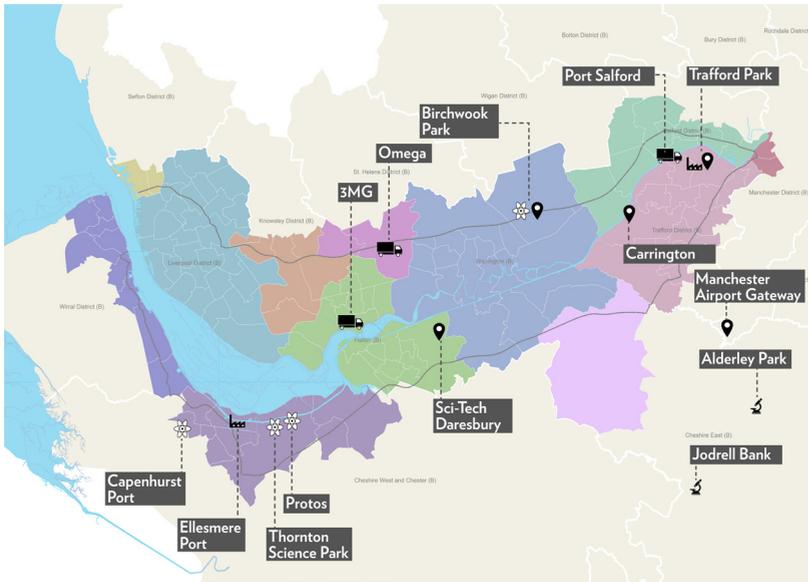


Fig. 29: Working Population

Enterprise Zones

Knowsley and Halton are the areas with the lowest number of existing businesses. Halton is where the two main Rail freight hubs are situated yet this does not reflect on employment rates. Trafford includes one amazon distribution centre and is another one very close in Manchester. A new amazon distribution centre is to be finished and operating by 2019 in Warrington but its impact is not yet clear. Included in the plans of the Northern Powerhouse are energy and nuclear plants in Cheshire West and Chester and Warrington, Logistic hubs in Halton and Salford, manufacturing centres in Cheshire Weast and Chester and Halton, science and bio-medical centres in Cheshire East and Technology and business hubs in Halton, Warrington, Trafford and Manchester which will have an impact on the corridor area that is not assessable at this point but can contribute to the increasing value of the development in the area.

As for industries' future needs in expansion the areas of Cheshire West and Chester, Cheshire East, Liverpool and Manchester are in demand.



Source: Digimap – Ordnance Survey - 2018.
 Data source: The Greater Manchester Strategy - No Date.
 Cheshire and Warrington Strategic Economic Plan - 2017.
 Halton Local Plan 2014 – 2037 Partial Review Consultation Draft- January 2018.

Energy and Nuclear		Science and Bio-medical	
Logistic		Technology and Business	
Manufacturing			

Fig. 30:
Green Belt Map

2.4.5 Connectedness

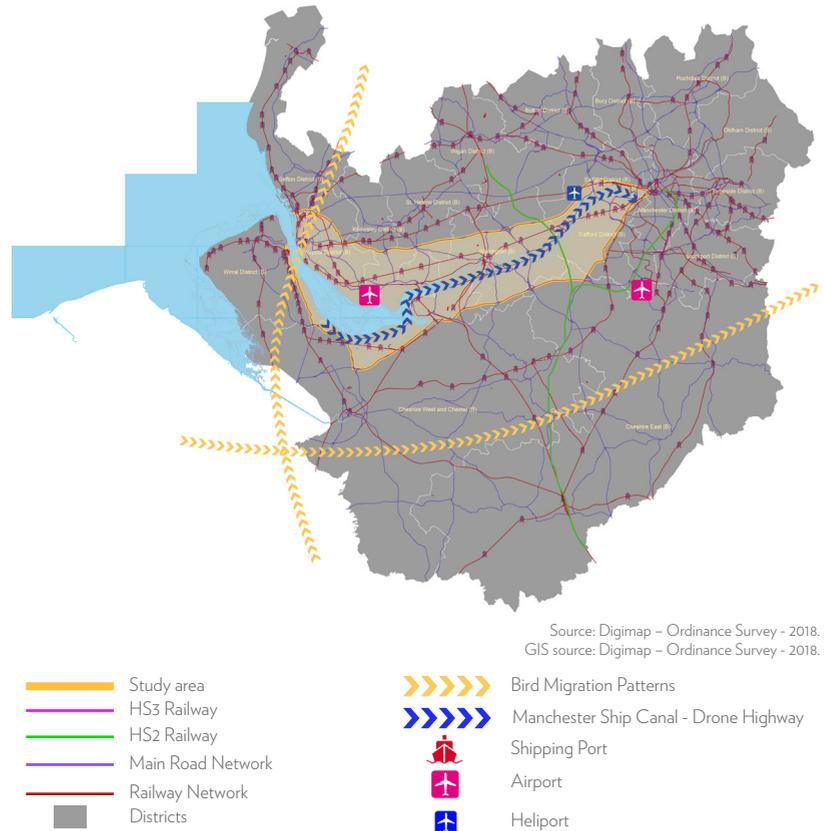
Networks

A drones highway was presented as a potential driver for the corridor after analysis of the exiting birds migration paths, the exiting and planned regional logistic facilities and the existing plans for the corridor and surrounding areas.

The projects include the HyNET project which aims at transform current deactivated industrial plants into future hydrogen production plants and pipeline for alternative energy supply in the region. Initially for trains and vehicles to reduce carbon emissions followed by domestic use.

Since there are already plans in place to look at the use of different technologies to transform the MSC corridor into a clean and more efficient energy supplier along with plans to increase freight and the installation of distribution centres and science parks a drones highway could trigger and support further development.

Fig. 31:
Networks and Links



2. MSC- The Vision

The residence to workplace commuting patterns were also analysed and showed that the time spent commuting from and to the cities of Manchester and Liverpool was the highest. There is also significant commuting to and from Manchester Airport on a daily basis. This was related with poor transport and connectivity network in the areas in between Liverpool and Manchester; the future plans for these districts do not include potential solutions to overcome the issue. The transport networks and commuting patterns analysis show the poor and ineffective connectedness between the north and the south of the corridor.

Existing future plans from the different councils acknowledge the poor connectedness as a barrier to the corridor development and include potential strategies to improve communication and connectivity through supporting intelligent and sustainable transport system, freight strategies, Airport expansion, road strategies, promote public transport, parking provision and most importantly they all support the development of digital systems to support all these improvements/developments.

This supports further the development of an Ecological Smart Future Urban Corridor linking Liverpool to Manchester. The use and analysis of existing data on different facets of the area provided for the understanding of the existing different urban/rural patterns that can make for a smart metropole along the canal.

2.5 MSC Future

Through working cross-disciplinary partnerships engagement with academics, different local authorities and industry partners to find potential environmental, liveability and economic drivers and enablers to establish a set of principles that guide the development of a smart urban corridor for MSC. A blue-sky approach was used in the workshop combined with data analysis of a number of pre-determined catalysts for MSC with the focus on developing potential scenarios of what the smart ecological urban corridor along the MSC could be.

Four iteration phases were determined within a series of multidisciplinary meetings and three workshops with key experts from different fields, including urban design, ecology, engineering, environmental studies, transport, health, and social science, to identify the potential of the MSC corridor, prospective catalyst projects, and key drivers and enablers.

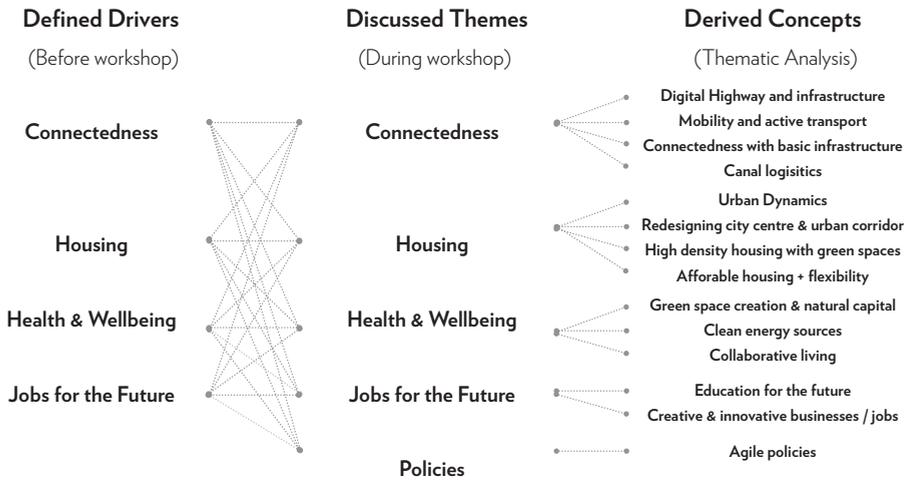


Fig. 32:
Diagram of the main
concepts

Initial catalyst themes were identified. The themes were selected to cover a range of objectives for the redevelopment of the region, including:

- Rurban Fusion: Human-wildlife interactions in an urban environment.
- Future Mobility and Interconnectivity: Changing patterns of use and mobility in the proposed corridor.
- The Corridor Economy.
- Inhabiting a Smart Urban Corridor: Population trends and housing patterns.
- Manchester Ship Canal Rurban Living: Urban / rural interconnections, exploring topics from urban agriculture to the urban fringe.
- Smart Manchester Ship Canal Futures: How the design of particular configurations afford possibilities for co-existence.

Socio spatial characteristics of the MSC region were analysed using the current available data. The analyses were introduced to participants of the workshop to inform their discussion. Participants were asked to respond to three areas of development; Environment, Living and co-existence, and Economy. A number of key points were identified. These key points of the three areas of development were reviewed and collated in between the workshops, a series of 12 meetings in total took place to discuss the data sets, the main themes/drivers and develop the catalysts projects.

Following the 2nd workshop, the themes and concepts were mapped accordingly to the level of consensus achieved.

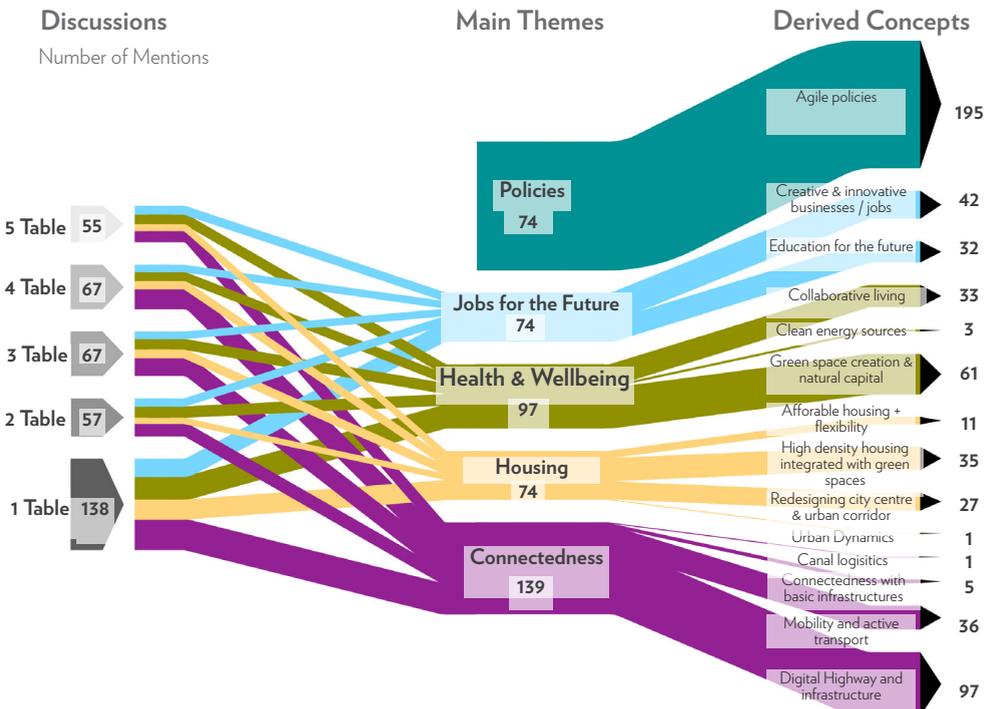
2. MSC- The Vision

In the second workshop the data sets were presented. The three areas of development were reviewed and updated. Focus were therefore placed on four sectors:

- Health and wellbeing in the 21st century.
- Housing.
- Jobs for the Future and;

After the initial identification of potential themes a third workshop with 31 key experts and stakeholders to the project was established. The four main themes data was converted into maps and info graphics. Each theme was presented with a challenge or question at the end to instigate the discussions. The main purpose of the third workshop was to present the data findings and engage experts in the different related fields of the MSC corridor to draw possible future scenarios. The themes and concepts were mapped according to the level of consensus achieved.

Fig. 33: Sankey diagrama thematic analysis tables discussions, Source: Workshop discussions



2.6 The Vision & Scenarios

The vision was formed following the major workshop in order to visualise and communicate the primary aims of the MSC vision project. The vision builds on the meetings and workshops engagement events, and the wide array of material produced. The potential visions were developed through the production of visual material, which imagines what form the catalyst projects could take, both to seek a level of engagement and excitement by external groups, and to explore opportunities. The material produced is intended to inform the implementation strategy and to seek a level of understanding between the partnership and wider interest groups as to the final vision.

On the 22nd of June 2018, the major workshop for the MSC vision/scenarios occurred to present the main themes identified in previous workshops in smaller groups. The event brought together a number of prominent professionals from different fields of Academia, Environmental trusts and agencies, City Councils, Architecture, Urban Planning, Construction and Landscape enterprises, as well as the inclusion of Salford design students. As the MSC vision is looking to achieve blue-sky, dynamic and innovative thinking in its scenarios, the same is true of the individuals invited to attend and who contributed to the process.

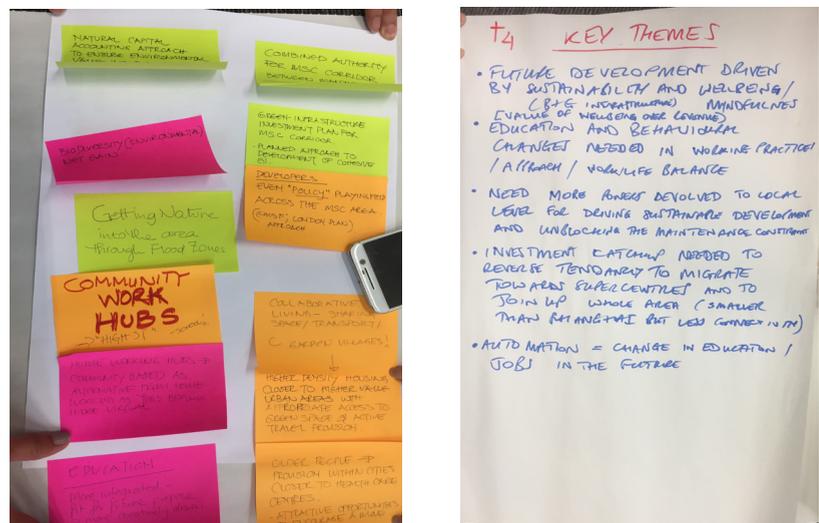


Fig. 34:
Workshop work

Themes weight in discussions

Source: developed from workshop discussions.

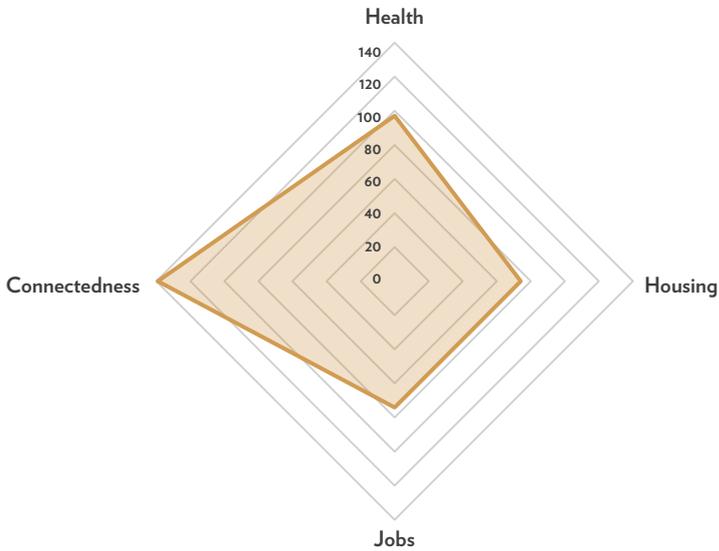


Fig. 35: Themes weight in discussions

Concepts weight in discussions

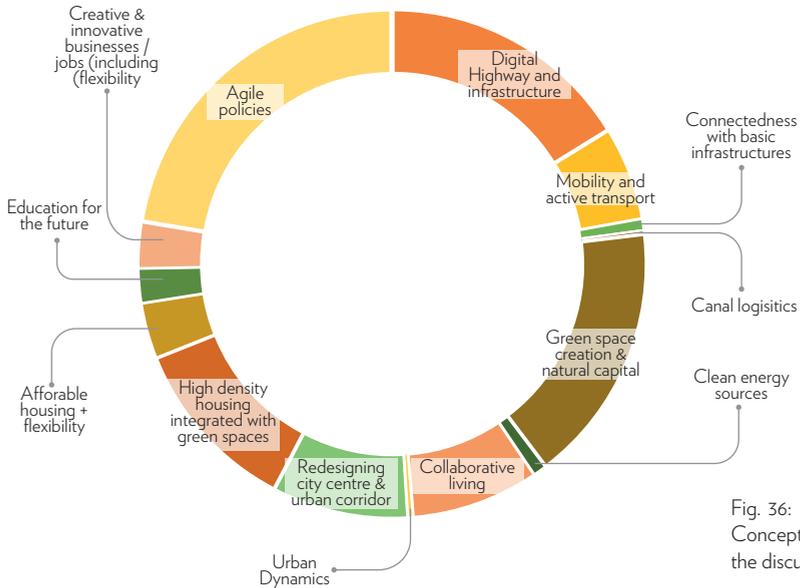


Fig. 36: Concepts weight in the discussions

3. MSC- The Catalysts



3

MSC- The Catalysts

Fig. 37:
MSC Rucorn Bridge

3.1. Masterplan

The Masterplan sets out the scope of the main catalysts projects. They are individual yet their concepts and development are inextricably linked to the final outcome of the vision exercise to revitalize the MSC corridor.

The Masterplan is a representation of the Task:

- To draw people and activity to the MSC corridor, by influencing the attitudes and actions of current potential business owners, institutions, investors, residents, workers, students and visitors.
- To strengthen the MSC as a major regional urban/rural corridor- and the districts along the way- by supporting the growth in education, health and service sector, and increasing the number of people living along the canal.



Fig. 38:
Sketch of one of the
Design Scenarios
generated after the
workshop

3.2. Key Moves

There are certain key moves that unlock the constraints that the MSC is currently experiencing. Addressing these constraints will allow for a number of opportunities to become available.

Create a digital highway and infrastructure to support business, working and living connectivity

The MSC is currently mainly used for freight transport and logistics hubs along its margins with some key industry infrastructures. The canal can be transformed into a digital highway infrastructure, potentially with drones to attract innovative business investors and subsequent technological jobs for high-qualified professionals. The area can be developed along the digital infrastructure through the design of a connected working and living environment.

Green space creation and natural capital

The physical and environmental characteristics of the canal and the landscape along its margins are some of its main assets. The creation and establishment of green spaces can support the development of a healthier and collaborative ways of living. A number of areas along the MSC margins are highly prone to flooding, urban/rural interconnections, exploring urban agriculture to the urban fringe connected with housing and working hubs can provide for a sustainable solution for such areas. The green spaces and natural capital preservation will increase air quality and the livelihood of its residents and visitors.

Creative and innovative jobs

Innovative jobs are the main driver for fixation of populations. The area along the corridor requires special attention in terms of trends in population growth given that there is a tendency for young people to establish in the main cities though the data shows that the housing offer and the quality of living is not suitable or viable. The potential of creation for innovative jobs along the corridor can increase the level of high skilled young people that chose the area to work and live.

Linking the North with the South –mobility and active transport along the corridor

There is a need to change the patterns of use and mobility along the corridor. The connection between the north and south margins of the canal is vital to the development of the vision. There are a number of initiatives from local and government authorities to develop the transport network thus increasing mobility in the area can serve as base for the development of a connected network of active transportation along and through the MSC. This will support the development of innovative business to be established leading to the creative and innovative jobs in the area. This can be potentiated through the creation of more bridges, cableways or boats along the corridor in key strategic positions aligned with the working/housing hubs and the green spaces.

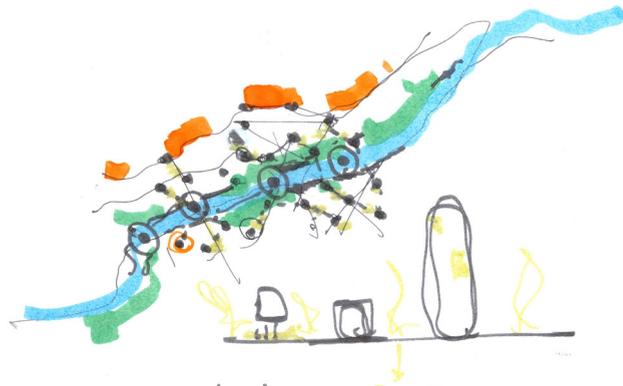


Fig. 39:
Sketch of one of the
Design Scenarios
generated after the
workshop

Create high-density affordable housing integrated with the natural environment and easy access to green spaces

This theme is inexorably related with the development of creative and innovative jobs in the area. There is a need to change the trending population and housing patterns in the area. To attract young people the creation of affordable housing is essential. Given the need to integrate the housing hubs with both the work hubs and the green spaces created, high density housing that establishes the connectivity between them allowing easy access to green spaces is considered the most effective way to develop livable areas along the corridor.

Re-designing the city centers and the urban corridor to improve collaborative living

The city centers are increasingly expensive to live in and with the growth of population the expectation is that this trend will intensify. The design of the corridor along with the re-designing of the cities centers can potentiate the connectivity along the urban corridor whilst providing a sustainable environment to live, work and visit that is close to the city centers and provides easy access to them but also provides for the population from the city center to have access to green spaces and outdoor spaces that can be appreciated and experienced by all.

Education for the future

The digital and disruptive technologies have a major impact on the education for the future. Today's expectations in terms of adaptability and jobs throughout an individual's life cycle are not the same as in previous generations. Technology will have a major role in the education for the future and given the education's strong presence in the Quays area more education and innovative business in the area. These relations can be explored further in many areas such as digital, media, creative industries, professional services and new distribution and logistics businesses models.

To achieve the key moves agile policies have been identified as the main driver for the MSC urban corridor regeneration. This will be further explored with the networks already established and to be further strengthen as the development of the vision unfolds.

be potentiated through the creation of more bridges, cableways or boats along the corridor in key strategic positions aligned with the working/housing hubs and the green spaces.

3.3. Scenarios

The main concepts, ideas and catalyst projects were converted into different potential scenarios for the development of a smart ecological urban corridor along the MSC.

The six scenarios developed are presented and highlight the consensus achieved during the workshop.

The main concepts, ideas and catalyst projects were converted into different potential scenarios for the development of a smart ecological urban corridor along MSC.

The six scenarios developed are presented and highlight the consensus achieved during the workshop.

Fig. 40:
Scenario 1

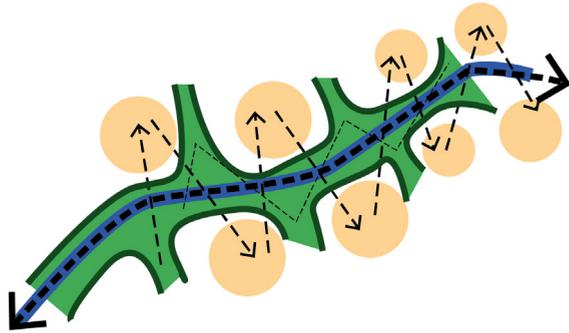


Fig. 41:
Scenario 2

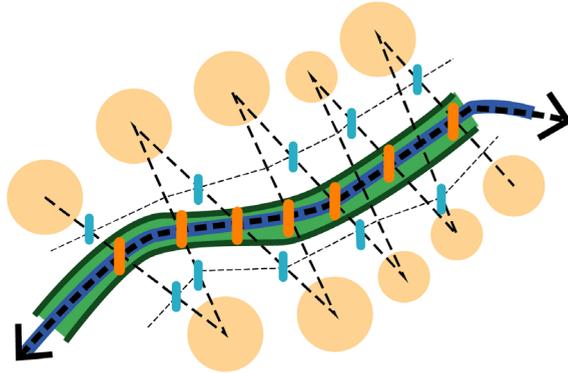
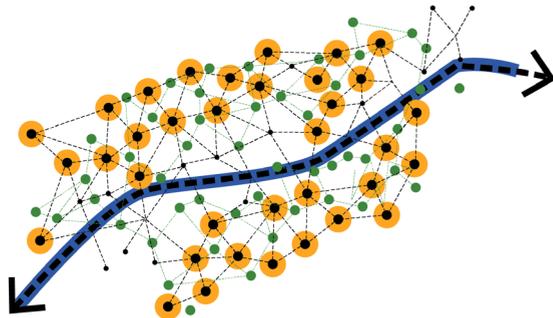


Fig. 42:
Scenario 3



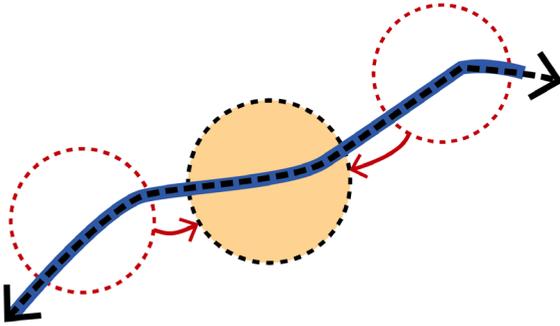


Fig. 43:
Scenario 4

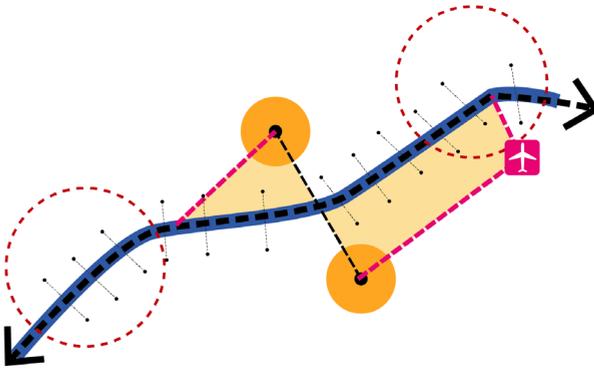


Fig. 44:
Scenario 5

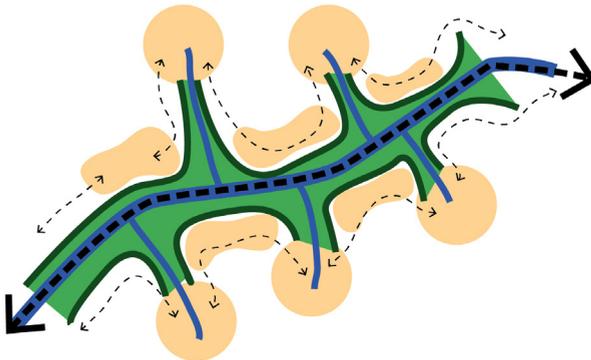
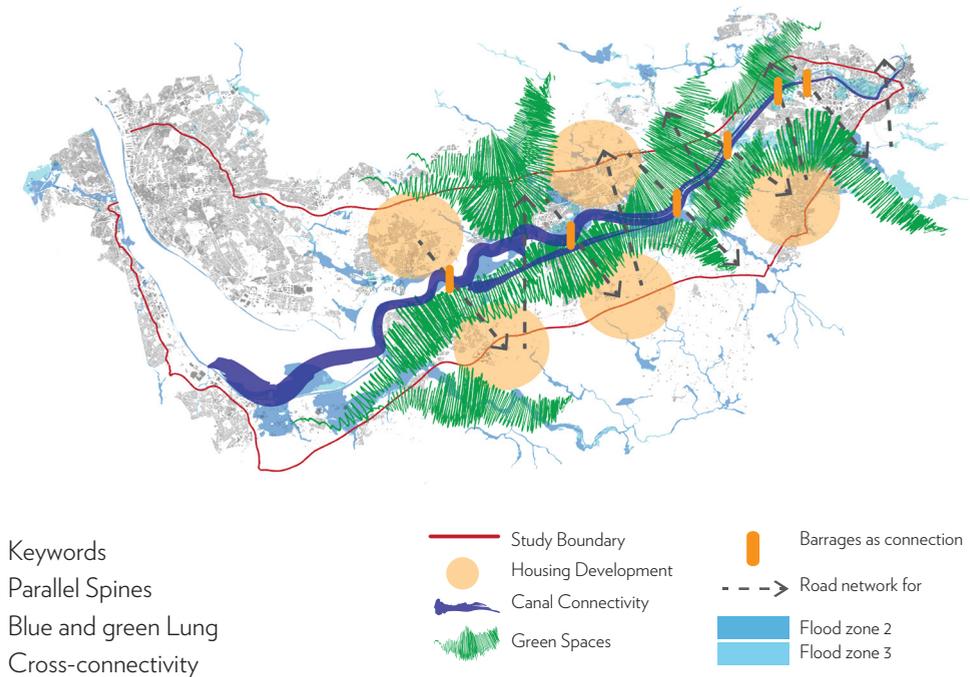


Fig. 45:
Scenario 6

Scenario 1

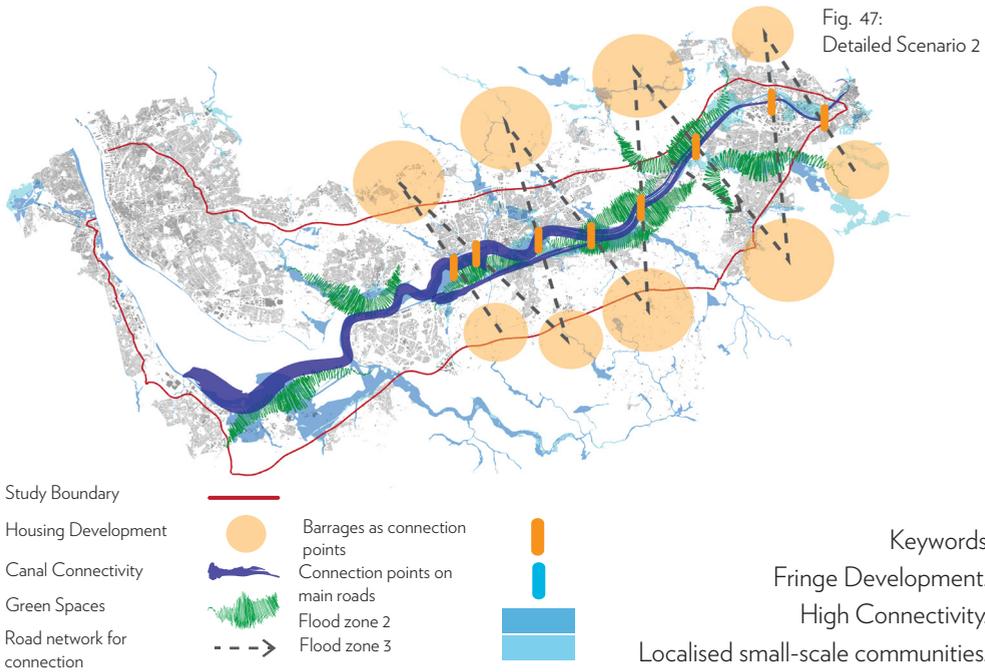
This scenario proposes 2 spines parallel to one another, the canal as a main connectivity spine, as well as a green spine following the flood zones. Urban residential areas develop around the existing green spaces as nodes with connections through a hierarchy of roads and pedestrian links parallel to and perpendicular to the canal.

Fig. 46:
Detailed Scenario 1

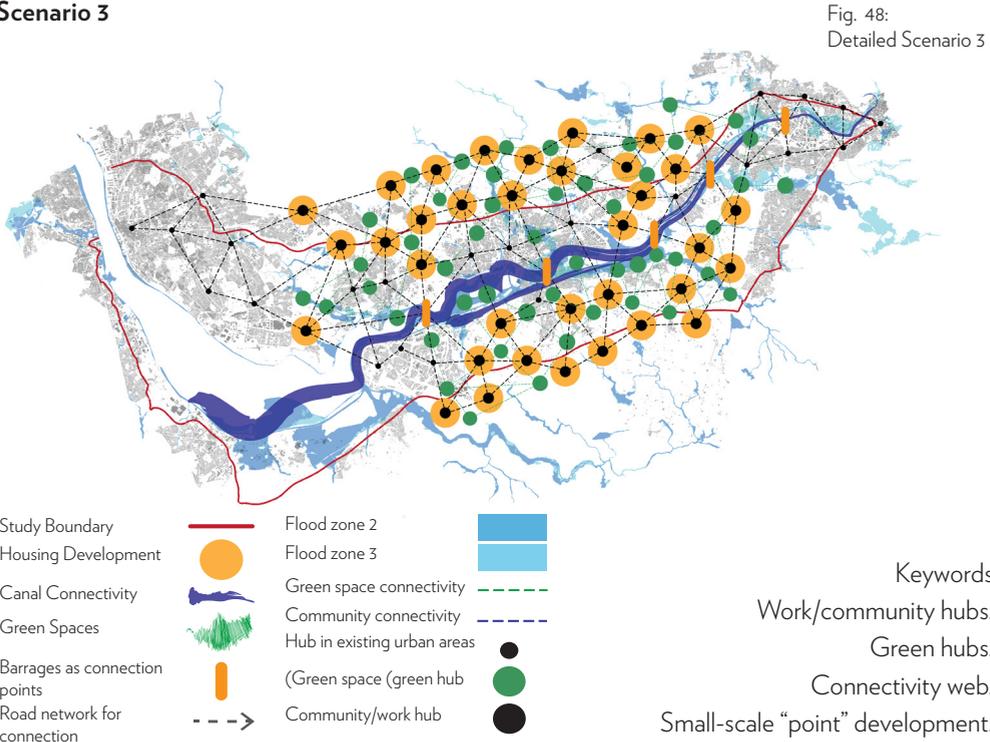


Scenario 2

This scenario proposes residential development on the fringes, which maintains smaller and more localised communities. At the same time, high connectivity and various intersection points are proposed. These connections are principally for commute as well as leisure in green spaces around the canal.



Scenario 3

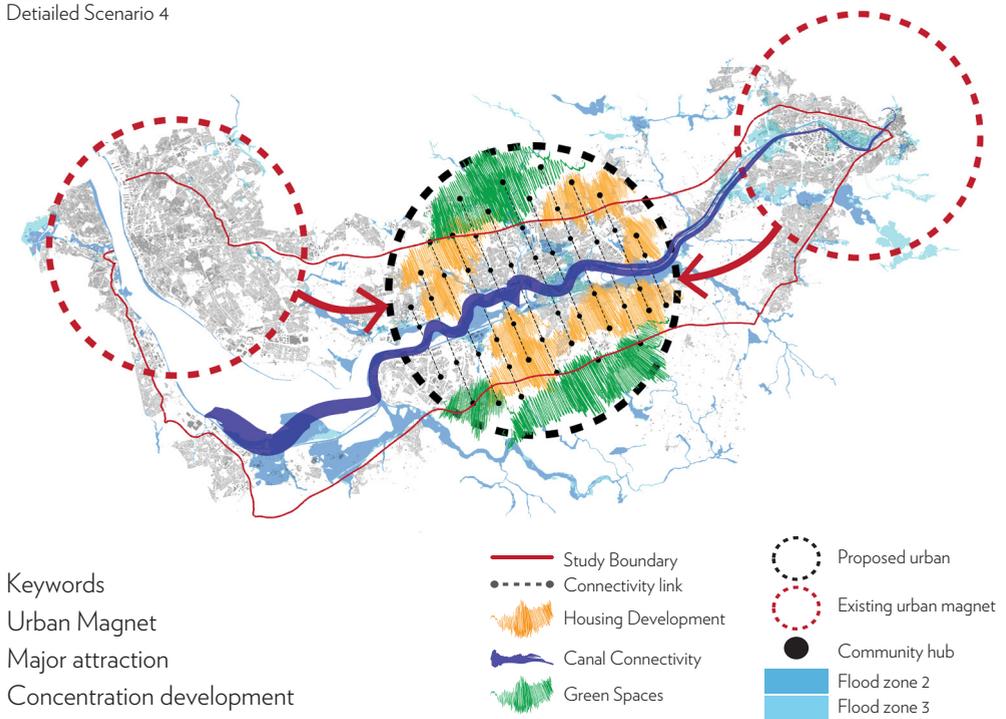


This scenario builds on the “hub” concept, in which new residential areas develop around work/community hubs, as well as having community green hubs for leisure and living with nature. These hubs are interconnected with a strong web of connections that include the hubs and barages as crossing points along the canal.

Scenario 4

This scenario proposes a third development magnet in between the already existing two major developments on the canal; Manchester and Liverpool. Developing this magnet would be comprehensive of different strategies such as hub creation, community spaces, links focusing on North/South connectivity.

Fig. 49:
Detailed Scenario 4

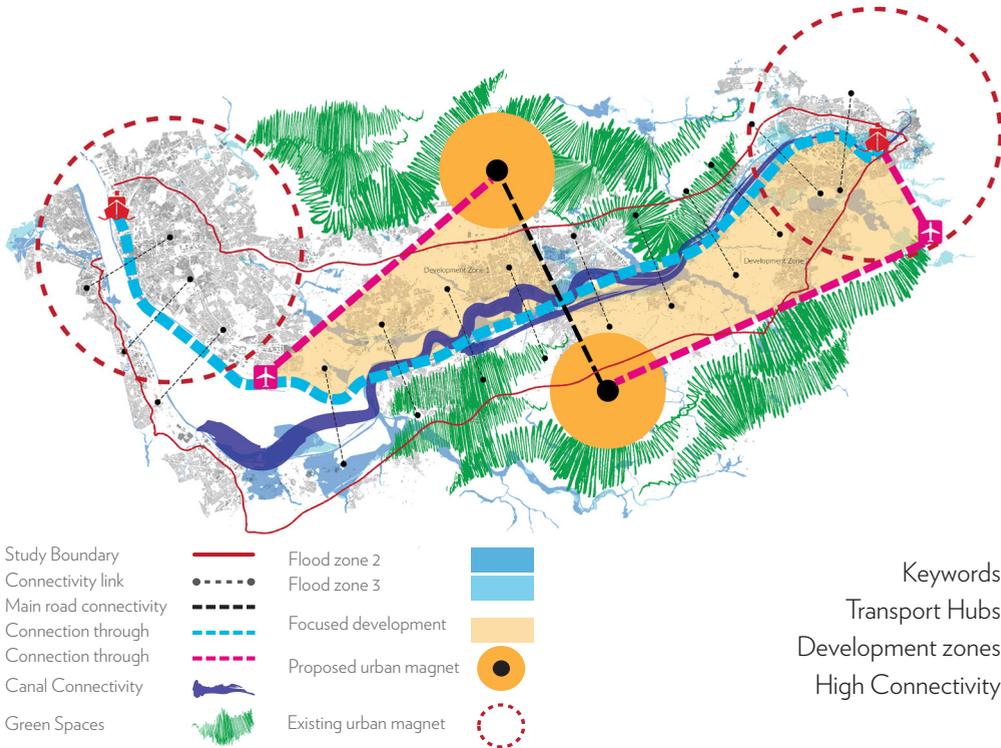


Scenario 5

This scenario focuses on utilising main transport hubs as the primary driver for connectivity. The connections between the ports, airports and cities shape the borders of focus areas inside which the housing development will be concentrated.

Surrounding areas are proposed to preserve natural habitats with large areas, complementing the high concentration of development by the canal.

Fig. 50:
Detailed Scenario 5

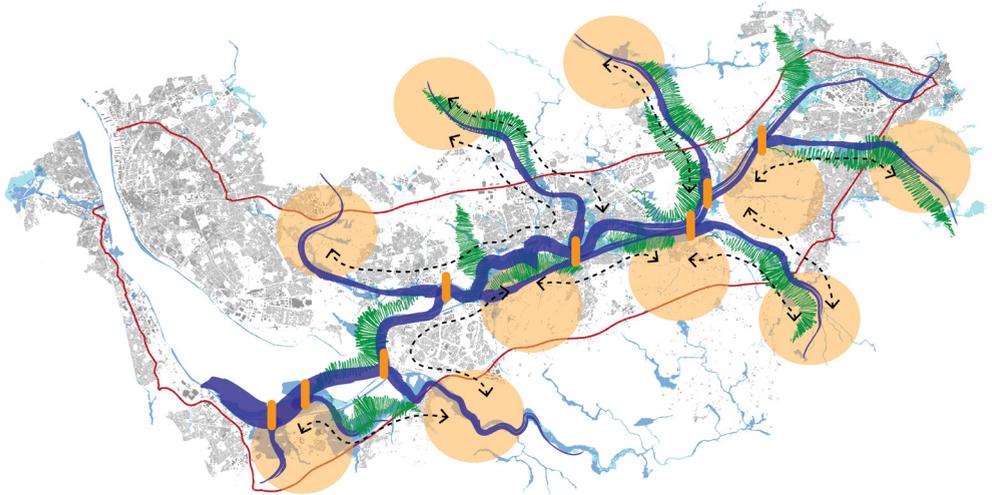


Scenario 6

This scenario builds on the idea of extending water relation to the urban environment, through extending the canal North and South on flood zones.

With this approach, connectivity is linked to water, and the developed residential areas become more directly in touch with “green” and “blue”. in this concept, the housing development takes place directly on waterfront zones North and South of the canal.

Fig. 51:
Detailed Scenario 6



Keywords

Water extensions
Blue and green connection to nature
communities overlooking water

- Study Boundary
- Housing
- Canal Connectivity + Canal extensions
- Green Spaces
- | Barrages as connection points
- - -> Road network for connection
- Flood zone 2
- Flood zone 3

3.4 MSC Projects -Design Principles / Future Pathway

Within the five identified themes, 14 concepts have emerged during the major workshop discussion, from these 8 presented themselves as having the potential to make a positive change in the MSC corridor development. Disruptive technologies and digital infrastructures are perceived as a major factor in the development of smart ecological urban corridors as well a stronger sense of connectedness with the natural and urban environment. The distinguish between urban and rural is to be dissipated to make space for a healthier life-work balance with less commuting and a new approach on education and jobs for the future along the MSC. The catalyst projects will be based on the identified design principles:

3.4.1 Connectedness

There is a need to improve connectedness in the area. High-speed railway development, airports and airfields but also the potential for a drones highway along the canal.

A drone's highway was presented as a potential driver for the corridor after analysis of the exiting birds migration paths, the exiting and planned regional logistic facilities and the existing plans for the corridor and surrounding areas. The projects include the HyNET project which aims at transform current deactivated industrial plants into future hydrogen production plants and pipeline for alternative energy supply in the region. Initially for trains and vehicles to reduce carbon emissions followed by domestic use.

Since there are already plans in place to look at the use of different technologies to transform the MSC corridor into a clean and more efficient energy supplier along with plans to increase freight and the installation of distribution centres and science parks a drones highway could trigger and support further development.

The residence to workplace commuting patterns show that the time spent commuting from and to the cities of Manchester and Liverpool is the highest. There is also significant commuting to and from Manchester Airport on a daily basis.

Design principles:

- Digital highway – (drone’s highway) which considers:
 - Technology.
 - Smart Cities.
 - Infrastructure.
 - Role of the Media.
 - Creative drivers
 - Automation.
 - Digital infrastructure.
 - Canal Logistics.
 - Canal airspace accessibility.
- Mobility and active transport system along the canal, which will include canal logistics and connectedness with basic infrastructures:
 - Active transport/travel.
 - Less commute.
 - Affordability.
 - Flexible commute network.
 - Access to Healthcare.

3.4.2 Health and Wellbeing in the 21st century

Through the analysis of the different levels of the existing diseases along the corridor there is clearly an existing deterioration of the health conditions in all age groups. The main cause of the diseases of the 21st century such as obesity, diabetes, cancer and dementia are chronic inflammation caused by: lack of physical activity, obesity, noise, disconnect with the natural environment and the consumed food.

All of these are rooted in the current way of living but also in the way cities have evolved over time not promoting a relationship with nature and outside activities whilst fostering an inactive life style.

The areas showing high levels of diabetes, obesity and cancer are the ones that do not present as much green spaces access as the ones with lower levels. The concept of rewilding was introduced which looks to restore habitats. In a Urban context rewilding means making space in the city for people to enjoy, use and engage with as a way to bring nature back to people’s daily lives.

3. MSC- The Catalysts

Given the conditions along the MSC corridor potential ideas to engage people with nature were suggested/presented for discussion which included green roof spaces, urban farming, urban parks (i.e. fruit and nut trees for harvesting, allotment spaces, walking spaces and community activities), native trees and flora that are able to flourish naturally. The main purpose being making the corridor more sustainable and resilient though improved health and well-being, clear air and water, reduced pollution levels, flood mitigation, improved soil health and landscape resilient to change.

Design principles:

- Green space creation and Natural capital.
 - Healthy lifestyle.
 - Rethinking the Greenbelt.
 - Biodiversity.
 - Rethinking flood zones.
 - Green space/Infrastructure.
 - Clean energy sources.
- Collaborative living environment.
 - Integrated Community Spaces.
 - Collaborative living and behavior (changing habits).
 - Social hubs.
 - Work hubs.
 - Partnership hubs.
 - Home working hubs.
 - Desegregation.
- Outpost office .

3.4.3 Housing

The housing offer in the region requires a shift in the proposed current trends. There is an increasing demand for housing in the greater Manchester area and Liverpool. The Greater Manchester strategic plan for example includes the development of 10,000 net additional dwellings per year during the next 20 years (2018 GMCA).

The focus of growth has been around the Liverpool and Manchester areas but the Ecological Smart corridor could present different options for the continuous

urban development along the MSC. Affordable housing connected with works hubs and easy access to green spaces is required.

Design principles:

- High-density affordable housing models with easy access to green spaces
 - Smaller urban footprint.
 - Integration with nature.
 - Higher Urban Densities.
 - Canal Accessibility.
 - Rental vs Buying market.
 - Flexible housing patterns.
 - Efficient housing solutions.
 - Equity in Housing (balanced development).
- Redesigning the city centers & urban corridor.
 - Sustainable development.
 - Redesigning the city.
 - Urban Safety.
 - Ageing urban areas.
 - Insurance for environmental risk.

3.4.4 Jobs for the Future

Without economic growth that includes jobs, affordable quality housing and areas that potentiate healthy liveability and work-life balance there is little space for development. This allied with the connectedness with the environment that has proven to be an element of paramount relevance in human life would provide for a smart metropole development that integrates the urban and rural settlements and defines an ecological urban corridor.

The uncertainty experienced nowadays makes it difficult to envision what the future jobs might be. What is known is that with the increase of technologies and data disruptive technologies are a fact but also encompass opportunities for growth.

Design principles:

- Creative and innovative jobs.
 - Flexible working hours.
 - Business innovation.

3. MSC- The Catalysts

- Work-life balance.
- Equity in Jobs.
- Principles of Education for the future.
 - Rethinking education- fit for purpose.
 - Education hubs.
 - Technology and education (Virtual learning environments and the evolution of learning institutions).

3.4.5 Agile Policies

Different existing policies and plans under elaboration or proposed for the future along the corridor districts/councils exist there is a need to stress the implementation of agile policies that allow for the development of the ecological green and blue urban corridor along the MSC.

In the design of such policies considerations should be given to the principles of:

- Policy Adaptability.
- Governance/combined authority for the MSC.
- Policies on the land prices.
- Government role and incentives.
- Return on investment (ROI).
- Localism.

Future research will require further data sets and analysis to achieve a holistic perspective on the smart ecological urban corridor.

The next stages of the research will be community consultations and development of the visions that will arise from the scenarios and identified catalyst projects.

3.5 Photo Montages

Photomontages of the existing landscape on Manchester Ship Canal, which aim to provide a visual guide for the visions, ideas and potentials for housing, green spaces, industry and leisure on the canal.

Existing condition of abandoned land on the canal.

No relation to surrounding community.
No urban image for boats or pedestrians commuting along the canal.



Fig. 52:
Before and After
Mixe Use Land
Photomonatge

Photomontage
The project's vision of open spaces.

Designing community parks and recreation facilities along the canal. Investing in creating pedestrian and cycling paths with movable connections bridges that do not hinder commute along the canal.

3. MSC- The Catalysts



Existing condition of areas near MediaCity.

Uneven development the canal.
Need for less dense development with more openness to the waterfront.



Photomontage
The project's vision of open areas.

Introducing open parks that exhibit user activities and connection to nature.

Fig. 53:
Before and After
Developing Housing
Area Photomontage

Existing condition of a chosen housing area on the canal.

No connection between the land use and the water,



Fig. 54:
Before and
After Housing Area
Photomontage

Photomontage
The project's vision of the housing area.
Integration with water through open spaces and activities.

3. MSC- The Catalysts



Existing condition of a chosen industrial on the canal.

Lack of interaction between industrial locations, as well as disconnection from the canal.



Photomontage
The project's vision of industrial areas.

Connection between industry and nature, as well as integrating technologies such as carriers, drones and teleferiks.

Fig. 55:
Before and
After Industrial Area
Photomontage

Existing condition of waterfront.

Missing link between users and the waterfront.



Fig. 56:
Before and
After Green Area
Photomontage

Photomontage
The project's vision of canal waterfront.

Introducing user activities that connect commuters to the waterfront with minimum impact on existing natural capital.

3. MSC- The Catalysts



Existing condition of areas near MediaCity.

Uneven development along both sides of the canal.
Need for less dense development with more openness to the waterfront.



Photomontage
The project's vision of open areas.

Introducing open decks that exhibit user activities, connecting users to the waterfront.

Fig. 57:
Before and After
MediaCity area
Photomontage

Credits

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MSC in Photos

The diversity of adjacent contexts along the Manchester Ship Canal can be seen through the displayed photos that exhibit different areas from Manchester to Liverpool. Ranging from central urban areas such as Salford's Media city, to low density residential areas, industrial zones and greenlands.



Halton





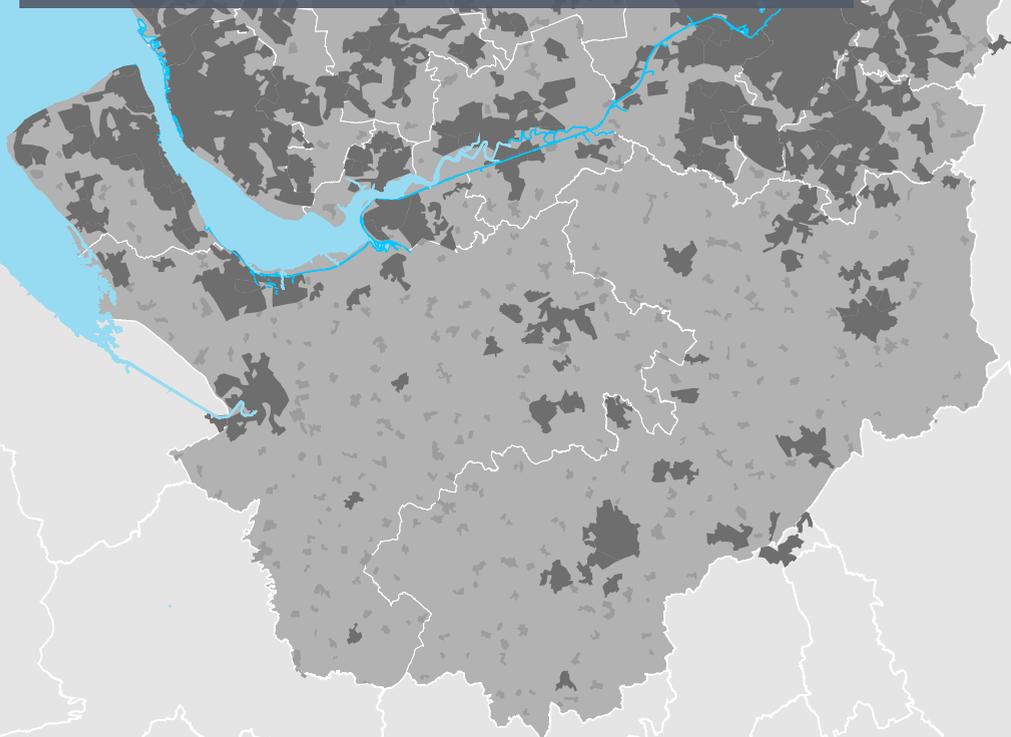
Warrington

Salford



Many European industrial waterways provide opportunity for regenerations of their regions. These disused canals and rivers have been neglected after their industrial bases collapsed. They do however provide interesting camouflaged multi layered-land use swirling through cities and countryside. Their linearity, ecological setting, and habitat could enable exciting development of smart healthy urban corridors, integrating countryside with urban home-work living.

The Manchester Ship Canal was the first man made transport waterway that transformed its countryside and interconnected its communities. This book demonstrates possibilities for the development of Manchester Ship Canal, setting up new prototype of future living around similar European disused waterways.



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