



**The first Leeds Doughnut City Portrait:
towards a safe and thriving city for all**

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Summary

Welcome to the Leeds Doughnut City Portrait. This report is for all those interested in how Leeds can become a thriving and safe place for everyone. It builds on the amazing work under way, and planned, in the city. We want to embrace the opportunities across Leeds' diverse communities and sectors and amplify the voices that are working towards a city able to meet the challenges and opportunities of the 21st century.

We are using an approach called 'Doughnut Economics' to create a first pen portrait of the state of Leeds right now. Our work presents a snapshot of Leeds across four areas – local social life, local nature, our impact on the planet, and people worldwide. It introduces a new way of thinking so we can tackle the challenges ahead. It will be useful for researchers, policy makers, politicians, social entrepreneurs and community activists.

Doughnut economics is an approach that comes from the work of Oxford economics professor Kate Raworth. It is a guide for how cities can respond to the challenges of the 21st century. The Doughnut is a simple idea. Imagine the outer edge is a ceiling, and we must stop the impacts of human life from overshooting this. Now imagine that the inner part is a floor, and no one should fall below this if they are to live well. This leaves the Doughnut in the middle - the place where all of us can thrive and be safe.

The Doughnut approach is a way to think about your place can meet its local aspirations while also living up to global responsibilities. It takes us on a journey through the city asking four simple questions:

1. What would it mean for the people of Leeds to thrive?
2. How can Leeds support and protect local nature?
3. What would it mean for Leeds to respect the wellbeing of all people?
4. How can Leeds respect the health of the whole planet?

Asking these four questions together is central to our work. It allows us to see if we are meeting local aspirations and global responsibilities, for both people and planet. In sum, we explore the broader question of whether life in Leeds is in the safe and just space of the Doughnut, and if not, what can we do to move towards it?

The Leeds Doughnut is a project of Climate Action Leeds, a National Lottery-funded project promoting community led climate action. The Leeds Doughnut is our first step in creating a City Plan that can help create a zero-carbon, socially-just, nature friendly Leeds by the 2030s. We see the Leeds Doughnut City Portrait as part of the conversation about how we tackle the challenges ahead - how we protect nature, create a zero-carbon city, and leave no-one behind.

Below are the key findings from each of these questions.

Local-Social life in Leeds: What would it mean for the people of Leeds to thrive?

In this first question on our journey, we focus on local social aspects of life in Leeds. We ask a simple question that can guide our local aspirations as a city: are people in Leeds living well? By this we mean are leading safe and thriving lives across issues like work, health and education but also safety, political

voice and inclusion. We use 16 dimensions of social life, largely reflecting the United Nations' Sustainable Development Goals (SDGs).

Doughnut dimension	Summary
1 – Health	Leeds City Council's aim for the city is one where people who are the poorest improve their health the fastest. We found that people in the most deprived areas of Leeds live an average of 10.5 years less than those in the least deprived. This falls below our proposed minimum social floor of 2 years, linked to places in the UK that have the lowest difference.
2 – Housing	The goal of the Council is for all Leeds residents to live in "good quality affordable homes". However, house prices in Leeds are an average of 6.3 times greater than average gross annual earnings. This is higher than our proposed minimum social floor of 4, based on neighbouring city Liverpool.
3 – Water	Water industry research suggests an aim to eliminate water poverty by 2030 (defined as spending more than 5% of income on water bills). In Yorkshire almost 3% of the population are in water poverty, falling below our proposed minimum social floor.
4 – Food	The FoodWise partnership in Leeds calls for a 'healthy, sustainable and fair food system for everyone in Leeds'. In 2019/2020, the Trussell Trust provided 31,526 food parcels in Leeds, 41% of these for children. Taking a proposed minimum social floor of zero food insecurity, Leeds falls below this.
5 – Connectivity	Leeds City Council has a vision for a 100% digitally connected and competent city. The nearest data in Yorkshire and the Humber shows that 7% of the population lack basic digital skills. Assuming Leeds is the same as Y&H, it is below the proposed minimum social floor of everyone being digitally competent.
6 – Community	Leeds aims for strong, engaged and well-connected communities. A 2020 survey showed that 78% of Leeds residents were satisfied with their local area as a place to live. This is some way below our proposed minimum social floor of 98% linked to the best-case European city.
7 – Mobility	Leeds' Transport Strategy has a target of zero people to be killed or seriously injured on Leeds roads by 2040. In 2019, 357 people were seriously injured or killed in road traffic accidents in Leeds. This is below our proposed minimum social floor of zero.
8 – Culture	Leeds' Best Council Plan states the ambition that local culture and sporting activities are to be available to all. Leeds has the largest museums service in England and Wales run by a local authority, and while there is no recognised social floor, Leeds currently performs well.
9 – Jobs	Leeds has a target for a "strong economy with quality local jobs". In 2021, an estimated 9.9% of all Leeds working residents earned less than the National Living Wage. Leeds significantly falls below the proposed minimum social floor of 1% earning less than the living wage, derived from a European best case.

10 – Income	Leeds’ ambition is for “everyone to earn enough to support themselves and their families”. In 2021, an estimated 13.7% of working age adults in Leeds were affected by in-work poverty, and this falls below the proposed minimum social floor of no working adults.
11 – Education	Leeds aims “to ensure that every child and young person in Leeds has the opportunity and support to achieve their potential”. In 2021, 85.9% of 16- and 17-year-olds in Leeds were in full-time education or training, which falls below our proposed minimum social floor of 97%, taken from the best performing case in the UK.
12 – Energy	Leeds’ ambition is for “all homes in the city” to be homes where “everyone can afford to stay warm”. 16.8% of Leeds households were in fuel poverty in 2019, which significantly falls below our proposed minimum social floor of zero.
13 – Peace & Justice	The Council aims for “everyone in Leeds to be safe and feel safe”. A recent survey found that 84% of Leeds residents feel safe in their community – this falls somewhat short of our proposed minimum social floor of everyone feeling safe.
14 – Social Equity	The UK Government set a target for only 10% of children to live in poverty. In 2020, 24% of children in Leeds aged 16 or under were living in poverty, falling below our proposed minimum social floor of 10%.
15 – Political Voice	Leeds strives for “strong, engaged and well-connected communities”. In 2018 local elections average voter turnout in Leeds was 34.3%, which falls below the proposed minimum social floor of 51% based on the best English case.
16 – Equality in Diversity	The Council aims for “Leeds to be inclusive, where all citizens are treated fairly”. In 2021 there were 3,654 hate crimes in Leeds, falling below our proposed minimum social floor of zero.

Local Ecology: How can Leeds support and protect local nature?

Our second question looks at local nature. To guide our local aspirations as a city we ask: What is the state of local nature in Leeds? Leeds has a wealth of natural resources. On our journey, we can see that all these can play a role in a safe and thriving city: clean water to drink, air to breathe, and land for storing carbon and renewable energy. We can also use the waste in Leeds as a resource. For each area, we explore if there is a city target, how Leeds is currently doing, and what more could be done.

Doughnut dimension		Summary
1 – Water	a – Renewable, clean water	While there is no city target for water, the national target is for 75% of UK waters to achieve the rating of ‘Good’ from the Environment Agency. The most recent assessment of the River Aire was Moderate quality.
	b – Floods & run-offs	Leeds City Council is undertaking a multi-year, multi-million-pound programme of work to increase flood resilience and preparedness. Over 11,000 properties in Leeds are at medium to high risk of being flooded.

2 – Land	a – Carbon sequestration	Approximately 17.1% of the Leeds Metropolitan area is tree canopy, higher than the UK average of 13%. Leeds City Council’s Tree Strategy aims to increase this to 33% over the next 25 years by planting 5.8 million trees.
	b – Supporting biodiversity	Natural England’s Access to Natural Green Space Standards aims for 1 hectare of local nature reserve per 1,000 people. Leeds has 1 hectare of Local Nature Reserves per 1,067 people, although this is uneven across the city.
	c – Harvesting energy	In 2018–2019, there were 43 megawatts of installed, grid-connected renewable energy capacity in Leeds. Leeds City Council has a target of least 75 megawatts of installed, grid-connected renewable energy capacity by 2021. Given the extensive land area of the city, there is potential to meet and surpass this target.
3 – Air	a – Purifying air	The Council aims to meet all WHO guidelines for air quality by 2030. Air quality in Leeds is currently rated as Good in WHO rankings, but areas of the major road network exceed annual objectives for nitrogen dioxide.
	b – Regulating temperature	The urban heat island effect is not formally measured in Leeds, nor are there targets to reduce it. As city centre development continues, the urban heat island is likely to increase in Leeds city centre.
4 – Matter	a – Processing waste	The recycling rate for domestic waste in Leeds has increased from 20% in 2004 to 39% in 2020, just lower than the English average of 44%.

Global-Social life: What would it mean for Leeds to respect the wellbeing of all people?

Our third question is about our impact on people across the world. To guide our global responsibilities as a city we ask: how are we affecting the lives of others across the world as a result of life in Leeds? On our journey, we need to consider all the supply chains linked to the goods and services we buy in Leeds. All these have effects including child and forced labour, workplace harms, pollution and the use of land. Clearly, actions in Leeds have impacts on people all around the world. For each dimension, we downscale global data to Leeds to gauge Leeds’ impact worldwide.

Doughnut dimension	Summary
1 – Child labour	In 2018, there were more than 21,000 child labourers in the global supply chains resulting from consuming goods and services in Leeds. Around half of these child labourers are in Africa.
2 – Forced labour	Global supply chains of Leeds’ local consumption draw on an estimated 1,700 forced labourers. In addition, there are a reported 300–460 potential victims of modern slavery in the whole of West Yorkshire.

3 – Occupational safety	Goods and services imported into Leeds result in 25 workplace fatalities and roughly 13,500 injuries a year elsewhere in the world.
4 – Air pollution	There are 580 air pollution-related deaths traceable to consumption supply chains that Leeds depends on. Of these, 251 occur in Leeds, 157 across South, East and Southeast Asia and the remaining 172 across the rest of the world.
5 – Agricultural land appropriation	497,109 hectares of cropland and grazing area is required to support goods and services imported into Leeds. Of this, for every acre of UK agricultural land used to provide for Leeds, another acre is used in Sub-Saharan Africa and Southeast Asia.
6 – Material footprint	Consumption in Leeds relies on extracting an estimated 0.7 tonnes of metal ores per person every year, or 540,000 tonnes: the weight of over 200,000 Range Rovers. This level of material use can be linked with coercive and hazardous working conditions, and displacement of local communities.

Global Ecology: How can Leeds respect the health of the whole planet?

Our fourth question is about our impact on the planet. To guide our global responsibilities as a city we ask: how are we affecting the planet's health as a result of life in Leeds? We use the idea of a footprint to explore this. How much bigger is the environmental footprint of Leeds compared to the actual size of the city? On our journey, we look at carbon, oceans, biodiversity and our use of chemical fertilisers, water and raw materials. Drawing on established global thresholds, we can see how Leeds performs against each dimension.

Doughnut dimension	Summary
1 – Climate change	The current safe boundary for carbon emissions is 1.61 tonnes of carbon for each person every year. Each person in Leeds is currently responsible for producing 9.6 tonnes of carbon per year, which exceeds the safe boundary almost 6 times.
2 – Ocean acidification	High-carbon activity and lifestyles in Leeds are driving ocean acidification. Leeds exceeds the safe global boundary by a factor of almost 6.
3 – Land use	The global land footprint of an average resident in Leeds is 2.3 times the safe and just planetary boundary for land use. More than two Earths would be needed to support the current global population if everyone consumed like an average Leeds citizen.
4 – Fertiliser use – nitrogen and phosphorus	Excessive use of fertilisers destroys natural ecosystems. Across the world, humans use chemical fertilisers beyond a safe limit by a factor

	of 2–3. In Leeds, the average person exceeds the safe limit over 5 times for phosphorus, and over 7 times for nitrogen.
5 – Freshwater withdrawals	A safe global limit of water use is 574 m ³ per year for each person. Water is abundant enough in Leeds that current use is well within the global boundary, at 220 m ³ per person each year.
6 – Material footprint	In Leeds, an average person can be linked to the use of over 13.2 tonnes of materials such as fossil fuels, wood and metals, exceeding safe planetary boundaries almost twice.
7 – Global biodiversity	Safe boundaries for biodiversity have been exceeded across the whole world. We can be confident that the average Leeds resident will have a biodiversity footprint exceeding safe planetary boundaries.

Unequal responsibilities

Many of the dimensions above are not shared equally across the people of Leeds. What we found is that the level of people’s ecological impact and ability to stay above the safe limits of the social floor is heavily influenced by their income. This is especially the case when we consider people’s impact on resource use and carbon emissions. For example, we found that whilst all income groups currently exceed safe limits for carbon emissions, the highest 20% of earners in Leeds exceed these by a factor of 1, while the lowest 20% of earners exceed them by a factor of 3. At a very basic level, the greater income people have, the greater the impact they will have on people and planet.

Moving Leeds towards the Doughnut

Moving Leeds towards the safe and just space of the Doughnut across all four areas of life can support our evolving mission as a city. This journey towards the Doughnut is one that means different things for different people. Some will have to make deeper and bigger changes, while others need to be able to access the basics for a good life. It will also require action from people across a range of sectors in the city – local authorities, businesses, universities and civic groups alike.

We want to build on, connect and amplify the already great work under way. This work is our starting point of a broader city planning process by Climate Action Leeds to support a ‘zero-carbon, socially-just, nature friendly’ city by the 2030s. We want to take this work out to communities, get their reflections, and build on it with lived reality. We hope this report stimulates new thinking and action and encourages you to join us on this journey.

Introduction

Our aim is for Leeds to be a city where everyone can thrive and feel safe; a city that meets its global responsibilities; and exists in balance and harmony with its natural environment, both locally and with the planet as a whole.

This report seeks to understand how much of that Leeds is currently achieving. The first of its kind for Leeds, this report explores how Leeds can make these local aspirations a reality whilst also honouring its global responsibilities.

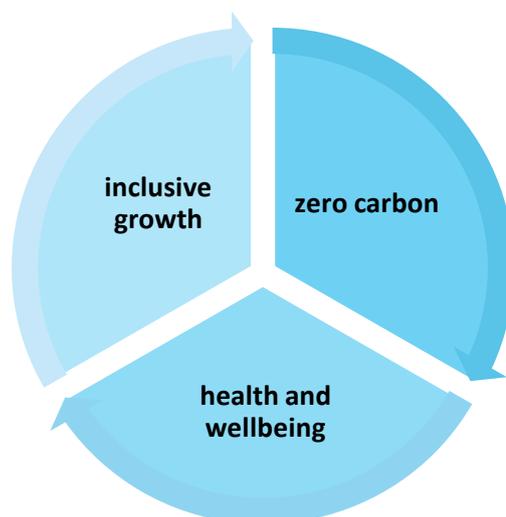
In the pages that follow, we take you on a journey through various aspects of life in Leeds and the impact the city has on people and planet. Our work and the analysis we have produced are inspired and informed by Doughnut Economics.¹ Pioneered by Oxford economist Kate Raworth, this approach presents us with a new kind of economics, one that is fit for the 21st century.

This is very much an initial study. There is much more to be done. These results are a starting point for conversations with people across the city; build partnerships with business, policymakers, community groups and researchers; and embark upon an ambitious city-level planning process over the next five years. Our work is part of the National Lottery-funded Climate Action Leeds programme that aims to support a zero-carbon, nature-friendly and socially just Leeds by the 2030s.

Above all, this report is an invitation to join us as we explore what a safe and thriving city for all means in practice. As we elaborate on next, we call this ‘living within the Doughnut’, ensuring that we do not exceed the ‘ceiling’ of our natural world, nor fall below the safe and just social ‘floor’ for humanity. We are incredibly conscious of the fact that many aspects of life in Leeds are outside this Doughnut, but we are excited about the energy, activities and enthusiasm that is already changing the city for the better. In the next section, we detail some of the challenges we face in our journey towards a safe and thriving city for all.

A time of change and renewal for a great northern city

This is an exciting period of transformation and rejuvenation for Leeds and its residents, visitors, students and workers. As the city gradually recovers from COVID-19, Leeds City Council and its partners are striking out in exciting new policy agendas. Major consultations are underway on a new approach to transport, housing, development and climate action. The Council is creating a new ambition around its three key pillars as follows:



Front of mind is the question of how to maintain the energy around these ambitions and particularly how to build momentum from the Council's 2019 declaration of a climate emergency. The city must also reckon with major and longstanding social and economic issues.

Our work on the Leeds Doughnut supports these ambitions and challenges. This is not another report to read and put on the shelf. It is a live planning process that we are eager to see used as a tool to inspire transformational conversations, connect people and amplify the brilliant work already underway in Leeds. This report is a guide for us to reframe our work and create a new kind of economy fit for the 21st century.

Our common challenges

Our approach begins with honesty about the challenges we face, but also boldness around the opportunities that we have for change.

The first is the climate challenge. Nations across the world have signed up to limiting global heating to no more than 1.5°C. However, we are currently well short of this ambition. Global carbon emissions are still around 50 gigatonnes a year. This must be halved in the next decade if we are to have any chance of a safe planet.²

Leeds faces this challenge at a city level. Leeds produces around 4 million tonnes of greenhouse gases a year.³ To halve this by the end of this decade and then get to zero emissions as soon as possible thereafter, we need immediate, fast-moving and large-scale action. Leeds has particular challenges from its high dependency on vehicle use and poorly insulated homes. To tackle the climate emergency, life in Leeds has to be transformed, but it can and will be for the better.

The second is the nature challenge. Half of all animal and plant species have collapsed since the 1970s and continue to do so at an alarming rate.⁴ Humans continue to take land and resources from our natural world. The same pattern can be seen in cities like Leeds. Urban development continues to expand across the city and the natural ecosystems we depend on are being degraded rather than regenerated. We urgently need to prioritise nature, creating space for it to thrive and expand.

The third challenge is resource use. Our increasingly consumer-based economy means our use of resources is only becoming more intensive and extractive. Globally, humans now use around 100 billion tonnes of materials a year, while scientists have stated that safe limits are about half of that.⁵ We simply cannot continue to devour resources at current rates if we want to ensure a safe future for the planet. We need to recognise this huge material dependency in Leeds and take a close look at our resource use. In particular, we must face up to how resource use in Leeds impacts and harms people in other places around the world working in the commodity supply chains that provide us with goods.

Fourth and finally is the social challenge. We live in a world where 1% of the population control 50% of global wealth,⁶ where billionaires and multinational corporations control vast swathes of our lives. Locally, we have persistent and pervasive poverty, precarious employment, poor housing and unequal access to quality healthcare. Most of these problems were not made in Leeds, but they provide the social context for any changes we make. Leeds must urgently address low-paid work, child poverty and health inequalities. We are also facing racial and gender-based systems of oppression, hate crimes and political disempowerment. In order to truly transform our city, we must be honest and realistic about the fact that several aspects of the growth model in Leeds have long been unfit for purpose. It is time for a fresh approach.

Building a safe and thriving city

This context leads us to one of our main guiding questions: how can everyone in Leeds thrive within the limits of our planet and ensure nobody falls below a basic level of wellbeing? We offer a challenge to all city-makers in Leeds: how can we shift from a mindset focused primarily on economic growth to one that prioritises safety, livelihoods, prosperity and thriving for all?

Rather than economic growth measured in GDP being the sole yardstick of a city's success, economists and politicians across the world are calling for a focus on growing the conditions for wellbeing. We need a new vision for our cities that cuts pollution, poverty and carbon emissions, but without compromising prosperity, jobs and investment. Underpinning a new prosperity is wealth building that sticks to places: community, co-operative and city-led businesses that lock in and recycle wealth for everyone.

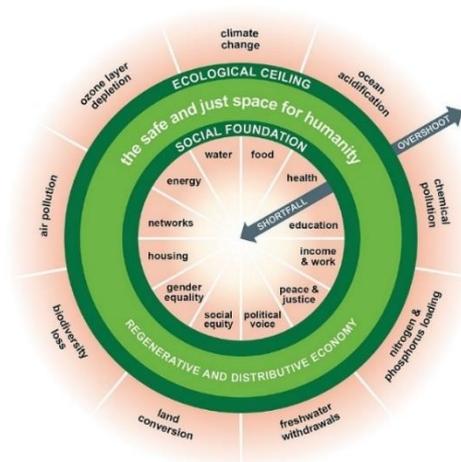
We know that over the years, the mantra of 'growth first' has often attracted investment; but this has resulted in gains that have not been broadly shared. Trickle-down from large-scale inward investment has not brought the benefits they promised. Moreover, the idea of a growing economy on a finite planet no longer makes sense. The Bank of England aims for GDP growth of 3% per year. This would see the economy becoming 20 times bigger by the end of this century. The global economy is already overshooting the planet's capacity two times over. Based on what we already know, an economy that is 20 times bigger would bring us into extremely dangerous levels of global warming, resource use and social inequality.

What is the Doughnut framework?

Doughnut Economics is a ground-breaking set of ideas conceptualised by Kate Raworth that presents us with economics fit for the 21st century. Very simply, the Doughnut shape has an outer edge that represents the planet's ecological boundaries and an inner edge representing our social foundation. These are known as the 'ceiling' and 'floor' respectively. The space between these two edges is a Doughnut shape representing a safe and just space for humans to thrive in (Figure 1). Current evidence shows two worrying and growing trends:

1. **The ceiling:** the way we, as humans, live our lives means we are transgressing the natural boundaries of the planet that keep us safe, breaking the ecological ceiling
2. **The floor:** many people and places are falling below the social floor, unable to access a social foundation that allows them to thrive

Figure 1. The Doughnut. Our 21st century compass. Source: Raworth (2017).



There is an exciting sense of hope. A global community of people taking these ideas and setting out exactly how places can get back within the safe and just space of the Doughnut. DEAL is a community of local activists, community members, entrepreneurs and council officers from across the world. Kate Raworth and the Doughnut Economics Action Lab (DEAL) have developed a methodology to downscale the Doughnut approach to the city and town levels. Many cities have completed Doughnut studies, while others are now embarking on this journey. We are excited and invigorated to be able to take our first steps too, connecting with the rich and expansive network of people, ideas and resources out there.

About the Leeds Doughnut

We use the Doughnut as a guide for developing a city planning process that can create a socially just, zero-carbon, nature-friendly Leeds by the 2030s. The Leeds Doughnut is part of Climate Action Leeds, a five-year National Lottery-funded programme of work to support community-led climate action across Leeds. Climate Action Leeds features a city-wide planning process that learns from and supports eight community climate action groups and seven sector-based transition partners, who are working to create a sustainable and just transition for Leeds.

To date, we have been supported by a coalition of groups, including the community interest company Leeds Love it Share it and Our Future Leeds, the citizen-led activist and ideas group. We have received policy support from Leeds City Council and funding from the University of Leeds. We are also part of DEAL, through whom we are connecting with other UK-based and international groups. Over the next year, we want to focus on building a community of people to support this wider movement. For us, the Doughnut is a novel approach that can complement existing work.

About this report

This report is our first City Portrait of Leeds using the Doughnut Economics framework – essentially, a summary of our findings from quantitative and qualitative research undertaken between summer 2021 and spring 2022. It is a snapshot of the baseline state across selected aspects of life in Leeds. Clearly, this is the work of a small group of people. More work is needed to test, show and refine these ideas, but we have four aims from this first iteration:

1. Generate initial conversations about what a safe and thriving Leeds looks like;
2. Advocate for the Doughnut as a valuable city planning approach to achieving this;
3. Detail how to use these findings to create practical next steps; and
4. Build a community of people that can own and support this transformation.

The following are key aspects of our work and that of the wider Climate Action Leeds partnership:



city-level change — how can we harmonise community-led action with wider municipal transformation?

emergency framing — how can we act rapidly enough to mitigate global heating but also empower and leave nobody behind?

climate justice — how can we foreground the voices of those most harmed by climate challenges, yet least responsible for causing them?

decoloniality — how can our work acknowledge the systems of oppression, exploitation and inequity stemming from colonialism and extraction, which still harm people today?

youth allyship — how can we prioritise deep connections with young people, who must live through the consequences of decades of inaction by current and previous generations?

Our approach

Our first step was to compile a City Portrait that examines both social and ecological issues, at both local and global scales. This creates what the Doughnut approach calls four lenses, each of which asks a basic question:

5. **Local-Social** lens: What would it mean for the people of Leeds to thrive?
6. **Local-Ecological** lens: How can Leeds support and protect local nature?
7. **Global-Social** lens: What would it mean for Leeds to respect the wellbeing of all people?
8. **Global-Ecological** lens: How can Leeds respect the health of the whole planet?

This report presents an initial picture of how Leeds measures up against these four questions. We feel excited by the fact that any group, neighbourhood or sector in any city can use these questions to guide their work. We envision future efforts to include holding this City Portrait up to reality, integrating and connecting the four lenses and action-planning for tangible change.

The following sections reveal our findings under each of the four lenses. We discuss our approach, what we found, the strengths and weaknesses of our research, what else we need to find out and what more needs to happen so Leeds can live within the safe and just space of the Doughnut.

The Leeds Doughnut City Portrait

Local-Social lens: What would it mean for the people of Leeds to thrive?

This lens explores the social foundation of Leeds and how people relate to it, as well as their ability to thrive within it. In essence, this lens explores the policy frameworks and related practices in the city, as well as the extent to which targets are sufficient for people to be able to live within the safe and just space of the Doughnut. Crucially, this lens reveals the areas in which people fall below the social floor and, therefore, where key opportunities for action lie.

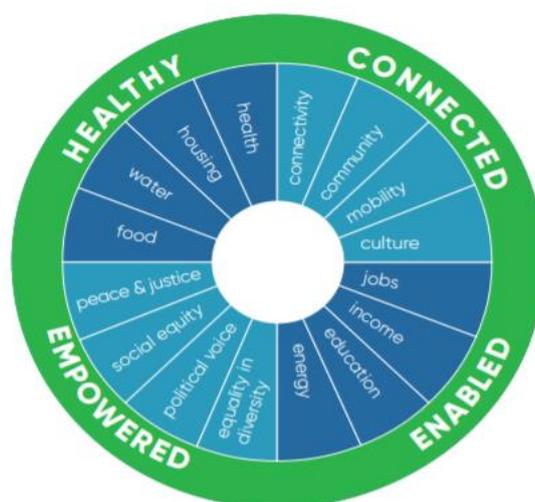
Our approach

This section follows the Thriving Cities Initiative's (TCI) approach used by DEAL for examining all the four lenses, having been used by several other cities in creating City Portraits. The social foundation is based on 16 social criteria (Figure 2) that cumulatively represent a basic standard of wellbeing that everyone in Leeds has the right to live within. In turn, these are inspired largely by the UN SDGs, with a few additions as outlined in the TCI guide. For example, racial equality is added to gender equality under the diversity category.

We then reviewed existing, publicly available Leeds City Council strategy documents to establish the formal city ambition for each social dimension. We selected targets by assessing which best captured the city's ambition relevant to each social dimension.

Next, we reviewed available data and chose an indicator which could capture one aspect of the city's performance against this target. We acknowledge that choosing one indicator is limited in what it can show. Our intention is to create an illustrative snapshot rather than capture the full complexities of the current social foundation for Leeds. This snapshot represents a starting baseline: a springboard for greater, more complex reflections on the city's development. The indicator selection process is outlined below.

Figure 2. The social dimensions of the Doughnut's social foundation. Source: DEAL (2021).



Indicator selection

The TCI's City Portrait methodology acknowledges that different indicators could be used to explore Leeds' performance against the 16 social dimensions of the Local-Social lens. We recognise the limitation, therefore, of starting by selecting only one indicator per dimension. Our choice was based on selecting data that is:

- Relevant to the identified Council target within each social dimension
- Representative of specific challenges in Leeds
- Available at the Leeds level
- Updated annually for the indicator
- Publicly available and follows trustworthy methodologies
- Where relevant, comparable with other cities utilising the Doughnut methodology and the UK Doughnut to facilitate wider comparison

The availability of data significantly influenced our selection of indicators. We found that much of the data we desired is currently not collected at the Leeds local authority level. Where local data was not available and there were established, downscaled estimations drawn from national figures, we have included this. The indicator selection and data collection process involved extensive discussions with relevant experts across Leeds and ultimately, relied on a judgement of the most appropriate indicator. Where possible, we have included additional qualitative contexts for each social dimension.

Thresholds – comparing city life against the Doughnut's social floor

To assess the extent to which the 16 dimensions of this lens perform, we compare them to what the Doughnut framework calls a threshold. Essentially, this is a social boundary below which people cannot thrive and life becomes 'unsafe and unjust' in some way. This boundary is also called a social floor - it's the inner rim of the doughnut that creates a foundation for our lives.

The process of establishing thresholds presents many challenges. Firstly, thresholds are rarely established at the city level. Indeed, they are difficult to set because so much depends on local context. The same applies for downscaling international thresholds. For example, in Fanning et al.'s comparison of National Doughnut trends, the percentage of the population earning over \$5.50 per day represents the income threshold.⁷ However, this would be an inadequate threshold to represent Leeds' safe and just space, where the UK's Real Living Wage is £9.90 for the city.⁸ Our approach to setting thresholds, therefore, involved qualitative assumptions on establishing a baseline that is both just and achievable, relative to where Leeds is and could be.

Where the Council has clearly set a target, we used this as the threshold Leeds should achieve. This was the case for Leeds' Vision Zero for serious accidents and deaths caused by road accidents by 2040. Where there is no clear Council target, we allude to best case scenarios for each indicator across European comparators, or to the Leeds statistics within the national English context. The table in Appendix 1 summarises the social dimensions and the indicator, indicative snapshot, threshold and target for each.

The local social foundation in Leeds: an initial baseline

1. Health

Our health, or lack of it, is one of the main determinants of our ability to thrive. It's not just how long we live, but how well we live. It's not just about how healthy we are in ourselves, but how healthy the place we live in is and the services it provides to keep us healthy. Health is defined by the World Health Organisation (WHO) as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.⁹ Good mental and physical health are essential to thriving lives. There is a well-established relationship between low socio-economic status, poor health and early mortality,¹⁰ so clearly there is a strong intersection between health and many other dimensions of the Doughnut’s social foundation.

Leeds target

Leeds as a city has a major focus on health and wellbeing. Its ambitious city target is to be “a healthy and caring city for all ages, where people who are the poorest improve their health the fastest”.

Indicator

In Leeds, Health and Wellbeing is part of the Council’s statutory duty, hence there is a substantial range of data across indicators available to select. Nationally, the trend of health inequalities associated with socio-economic status has been increasing over the past decade.¹¹ In Leeds, 164,000 people live in the areas ranked the most deprived 10% nationally (LCC, 2021)¹². Reversing this trend is critical to a thriving Leeds.

Additionally, income-related health disparities are a critical factor to consider; the Council’s Health and Wellbeing strategy stresses this. Therefore, the key aspect we have focused on is **inequality of life expectancy at birth between those who live in the most and least deprived wards of Leeds**. Leeds cannot be considered a thriving city while significant variations in life expectancy remain an issue. Health cannot be a postcode lottery.

Threshold

Leeds lacks a quantifiable, specific target for its own inequality in life expectancy at birth. In order to establish an achievable and desirable threshold for a ‘socially just’ level of inequality in life expectancy at birth, we have taken an accumulated average from the lowest score of inequality for men (Barking & Dagenham - 2.3 years difference) and for women (Richmond upon Thames - 1.2 years difference), equating to 1.74 years difference.¹³ **Therefore, we have adopted an average of two years difference in life expectancy at birth between the most and least deprived people as our minimum social floor.**

Leeds snapshot – how does Leeds compare against this threshold?

Based on data between 2018 and 2020 provided by Public Health England, the average life expectancy at birth for men is 77.8 years and 81.8 years for women. In both of these cases, Leeds falls below average life expectancy at birth nationally across England, at 78.7 years for men and 79.4 for women.

When looking at inequality of life expectancy within the city, over the same year range, this stands as 11.4 years’ difference on average for men between the most and least deprived areas, and 9.7 years difference for women. Combined, this is an average inequality of 10.5 years in life expectancy at birth between the most and least deprived areas in Leeds. **In other words, on average, people from the most deprived areas in Leeds live 10.5 years less than those from the least deprived areas.**

The inequality of life expectancy at birth in Leeds is greater than the English national average, of a combined number of 8.8 years' difference between the most and least deprived (9.7 for men and 7.9 for women). This puts Leeds in the worst quintile for England, with a greater overall average inequality of life expectancy at birth than Manchester (7.8 years), Bradford (8.95 years), Sheffield (9.8 years), Birmingham (7.85 years) and York (7 years), for example.

At 10.5 years, Leeds represents a considerable difference compared to the best case 2-year health threshold and, therefore, is falling below the social floor in this dimension. Of course, the disparity is likely to be even greater when other oppressions are taken into account, particularly racialised and gender-based. To gain a fuller picture of this health dimension, future work needs to explore a range of other indicators including quality of health during the life course, mental health, access to healthcare services, age and ethnicity.

2. Housing

Basic access to good quality, safe, secure and affordable housing is a fundamental and recognised human right, enshrined by the United Nations. Having a home very critically underpins our ability to thrive. However, this is one of the areas that almost universally across all places, many city residents are experiencing inequality and hardship, whether in poor housing quality, unaffordable rent, insecure tenancies or unsustainable mortgage debt.

Leeds target

Leeds has an ambitious housing strategy which states that “All Leeds residents will be living in good quality affordable homes” with “appropriate levels of support and safe and harmonious communities”. We take this statement as our baseline target for housing.

Indicator

Housing as a social dimension of thriving is complex and conceptualising it requires a range of indicators. There are additional challenges due to differences in the availability of housing data. We considered aspects of what allows people to thrive through housing, such as affordability and quality. Quality of housing is a particularly significant issue that links to many other aspects of thriving, particularly around energy and fuel poverty. We return to the energy dimension of housing later and here we focus on affordability.

Affordability pertains to more than simply price. Issues of physical adequacy and overcrowding are also important to consider.¹⁴ Affordability varies with income and geography. **One key indicator used to measure the affordability of housing across the UK is average house price to median income earnings, known as the price-to-income affordability ratio.** There are limits to this indicator, as it simply reflects the relationship between house prices and income in a given place. Nevertheless, we use it here as there is reliable local and national data available.

Threshold

Setting a threshold for the difference between house price and income is a deeply subjective task. How much more than an average income should a house cost? This is a more or less relevant question depending on the balance between home ownership and social/private housing. There is a huge variation in housing price and income across England. According to the ONS figures for 2020, the worst is Westminster at a factor of over 21 times income, while the best is Copeland at just under 3. A close comparator to Leeds is Liverpool where the house price to income ratio is 4. Therefore, while aiming for a threshold of zero difference between average house price and income is not achievable in the near term, a difference of 6 means that many people are excluded from the housing ladder. **A slightly**

lower house price to income ratio of 4 seems a more appropriate and manageable threshold to allow the people of Leeds to thrive.

Leeds snapshot

On average, house prices in Leeds are 6.3 times more than median gross annual workplace-based earnings. This is up from 5.7 times more in 2010, and up from 3.4 times more in 2000. By way of comparison, the average figure for England is 7.8 times while the average across Yorkshire and The Humber is 5.8.¹⁵

Therefore, at 6.3 Leeds is slightly higher than our proposed minimum social floor, and means that in terms of housing, many people are not able to live safe and thriving lives.

Going forward, there are many other indicators to explore to gain a fuller understanding of housing in Leeds. These include measures of housing vulnerability, security of tenure, rough sleeping and homelessness, fuel poverty, quality of accommodation and access to local services, overcrowding, average housing expenditure-to-income ratio (for which data is currently not collected in Leeds), housing-related borrowing and debt, house energy efficiency rating, number of citizens on social housing waiting lists and so on.

3. Water

It is stating the obvious to say that water is essential to life. In a global context, Leeds is a higher income city in which access to clean safe water has been established and guaranteed for many years, especially through national level policy and regulation. We also live in a relatively water-abundant part of the world that does not suffer from prolonged water shortages. Nevertheless, this area still needs attention. Water security is a growing global concern and repercussions of this can be detected in Leeds. However, while access itself may not be a priority issue in Leeds, there are concerns around the affordability of water bills across the UK, exacerbated by the rise in the cost of living.

Leeds target

There is no city-level target for water affordability in Leeds. However, a 2020 report by UK Water Industry Research (UKWIR) pointed to the need to **eradicate water poverty by 2030.**¹⁶ **We adopt this as our city target.**

Indicator

This social dimension seeks to capture issues around quality, access and affordability. As access to water and improved sanitation is generally good in the UK, **we look at the affordability of a water connection as a way to gauge 'water poverty'.**

Though there is no explicit definition of water poverty, the UK water regulator OFWAT defines water affordability as 'the ability of household customers to pay their water and sewerage bills.'¹⁷ Water poverty is measured differently across the industry, meaning it is hard to establish a clear, consistent understanding of the extent of the problem across the UK. A commonly used indicator looks at the percentage of income (after housing costs) spent on water and sewerage bills. One of two recognised thresholds considers the threshold of water poverty as spending more than 5% of household income on water and sewerage services, with another slightly less common threshold is 3%. We use the threshold of 5% as the data is available at the Yorkshire level.

Threshold

Reflecting the work of UKWIR, we adopt the aim of **eradication of water poverty** by 2030 as the threshold for the safe and just space of the Doughnut.

City snapshot

Across Yorkshire, there are an estimated 150,000 customers with a water bill that is at least 5% of their income after housing costs. Using ONS population projections for Yorkshire and the Humber in 2020, that is roughly 2.7% of the overall population (2714 in every 100,000 population). There is no Leeds-level data for the water poverty indicator and further work will be needed to establish how Leeds compares to this Yorkshire level data in terms of water poverty. **But taking Yorkshire as a proxy, it can be assumed that there will be a significant number of households in Leeds experiencing water poverty.** This level of water poverty is something that should be considered by the Council in the future.

Future issues requiring further analysis include the number of households connected to a water supply, average water costs, water quality, outages and wastage levels. In addition, the privatised and globalised nature of water utility companies brings challenges for this Doughnut framework. Issues here include increasing local economic multipliers and re-spending, local ecological effects, shareholder profits and accountability.

4. Food

Access to food is critical to life, let alone thriving. There are many aspects to this including safety, quality, nutritional value, diversity, price and how local it is.

Leeds target

Leeds has a well-developed network of partners developing a food strategy. The FoodWise partnership, which includes the Council, has developed an action plan to “create a healthy, sustainable and fair food system for everyone in Leeds”. **We take as an indicative target one of its aims that “no-one should be denied access to a nutritious diet”.**

Indicator

A common indicator used in this area is food insecurity, also known as food poverty. It is defined as “the state of being without reliable access to a sufficient quantity of affordable, nutritious food”.¹⁸ This can be measured using indicators such as nutritional intake or number of missed meals. However, due to the complexities of quantifying food poverty in particular places, data on food security currently does not exist at the Leeds level.

One indicator with available data relates to food bank access. Food banks are charity-run emergency food providers for those in need of food aid and have seen a significant rise during the COVID-19 pandemic.¹⁹ The Trussell Trust is the main food bank provider in the UK, with over 1,300 food banks across the UK in 2021. Additionally, there were over 900 independent food banks in the UK.

According to the Trussell Trust, the need to access a food bank is most commonly the result of destitution and the consequent inability to afford basic essentials.²⁰ The Trussell Trust notes the implications of ill health, loss of job and a lack of social network and support on an increased need for food bank provision, clearly highlighting the link with the other dimensions that make up the social foundation of the Leeds Doughnut. Between April 2019 and March 2020, the Trussell Trust operated across 27 food banks in Leeds. **Therefore, we use the indicator of the number of food parcels delivered during 2019-2020.**

Threshold

Setting a threshold for food poverty is again complicated. Nevertheless, the UN’s Sustainable Development Goal of Zero Hunger (Goal 2) aims to alleviate hunger and achieve food security globally.

Considering the UK is a highly developed global nation, and that Leeds is a city with an economy that is predicted to grow by 50%, **we suggest that an acceptable baseline social floor for food insecurity in Leeds is zero.** This resonates closely with the FoodWise plan for the city.

City snapshot

In 2019/2020, the Trussell Trust provided 31,526 food parcels, 41% of which were provided for children.²¹ This is almost double the figure - 66,303 - from 2015/2016. **Leeds therefore falls below the social floor of the safe and just space of the doughnut,** given that tens of thousands of Leeds residents are still dependent upon free food parcels.

Whilst figures on food parcels go some way to indicate the level of food poverty in Leeds, they are not comprehensive of all food bank recipients. Though not included in our snapshot statistic, in 2019-2020, the Independent Food Aid Network (IFAN) reported that 41,606 people accessed their food banks across Leeds.²² These figures still do not account for other community-based food initiatives and school-based food banks, for example.

This review is limited and we have used only a single indicator, so clearly there is more to be done. Indicators of food bank access should be supplemented with nutritional data to measure access to a healthy diet, with adequate nutritional value. Further, there are key issues around food cost, food access and, looking across other lenses, food miles and the ecological impact of the food eaten in Leeds.

5. Connectivity

Being connected – both socially and digitally – is another key aspect of thriving. Accessing employment and training opportunities, social networks of family and friends, leisure and retail all rely on a city's connectivity.

City target

Through its 100% Digital Leeds²³ approach, Leeds City Council has a clear and bold target to be 100% digitally connected and competent.

Indicator

Connectivity can refer to both the digital and physical sides in terms of community connectivity and mobility. Both are key to a thriving city. This section looks specifically at digital connectivity and inclusion, while mobility is considered later.

We interpret digital connectivity broadly as digital inclusion, which is widely recognised as a social justice issue, made even more significant by the fact that much of our social and employed lives have gone online in the wake of the pandemic. The internet connects people with essential services such as social welfare support, employment, healthcare and education.²⁴

According to Leeds' Digital Inclusion Toolkit, digital exclusion is an indicator of social exclusion.²⁵ Groups who are most likely to be digitally excluded are those who are falling below the social floor in other dimensions of the social foundation including older people, those out of work, with disabilities, on lower incomes, in rural areas, with fewer qualifications or with first languages that are not English. The UK Government's Digital Strategy²⁶ identifies key barriers to digital inclusion as access to internet connection, the skills to use the internet and online services, the confidence to use online services, and the motivation to use the internet, understanding its relevance and usefulness for everyday life.

Clearly, there is no single indicator to capture digital inclusion and this generates challenges. Further, there is no indicator for individual levels of inclusion or exclusion at the Leeds level. The most suitable comparative indicator is from the annual Consumer Digital Index data collected by Ipsos MORI for Lloyds Bank. From this **we use digital competency in the basic tasks required for online connectivity as our indicator**. This data is widely recognised and underpins the UK Government’s digital strategies and policy approaches. However, this data is unavailable at the Leeds scale, so we have used data for Yorkshire and the Humber.

Threshold

Leeds City Council’s vision is for a 100% digitally connected and competent Leeds. Therefore, we set the minimum social floor for Leeds as no-one lacking basic digital skills necessary for digital inclusion.

City snapshot

In 2021, across Yorkshire and the Humber, 7% of the population were classed as digitally excluded, due to lacking all of the seven basic digital skills.²⁷ This is lower than the UK average and indeed the worst performing region in England.

While 7% of people in the Yorkshire and Humber region do not meet this threshold, the figure for Leeds is likely to be much closer to the acceptable threshold. **Nevertheless, it is clear that Leeds falls below the social floor and more work is needed to ensure digital connectivity and competency.**

Future efforts should aim to discover the extent and specific nature of digital exclusion versus competency in Leeds, as well as cost and coverage. For example, Ofcom data shows that 96.6% of Leeds households have the capacity for superfast broadband access. The reality of who is connected and the quality and cost is deeply uneven. We also need to know more about cost and coverage. Crucial issues for future exploration are how connectivity and competence vary by age, area, gender, disability and ethnicity.

6. Community

Strong communities are an essential source of social connections and sense of belonging, both of which are fundamental to a thriving life. These intersect with many other social dimensions, especially health and safety.

City target

Leeds has a clear target: to have strong, engaged and well-connected communities. Clearly, this is a generalised target and more precision is needed to determine what the concepts of strong, engaged and connected mean in practice.

Indicator

Community is a broad social dimension comprising many elements, including cohesion and inclusion, active participation in governance and the nature and quality of local services. As a result, there are many possible indicators, such as the number of available local services within a set distance, the percentage of communities considered to be in deprivation, or residents’ sense of local influence in decision-making.

We selected residents’ satisfaction with their local area as our indicator, reflecting data available at the Leeds level and the value of self-reported resident input into the Doughnut city snapshot. This is derived from the Police and Crime Commissioner’s annual Your View Survey across West Yorkshire.

Threshold

As there is no quantifiable target for community thriving in Leeds, we have chosen to benchmark an acceptable threshold for Leeds against a comparative report on quality of life in European cities from 2020, which covered 83 cities.²⁸ Against the question on ‘satisfaction with living in the city’ Copenhagen scores the highest, with 98% of residents responding ‘somewhat agree or strongly agree’. Given that this is a level achieved by a fellow European city, **we suggest that an achievable threshold for Leeds resident satisfaction with their local area is 98%.**

City snapshot

In 2020, based on 5,618 survey respondents in Leeds, **78% of residents were satisfied with their local area as a place to live.**²⁹ Clearly, this snapshot is limited by a small number of respondents.

At 78% satisfaction, Leeds falls below the minimum social floor of 98%. Clearly there is much work to be done to understand what brings satisfaction versus dissatisfaction for Leeds residents. Future efforts on the Leeds Doughnut should consider these in addition to a broader range of Local-Social lens dimensions, such as local mobility options, access to green spaces and local services and the nature of housing.

7. Mobility

Mobility is the system by which people move around the city and as such, is a fundamental underpinning of thriving and social justice. Poor mobility leads to social isolation and a lack of opportunities for employment and education, as well as an inability to access essential services such as supermarkets and healthcare. A lack of affordable, accessible and reliable transport options increases the need for car ownership and locks in car dependency. Increased car dependency is linked to exacerbated economic pressure on households, which disproportionately impacts citizens from lower socio-economic backgrounds and those with disabilities. Other social consequences of heavy car use include more frequent road accidents, congestion and noise pollution. Environmentally, individualised car use drives fossil fuel consumption and heavily contributes to air pollution, which has consequential public health implications such as respiratory illness and premature death.³⁰ In contrast, a city with strong, well-connected, public and active travel-based mobility enables greater social connectivity, equality, physical and mental wellbeing, economic inclusivity and road safety, all whilst significantly reducing the carbon output of the city.³¹

Leeds target

The recent Leeds Transport Strategy envisions “a city where you don’t need a car” and includes a bold and ambitious target to have “zero people killed or seriously injured on Leeds roads by 2040”.

Indicator

The multifaceted nature of mobility means there are numerous indicators that we could use to gauge its effectiveness. These could include level of access to a bus stop, frequency of local public transport, number of electric vehicles, creation of active travel schemes, amount of road reallocation, number of vehicles in circulation, length of connected bike lanes or the percentage of journeys taken by walking or cycling. Based on city data availability and the specific policy aim for zero road injuries and deaths, **we have selected an indicator of people killed or seriously injured in road accidents.**

Threshold

While a threshold of zero road deaths or injuries seems ambitious, it has now been set as an official target by Leeds City Council. **For this reason, we consider the zero figure as the social floor’s threshold that Leeds should not exceed.**

City snapshot

In 2019, there were 357 people in Leeds seriously injured or killed in road traffic collisions.³² Of these, over 60 were cyclists, 90 were pedestrians and 40 were children. The total figure represents 45 cases per 100,000; for comparison, Doncaster has a figure of 80 per 100,000. **Clearly, Leeds is outside our safe and just threshold, but it has set an ambitious new strategic direction to get back within it.**

8. Culture

Culture includes more formal elements such as art, history, music and dance, but it also refers to a broader way of life based on our shared heritage and identities. Both these elements are essential to a thriving Leeds. It is through culture and cultural practices such as festivals and traditions that people express and celebrate their values and heritage, take pride in their community and forge strong connections with others locally and globally. Culture is also about how open, tolerant and understanding a place is, its sense of self and ability to learn and change.

City target

In its Best Council Plan 2020 - 2025, the Council envisages that **“Leeds will be a city where local culture and sporting activities will be available to all”**.

Indicator

As with many of the other dimensions, culture can be characterised and depicted through numerous different indicators. The Council’s Best Council Plan performance scorecard, which measures the progress of culture in Leeds, has KPIs referring to the number of visitors to a range of venues and events and the number of jobs in the culture sector in Leeds.

Due to the availability of data, for this snapshot we have adopted the former, looking specifically at **the number of visitors at local authority run museums and galleries in Leeds**. There are limits in using this indicator as a measure of thriving as it is unclear how many visitors are city residents. It also does not capture cultural activities in non-local authority venues.

Threshold

There is no available data at the local-authority level in the UK that either compares or sets a comparative threshold for what might represent a sufficient level of cultural access. Therefore, this is one of the dimensions where we are unable to establish a threshold.

Leeds Snapshot

What we do know is that Leeds Museums & Galleries is the largest local authority-run museum service in England, with 1.7m visitors across its nine sites in 2018/19. In addition, Leeds has a very strong calendar of cultural activities and festivals and has embarked on an ambitious programme of events under the Leeds2023 banner. In the absence of comparative data, **our assumption is that for culture, Leeds is currently within the safe space of the Doughnut.**

Going forward, to paint a fuller picture of culture and cultural access in Leeds, a broader range of indicators should be developed and explored, with greater exploration of how participation and access, for example, varies across income and axes of identity such as gender and ethnicity, as well as assessing the actual impact that cultural visits have on people’s lives.

9. Jobs

Work and jobs are fundamental to thriving. They facilitate the exchange of goods and services that are essential to everyday life, direct local economies and are also key to personal health, wellbeing and

quality of life more broadly. Well paid, secure employment is central to poverty alleviation, reducing health inequalities and increasing social security. However, this goes beyond just measuring the quantities of jobs available. Many people are under- and overworking and poor distribution of work is a major issue in UK society. In 2018, people from working families represented over half of those living in poverty.³³ During the recovery from the 2008 financial crash, whilst employment increased, job quality decreased with steep reductions in real wages and productivity.³⁴ This set the precedent for the boom in self-employment, zero hours contracts and agency work, which, according to Resolution Foundation research, composed two-thirds of post-crisis jobs in 2018.³⁵

Leeds target

Leeds has a broad employment target to have a strong economy with quality local jobs. Clearly, more detail is needed in terms of what the concepts of strong and quality mean in practice.

Indicator

Leeds does have a growing economy, and to get a sense of whether people are thriving we need to look beyond the number of jobs generated. The ideal indicator for this social dimension is 'insecure work', defined by the Living Wage Foundation as non-permanent work, self-reported volatile pay or hours or low-paid self-employed people.³⁶

The most appropriate way to measure this social dimension would be to use these kinds of definitions, but currently insufficient data exists at the Leeds level. Due to this data gap, **we use as an indicator ONS estimates for the number of residents in Leeds who are earning below the National Living Wage and the Living Wage Foundation's Real Living Wage.** This data is based on the Annual Survey of Hours and Earnings (ASHE) and though it should be taken with caution at the Leeds level,³⁷ it is well established as an indicator in the Leeds City Council's Joint Strategic Assessment³⁸.

It is widely recognised that low wages are closely aligned with insecure work. The National Living Wage is a legal minimum wage for employees of 23 years old and over as of 2021, previously mandatory for all aged 25 and over, and is based on median earnings. In 2021, the national Living Wage outside of London was £8.72. The Real Living Wage is set annually by the Living Wage Foundation and is calculated according to the cost of living. It is voluntary for employers and for outside of London in 2021, it stood at £9.50.

Threshold

As there is no specific Council target, we have identified the social floor's threshold based on a 2018 European analysis of low pay assessing the percentage of employees earning less than 105% of the minimum wage. The best case was Belgium, with only 1% of those in employment earning less than the minimum wage.³⁹ While Belgium is a much more progressive social and economic context than the UK, **we use this figure of 1% of working residents earning less than the minimum wage as a threshold to aspire to.**

Leeds snapshot

In 2021, 9.9% of all Leeds working residents are estimated to have earned less than the National Living Wage, affecting 30,294 FTE residents. When using the Real Living Wage, this figure increases to 21.5% (65,900 residents).

At present, given nearly 10% earn less than the National Living Wage, Leeds falls considerably outside the minimum social floor of 1%. Going forward, future analysis of work in Leeds needs to focus on the nature and quality of work, under- and overworking, in-work poverty, job security and the extent and nature of the green jobs transition.

10. Income

Ensuring everyone has adequate income is another aspect of thriving. This varies hugely by place and reflects the costs of goods and services, much of which is determined nationally. However, there are many aspects that are determined locally, especially food, energy, housing and transport provision.

City target

Leeds has an ambitious income-related target for “everyone in Leeds to [...] earn enough to support themselves and their families”.

Indicators

Determining the indicators that best gauge the level of income that enables thriving is a complex task. How much income is enough depends on the specific needs and context of each household. It also raises issues of expectations of consumption and what level provides a good life.

Indicators would have to be subjective to suit the Council’s qualitative target. While further work needs to be done here, **we have chosen the extent of in-work poverty as an identifiable and manageable indicator for Leeds**. However, precise data for Leeds is unavailable. We have therefore drawn from Leeds Observatory’s Poverty Factbook, and downscaled estimates from the UK level (5.5 million adults, which is 14% of all working age adults in 2019/2020), based on ONS’s Mid-year Population Estimates for Leeds in 2019 (516,100 working age adults).

In-work poverty is a critical issue for Leeds. Low pay coupled with high costs (e.g., housing, energy, water, Council Tax or broadband), low skills or education, poor social security systems and a lack of affordable childcare all undermine an ability to thrive⁴⁰⁴¹ and highlight the intersection across dimensions of the local-social lens. This link between social dimensions becomes increasingly pertinent when looking at the impact of poverty, causing issues in health, housing, drug and alcohol abuse, relationships and family and increasing the likelihood of being the victim or perpetrator of crime.

Threshold

We have interpreted the statement of “everyone in Leeds” earning enough to support themselves and their family as a means for setting the **minimum social floor for in-work poverty at zero people**.

City snapshot

In 2021, an estimated 70,822 (13.7%) of working age adults across the city are estimated to be affected by in-work poverty after housing costs.⁴²

Using our threshold of in-work poverty as zero, Leeds falls below the social floor, with over one in ten working adults facing in-work poverty. This is a sobering baseline. More work needs to be done to explore how this varies across communities along various axes of identity, such as black and brown communities, disabled people and those with immigrant status.

11. Education

Education is integral to enabling an individual to achieve many of the other social dimensions, particularly around being able to think, feel, communicate and engage with the world around them. It provides essential skills and knowledge to obtain decent work, and to participate in society politically for example. We also know that education participation and outcomes are negatively impacted by social background and poverty, with children from low-income backgrounds achieving low education outcomes, resulting in lifelong disadvantages and a pattern passed on to their children⁴³. Poorer health

outcomes are linked to a lower education participation and attainment, as an example of one lifelong disadvantage. Education is also important across an individual's whole lifetime to offer the opportunity to retrain and upskill, which is linked to greater social cohesion, active citizenship and personal development, in addition to better employment on an individual and societal level.⁴⁴

Leeds target

Leeds has a bold education target to ensure that every child and young person in Leeds has the opportunity and support to achieve their potential.

Indicator

There are a range of possible suitable indicators, such as educational outcomes at various Key Stages, transition rates between Secondary and Tertiary Education, and opportunities for and participation in lifelong learning.⁴⁵ **We have selected the percentage of 16- and 17-year-olds in full-time education or training**, which also gives us the estimated figure for the percentage of young people of this age considered Not in Education or Training, known as NEET. To get a broader picture of Leeds' performance in Education, clearly much more should be considered.

Threshold

There is no stated objective that frames the Council's target. Therefore, we have established a comparator threshold that feels realistic and useful based on a high-performing English Local Authority area. **Barnet is one of the best-performing areas in the UK. Based on Barnet's figure of 96.6%, we suggest a minimum social floor of 97% of 16- and 17-year-olds in full-time education or training in Leeds.**

Leeds snapshot

Based on figures provided by the Department for Education at the Local Authority level from March 2021, **85.9% of 16 and 17 year olds are in full time education or training in Leeds.**⁴⁶

This is lower than the English national average of 87.4%, but higher than the regional average for Yorkshire and the Humber (84.5%). London outperforms this with an average of 93.4% of 16- and 17-year-olds in full time education or training. The highest scoring local authority is the City of London (100%), however there are 50 or less young people of this age group (16- to 17-year-olds) identified in that local authority and therefore this is not a comparable benchmark. Close behind this, Barnet has 96.6% of 16- and 17-year-olds in full time education or training.

At 86%, Leeds does not meet our social floor threshold of 97%, but this gap could be closed in the near future. Going forward it will be crucial to focus on a range of aspects of education including cost and accessibility across the various stages of education, especially to post-compulsory education.

12. Energy

Access to affordable energy for heating, cooling, light and cooking is essential to a thriving life. Currently there is a global energy crisis, in which soaring gas and oil prices are forcing many across the UK into even more intense fuel poverty.

Leeds target

Leeds has a bold target for "all homes" to be "of a decent standard and that everyone can afford to stay warm".

Indicator

We have adopted a measure of fuel poverty as an appropriate indicator. In England, Fuel poverty is measured using the Low-Income Low Energy Efficiency (LILEE) indicator. Under this indicator, the Government defines a household as fuel poor if they are living in a property with a fuel poverty energy efficiency rating of band D or below, but also after spending the required amount to heat their home, they are left with a residual income below the official poverty line.

They note that household income, household energy requirements and fuel prices as the most important components to determining whether a household is fuel poor.⁴⁷ Fuel poverty is therefore closely linked to housing quality, but research shows it has drastic impacts on physical and mental health for adults and children.⁴⁸

Threshold

Given the Council's ambitions for "everyone" to be able to afford to stay warm, **we have set the social floor's threshold for zero Leeds households to be in fuel poverty.**

Leeds snapshot

The most recent government fuel poverty statistics from 2019 indicate that 57,492 households in Leeds – 16.8% – are in fuel poverty. This is in line with Yorkshire and the Humber, but higher than the English national average of 13.4%.⁴⁹ **At nearly 17%, Leeds falls below the safe and just social floor.** Future work also needs to explore how this varies across Leeds' individual communities and the extent to which households have access to local and secure green energy specifically.

13. Peace & Justice

Peace and justice mean different things to different people. This dimension covers everything from rights to recognition and the freedom from threat of physical harm. This is an all too often-overlooked aspect of people's ability to thrive.

Leeds target

The Council's Best City Plan stats: "We want everyone in Leeds to be safe and feel safe".

Indicator

Peace and justice as a social dimension refers to the subjective feeling of safety, as well as actual physical safety, and can be measured by a range of indicators. Such indicators may include violent and sexual crime rates per population, perceptions of safety, rates of antisocial behaviour, or level of trust in the community. Reliable data is difficult to find for many of these indicators. The most reliable and comparable indicator is qualitative impressions of feeling safe in one's community.

Threshold

With the Best Council Plan ambition in mind, we set the social floor's threshold for peace and justice to be for everyone in Leeds to have both.

Leeds snapshot

In 2020, of 5,618 Leeds survey respondents, **84% of residents felt safe in their community.**⁵⁰ This is higher than the West Yorkshire average of 81%. This snapshot is from a limited sample size, but it does point towards generally satisfactory levels of safety in Leeds. These figures are limited and partial in nature and therefore must sit alongside other data. For example, in the 12 months up to December 2021, there were the equivalent of 55 recorded violent and sexual offences per 1,000 people in Leeds.⁵¹

Leeds falls below the safe social floor for peace and justice and more work is needed to assess what creates a sense of safety across Leeds more broadly. We recognise that future work and conversations about peace and justice in Leeds should consider racial, gendered and age-related injustice both in the community, workplace, schools and colleges.

14. Social Equity

Like peace and justice, social equity can also mean different things to different people. It speaks to fairness and justice, relating to the distribution of public services, social policy implementation, social participation, recognition in society and beyond. While equality refers to everyone having the exact same resources or opportunities, equity highlights the oppressions that some groups face and advocates for resources and opportunities to be distributed according to need.

Social equity, then, addresses existing deprivations based on factors such as gender, ethnicity, religion, ability, geographical location and structural poverty. Society's historic inability to address the inequalities around these axes of identity hinders access to essential social services, such as health, food, housing, education, information. These can often lead to persistent intergenerational poverty and inequity. Social equity is of fundamental importance to this whole approach and is a cross-cutting dimension underpinning a thriving life for all across each and every of the sixteen social dimensions.

Leeds target

There is no precise city target that addresses the complexity of social equity. However, we have chosen a focus on child poverty, due to the important role that this plays in shaping the rest of a person's life course. In its Child Poverty Strategy 2019 - 2022, titled 'Thriving,' Leeds City Council states: "we want to ensure that poverty presents no barriers for our children and young people, and we want all people to have access to the same opportunities, regardless of their background".

Indicator

Child poverty is a result of many different, intersecting social inequities and is an internationally recognised area of concern, with UNICEF highlighting the link between social inequity and intergenerational poverty.⁵² **Thus, we have selected a broad indicator for child poverty, focusing on the percentage of children under 16 living in poverty before housing costs.**

Poverty here is taken to mean relative poverty, where a household's income is less than 60% of the medium income nationally, therefore falling below the poverty line. A more accurate measure would be to look at the levels of child poverty after housing costs, though this data is not available at the Leeds Local Authority scale.

The impacts of child poverty are wide-ranging and endure throughout an individual's life course. It is associated with lower educational attainment and skill levels, which underpin later inequalities across employment and income, as well as driving damaging behaviours such as smoking and increasing the likelihood of exploitation and abuse⁵³. Clearly, to establish a greater understanding of social equity across Leeds, this dimension should be looked at with specific reference to each of the other aspects of the social dimension, across, for example, age, gender, ethnicity, race and disability.

Threshold

Leeds' Child Poverty Strategy centres on "mitigating the impact of poverty and working with organisations to reduce the barriers that children, young people and families who live in poverty may experience". Despite a clear focus on child poverty as a critical issue in Leeds, the strategy lacks a measurable target for reducing it.

In 1999, then-Prime Minister Tony Blair set the ambitious target to end child poverty by 2020. This ambition was reaffirmed by Conservative policy director Oliver Letwin in 2006.⁵⁴ This was since watered down to a target to have less than 10% of children in relative poverty before housing costs, becoming enshrined into law in 2010 under the UK Government's Child Poverty Act.⁵⁵ **We therefore use this 10% target as the social floor's threshold for households with child poverty.**

Leeds snapshot

The most recent official government data from the Department for Work and Pensions indicates that between 2019 - 2020, **24% of children aged 16 or under in Leeds were living in poverty before housing costs; 36,496 in total.**⁵⁶ We expect this figure to increase substantially once housing costs are accounted for. Calculations by the Child Poverty Action Group find that children from Black and Ethnic Minority groups are more likely to live in poverty, highlighting the need for greater scrutiny across this indicator to understand the picture of social equity across different groups.⁵⁷

Compared with the UK national average of 19%, Leeds has significantly greater levels of child poverty. Though regional statistics for Yorkshire and the Humber are not available, compared with child poverty rates before housing costs across West Yorkshire, Bradford fares the worst at 38%, with Wakefield the lowest at 21%. For reference, Leeds compares relatively well to other UK cities, such as Manchester (34%), Sheffield (25%), and Birmingham (37%). **Like many other UK cities, Leeds is falls below the social floor's safe threshold – significantly more so when compared to Blair's original target of 0%.**

15. Political Voice

Political voice is critical to any democracy. This means that the citizens of a place have the knowledge, resources and power to hold political representatives accountable and have a say in the decisions that directly affect their lives and local place. In a city built for thriving – and one that embraces diversity across people, communities, towns, cities and regions – political voice and participation are an essential means by which local economies understand and respond to the local needs, aspirations and strengths of their population. In a place that is distributive rather than divisive, political empowerment and a strong citizen voice is central to fostering co-creation and representation.

City target

“Strong, engaged and well-connected communities” is one of the twelve strategic priorities of Leeds' Health and Wellbeing Strategy. We have interpreted this priority as a broad ambition that relates to political voice and empowerment.

Indicator

This dimension speaks to many aspects of political engagement and participation, so the potential indicators are numerous. Indicators could include self-assessed perceptions of one's ability to influence local decisions, local response rates in public consultations, policies introduced as a result of participatory and deliberative methods (e.g., citizens jury, citizens' assemblies), number of successful petitions, levels of volunteering or local political participation.

Very little data exists that reflects these complex aspects of our political lives. Therefore, we have drawn on indicators where data does exist – in this case, **voter turnout in Leeds City Council's local elections in 2018.** We have chosen to look at 2018 despite a more recent local election in Leeds from May 2021, due to the potential influence of the ongoing pandemic and government restrictions and the unavailability of comparable data. We recognise that voter turnout is a very blunt indicator for painting the full picture of empowerment and political voice. Future work will consider a greater range

of indicators and explore the meanings and extent of empowerment in follow-up workshops – particularly with those who face structural and systemic oppression.

Threshold

There is no clear target relating to participation and voter turnouts in local elections in Leeds. We have therefore used the local authority with the highest voter turnout – Richmond-upon-Thames, with 51% – as the social floor’s best-case threshold for this dimension.

Leeds snapshot

In the latest Electoral Commission’s data for the 2018 Local Elections across England, average voter turnout in Leeds was 34.3%.⁵⁸ This is very similar to the English average at 34.7%. The lowest turnout was in Hartlepool at 24%. Using voting as a measure of political voice, at 34%, Leeds falls below our proposed social floor of 51%.

While voter turnout in Leeds is consistent with national averages, more work is needed to explore a broader range of indicators that measure the extent of participating in local decision-making and political life. Further research should also consider the levels of participation across age, ethnicity, gender, income levels and other axes of identity.

16. Equality in Diversity

Equality in Diversity is about recognising, celebrating and harnessing the rich diversity of our cities and communities. It's about social justice, racial equity, gender equity, and ensuring that diversity in our communities is valued, not discriminated against. In a city as culturally diverse as Leeds, home to over 169 nationalities, equality in diversity is integral to thriving, ensuring that everyone has a claim to a thriving life and leaving no-one behind.

City target

The Council’s Best City Plan states: “Underpinning all our work is our ambition for Leeds to be inclusive, where all citizens are treated fairly”.

Indicator

Equality in Diversity is a broad social dimension covering equality across gender, race, ability and sexuality. Therefore, adopting a single representative indicator does not provide an accurate picture of the diverse experiences across Leeds. Indicators could for example look at political empowerment, education attainment, representation, prejudice, racism, health outcomes, economic participation, domestic abuse rates, crime rates, broken down by gender, race, religion, for example. These examples demonstrate the interconnections between the social dimensions.

While there are several we could have chosen, **we have selected the broad indicator of hate crimes - a crime against a person because of their race, religious belief, disability, sexual orientation, political opinion, gender identity or disability.**⁵⁹ Future iterations of the Leeds snapshot should further unpack this dimension, taking a deeper look across the specific subgroups.

Threshold

Derived from the Leeds City Council’s ambition for “Leeds to be inclusive, where all citizens are treated fairly” **we have interpreted the social floor’s threshold of zero hate crimes per 100,000 population.**

Leeds snapshot

Drawing on data from Leeds City Council’s Best Council Plan scorecard, in the twelve months to the end of September 2021, there were 3,654 reported hate crimes in Leeds⁶⁰. Using ONS population

projections for Leeds, that is roughly 457 hate crimes per 100,000 population. Comparing this with figures provided by West Yorkshire Police in response to a Freedom of Information request, this figure is up from 1,789 reported hate crimes in 2016, and 711 in 2014⁶¹. These figures are assumed to significantly underreport the total number of hate crimes as many people will not report it to the police.⁶²

To put this in context, the West Yorkshire Police has the highest offence rates for all hate crimes across England and Wales (374 per 100,000 population), whilst North Yorkshire had the lowest at a rate of 82 per 100,000 population. Across England and Wales, there were 208 offences per 100,000 population.⁶³ **At 457 reported hate crimes per 100,000, there is some way to go before Leeds meets our socially just threshold of zero.**

Local-Ecological lens: how can Leeds protect and support local nature?

Our second question focuses on local nature. Healthy and thriving ecosystems are the cornerstone of all life in our cities - human and non-human. People thrive from the quality and extent of their local ecosystems in all sorts of ways - cooling the air, sequestering carbon, storing and cleaning water, recycling waste. Leeds is a large metropolitan area with significant green space and ecosystems and natural habitats. The purpose of this lens is to explore their status and how they are treated and managed. We ask the simple question, how can Leeds protect and support local nature?

The key aspects are the co-benefits between ecosystem services – for example, how cleaner air supports public health, or how land management supports reductions in carbon emissions. There are also key links with our social dimensions, both global and local. Policy and action need to ensure that improvements to local ecosystems improve the lives of the most vulnerable people in Leeds, who are also the people with the least access to green space.

The Doughnut methodology uses indicators across four key ecosystems of water, land, air and matter to create the local-ecological lens. Below we present an initial Leeds snapshot for each. What we focus on is how nature operates each service and how Leeds can mimic these natural approaches to improve and regenerate each one.

The local ecological dimension in Leeds: a baseline assessment

1. Water

Water is one of the four key ecosystems that creates a thriving life. There are two aspects to this: provision of clean water and management of floodwaters.

1. Provisioning renewable, clean water

Freshwater from inland sources is critical to providing Leeds with clean and renewable water. Clean water is fundamental, but it is not a given. It is easily and constantly polluted by our current ways of managing and provisioning it.⁶⁴ In nature, natural hydrology operates a cycle of evaporation, condensation and evapotranspiration to provision a renewable source of clean water. Leeds does this through its diverse river catchments, mainly through the river Aire and also part of the Calder and Wharf catchments. Leeds is also defined by several becks which shape the river - the Killingbeck, Meanwood Beck and Holbeck as well as the Canal water ecosystem. It has several wetlands at St Aidan's and Fairburn which are key water habitats. In sum, Leeds has a diverse and extensive water ecosystem, all of which plays a role in the wellbeing of people and nature.

For this aspect of the local-ecological lens, it is critical to assess Leeds' water provision and the health and quality of its inland wetlands for a number of reasons:

- The foundational role that water plays in all aspects of life in Leeds and its links in supporting other ecosystem services by supporting temperature regulation, reducing the urban heat island effect, detoxifying waste matter and recharging groundwater;
- The influence of clean water for drinking and domestic use in washing and cleaning, but also the supply of water for industries like energy provision, transport and agriculture; and
- Water's impacts on other Doughnut lenses, especially around social wellbeing.

City target and snapshot

As we saw in the local-ecological lens, Leeds City Council does not currently have an established target for the provision of renewable and clean water. There are no targets or indicators in terms of cost, coverage and quality of water supply. This is partly understandable in a context where there is no significant perceived water provision issue at a daily level.

We use the Environment Agency's assessment of the quality of river water as a way of creating a city snapshot. **A rating of Good indicates that a river is close to its natural state. In 2020 the River Aire failed to achieve a 'Good' rating. An appropriate target for the city would be to achieve a good rating for all water courses passing through Leeds.** It was ranked Moderate which is classed as a "failure" to pass pollution tests and strongly suggests concerning levels of pollution. Only 14% of English rivers were of a Good ecological standard and all of them failed pollution tests, which shows the challenge for all cities in this domain.

The UK Government's Department for Environment, Food and Rural Affairs (Defra) highlighted its 25 Year Environment Plan target for 75% of UK waters to be "close to their natural state", or at a Good rating.⁶⁵ This offers a clear target for Leeds to aim for. Clearly this is only one indicator of the provision of water and future work should take into account the ecological health and quality of the wider wetlands in and around Leeds.

What's already happening in Leeds?

There is work being done in Leeds that serves as a good foundation for further future action so it can regenerate its water ecosystem. In 2008, Yorkshire Water planted a reed bed and installed a septic tank at the now-closed Monkton Colliery. This enables a natural, zero-carbon sewage treatment system.⁶⁶ Yorkshire Water is also planning a large-scale circular economy initiative at its Esholt reprocessing plant.

To work like nature, what more could Leeds do?

Given how critical renewable and clean water is for Leeds, the city would do well to reintroduce elements of natural hydrology. Opening up culverted becks, increasing the use of natural filtration through areas like reed beds and reducing water consumption would all help to protect natural aquifers. Beyond the 'pave, pipe and pump' approach, blue-green infrastructure innovations can be used to work with nature. These include rain gardens, bioswales, sustainable drainage ponds, urban wetlands and green roofs/walls, all of which can be enabled by changes in the planning system. Expanding urban wetlands is also a central part of the regeneration of the water ecosystem.

All these offer co-benefits around urban heating, carbon storage and social wellbeing. A natural hydrology-led approach would lead to better energy efficiency and water bills, ease pressures on biodiversity, enhance human wellbeing, save on water resources and reduce the cost of artificial filtration, which all bring social and financial benefits.

2. Managing floods and water run-offs

Leeds is flood prone. The floods of 2015 are testimony to devastation that flooding can do across large parts of the city. Much of this is due to its topography and weather patterns, but the frequency of floods is increasing as development continues along floodplains. Climate heating is increasing extreme weather events and human activity is altering natural water courses, through damming and culverting, all of which increase the severity and frequency of flooding. Nature itself has its own ways of mitigating floods and run-offs; plant life slows down the run-off of surplus water, permeable surfaces and wooded areas capture rainwater and allow it to replenish groundwater levels, rather than spilling over into populated areas.

By contrast, Leeds has experienced heavy development of land with hard surfacing, preventing this natural water absorption and management which drives faster, more frequent water run-off. This development also erodes Leeds' wetlands and natural water storage areas. In addition to wastewater being disposed of into sewers, this only compounds the problem. Flooding and excess water run-off lead to detrimental impacts on Leeds' people and nature: loss of homes, businesses, infrastructure, local ecosystems and habitats and pollution of water supplies are but a few. It is therefore critical to assess how flooding and run-offs are being managed for the Local-Ecological lens.

City target and snapshot

According to the Environment Agency, **over 11,000 properties in Leeds are at medium to high risk of being flooded.**⁶⁷ Clearly, this does not fully account for the breadth of the risk that flooding presents to local habitats and ecosystems, but provides an initial picture of the risk to human life and infrastructure. **An appropriate target for the city would be to eliminate all flood risk, minimise future floodplain development, whilst also increasing the use of natural flood management.**

Leeds City Council is reducing flood risk through its Local Flood Risk Management Strategy and its multimillion pound Flood Alleviation Scheme (FAS). This multi-year programme of work aims to increase flood resilience across the Aire Catchment, as well as parts of the Wharfe. Activities have included:

- Moveable weirs: to reduce flooding by up to 1 metre
- Merging the river and canal: to lower water levels during a flood
- Building flood defence walls and embankments: to protect specific areas
- Natural Flood Management (NFM): woodland creation, new storage ponds, river rechanneling to slow flow
- Trees and vegetation: planting 3 tree for every 1 removed, being sensitive to impact on wildlife and vegetation
- Traditional engineering: further flood defence walls and new and improved structures

To understand the scale of the challenge, the current Phase 2 of FAS aims to protect 1,048 homes and 474 businesses by providing a "one in a 200-year" level of flood protection, reducing flooding to having a 0.5% chance of occurring in any given year and ultimately protecting against "similar flooding to Storm Eva".⁶⁸

At the moment, current activity and investment in flood management seem to reflect the level of the challenge and it is encouraging that policy and resources is now focused on the impacts on nature and the power of natural management methods. As weather patterns become more extreme, this approach is likely to be further tested.

What's already happening in Leeds?

In addition to major flood management through the Flood Alleviation Scheme, Leeds City Council is encouraging sustainable urban drainage at new developments. For example, housing developments at CITU and Lilac have integrated Sustainable Drainage Systems (SuDS) that mimic nature in their design.⁶⁹ This approach to natural flood management is likely to be rolled out further through new priorities laid down in the Local Plan Update.

To work like nature, what more could Leeds do?

It's worth noting that in the current iteration of the Local Plan, strengthening policy on SuDS is in the process of being made a requirement, but whether there will be concrete targets or metrics is yet to be seen. All new developments need to feature permeable surfaces, hard tarmacked surfaces need to be reduced. Policies to support the paving of private gardens and rivers would also support this.

Leeds must also prioritise natural flood management, rather than just traditional engineering in order to get the most co-benefits from mitigation and adaptation methods. Benefits include improving and managing water quality; enhancing biodiversity; and providing amenity. There are a number of aspects to this water centric design including rain gardens, permeable landscapes, water swales and maximising soft landscaping. Vegetation can improve natural water filtration.

2. Land

Land is the second dimension of this Local-Ecological lens. Land plays three key roles as an ecosystem service: carbon sequestration, supporting biodiversity and energy harvesting.

a. Carbon sequestration

Land plays a vital role in accumulating and storing carbon dioxide, one of the main GHGs. Therefore, the way land is managed can play a key role in our ability to tackle climate change. Trees, plants and soil are all part of the carbon cycle, absorbing, making and storing carbon. Trees and plants play a particularly central role. They absorb carbon dioxide through photosynthesis, using this to grow organic matter and literally store carbon. They also clean the air by releasing oxygen and reducing CO₂ emissions in the atmosphere. In one year, an acre of forest can absorb twice the carbon dioxide produced by an average car's annual mileage. Without these precious resources the planet would not have a safe carbon balance. They are fundamental to a safe life on earth for humans. Protecting and enhancing these resources is a key challenge going forward.

City target and snapshot

When Leeds declared a climate emergency in 2019, the ecological emergency was recognised too. An ambitious tree planting strategy was outlined as one way to tackle this. There is now a widespread recognition that trees play a key role in the city's efforts to tackle climate change. **2019 saw the introduction of the Leeds Tree Strategy, which aims to plant 5.8 million trees over the next 25 years.** This involves creating woodland on 1,250 hectares of Council-owned land at a rate of 50 hectares each year.

Currently about 17.1% of Leeds Metropolitan area is tree canopy (9,434 hectares). The Leeds Tree Strategy aims to increase this cover to 33%, an additional 9,000 hectares. The current Leeds tree cover average is higher than the UK average of 13%. There is a significant disparity between higher and lower income wards. More affluent Roundhay, for example, has approximately 30%, with less affluent Beeston and Holbeck at less than 10%. **The current tree strategy is an ambitious and appropriate target for the city; the key challenge is to maintain momentum, ensure the future release of land and the equitable distribution of planting.**

What's already happening in Leeds?

Tree planting against the strategy is continuing at pace but is falling short of the number of hectares needed to be converted to woodland each year. Moreover, once Council land is fully utilised for tree planting, there will be challenges in terms of accessing private land to meet ambitious annual targets.

Tree planting in Leeds is part of wider efforts under the White Rose Forest community forest project, aiming to plant 7 million trees (3,500 hectares) across North and West Yorkshire, significantly increasing canopy cover in the region. In turn, this is part of the Great North Forest. Further changes are likely to be brought forward through the Local Plan Update and its focus on carbon sequestration.

To work like nature, what more could Leeds do?

A range of further interventions is needed to ensure Leeds maximises its land ecosystems for carbon storage. This would include regulations on further urban tree loss, especially those seen along rail corridors; increased natural flood management and reforesting river corridors; a review of Leeds' agricultural hinterland and introducing options to maximise it for carbon storage rather than sheep and livestock grazing; the use of mosses and other carbon sequestering plants; and the conversion of impermeable landscapes (especially car parks and retail malls) to community forests and gardens.

b. Supporting biodiversity

Due to the rapid decline of animals and plant species, it is now a policy imperative to support biodiversity. Since the 1970s, the continued expansion of urban development across the world has put nature under threat. Our wellbeing is deeply interconnected with nature, for food, recycling waste, medicines, energy and carbon storage. Therefore, it is an imperative to act. The natural landscapes around us provide habitats for plant, animal and insect species, creating conditions for them to thrive. These species in turn play a critical role in other ecosystem services like food supply, clean air, pollination of plants, pest control, wastewater treatment and soil maintenance. It is essential, then, to support biodiversity so that these processes can continue. Further, connectivity for biodiversity is key so that species can move between natural areas and ecosystems can interact. Put simply, for people to lead safe and thriving lives in cities, we must protect and expand biodiversity.

Leeds does have major green spaces, parkland, green belt, agricultural and river zones and green corridors. This an excellent base from which to protect and enhance biodiversity and offer a range of benefits to the city's residents and visitors. However, like many cities across the world, Leeds seeing incremental loss of natural environment and habitats due to the continued expansion of its urban area. Major housing developments in the east of the city, the continued growth of car volumes, the expansion of suburban and ex-urban retail and employment parks are all putting biodiversity under pressure.

City target and snapshot

As of November 2021, Leeds City Council legally requires all developments to achieve a minimum 10% net biodiversity gain, which should be delivered onsite and will soon be mandated through the nationwide Environment Act. A net gain is defined as "delivering more or better habitats for biodiversity and demonstrating this through use of the Defra biodiversity metric".⁷⁰ The National Planning Policy Framework requires this net gain to be achieved in a measurable way.

One way of measuring biodiversity is through the extent of nature reserves in a particular place. **Leeds has 1 hectare of Local Nature Reserves per 1,067 people living in the city.** This meets Natural England's ANGst (Access to Natural Green Space Standards) threshold, and for comparison we note that Wakefield has almost 2 hectares per 1,000 people.

While the Leeds metropolitan area contains extensive non-urban areas, there is significant inequality of access to green space. The large green hinterland is less accessible to the urban population, and in large part takes the form of degraded and poorly managed grazing land. Moreover, biodiversity is much more prominent in the north and east of the city. The motorway network and proximity to Bradford's urban area mean the west and south of Leeds have far less biodiversity. **A useful target for the city would be to continue to expand local nature reserves and ensure they are equitably spread throughout the city.**

What's already happening in Leeds?

The Council has a number of existing policy frameworks for biodiversity, including requirements to deliver biodiversity gain in its Core Strategy Policy G9, as well as its Leeds Habitat Network and Greenspaces strategy. More recently, it has formally recognised the need to address biodiversity loss. It has set out policy aims that focus on biodiversity gains in regulatory frameworks, using recognised assessment metrics and develop wider schemes and plans to improve biodiversity.

St Aidan's is a recent exemplar case. The Council has developed a new nature reserve at St. Aidan's in partnership with the Royal Society for the Protection of Birds (RSPB). What was previously an old mineral site is now 400 hectares of land restored specifically for nature, including reedbed, wetland, meadows and woodland, with 12km of public trails.

To work like nature, what more could Leeds do?

To protect and regenerate biodiversity and reverse species loss, further and more rapid action is needed in Leeds. Leeds needs to commit to ambitious net biodiversity gain across the whole city, making sure these are equally shared across all Leeds neighbourhoods and communities. The creation of Aire Park is a major addition and shows the Council's commitment to this agenda. Building on this, we need to create green 'corridors': wild areas that are connected up, so that nature can restore and regenerate according to its own patterns.

These corridors must radiate out from the city centre and feature break points and crossing points across existing road, housing and retail infrastructure. **The key issue is for Leeds development to allow space for nature.** The Council can accelerate plans for a biodiversity habitat bank on local authority-owned land, thereby creating a source of income as well as public access to the social, environmental and just benefits of increased local biodiversity. Additionally, work should be done to ensure that the tree planting initiatives do not disturb native species or threaten microecosystems.

c. Harvesting energy

In nature, plants harvest energy from sunlight through photosynthesis. The application of the principles of biomimicry shows us that we can and should harness energy from the natural world in a similar way. Beyond larger tech solutions around hydrogen production and energy from waste, cities have many natural methods available to them, ranging from solar photovoltaic infrastructure to capturing energy from flowing water and using small-scale wind turbines. In this sense, Leeds' natural landscapes offer an untapped energy bonanza. Its major waterways, roofs and hilltops could provide plentiful, clean secure, renewable energy. In addition, biomass could be harvested from land converted to mass forestry in its hinterland.

City target and snapshot

Leeds City Council had a target of producing at least 75 megawatts of installed, grid-connected renewable energy capacity by 2021.⁷¹ In the year 2018–2019, there were 43 megawatts of installed, grid-connected renewable energy capacity. However, there was a consented capacity of 77.9 megawatts, which highlights a delay in the implementation of the work.⁷² It is worth noting that the Council only has data available for the capacity, not actual production. **There is some way to go for Leeds to harvest all the energy available in the metropolitan area and an updated target could be based on a realistic assessment of all the harvestable energy across the city.**

What's already happening in Leeds?

Leeds City Council is making great effort to increase installed renewable capacity. One pioneering example is Yorkshire Water Bioresources, which is using sewage to produce renewable energy. In the year 2020–2021, Yorkshire Water Bioresources produced 147,500 dry tonnes of sewage sludge, which

was subsequently treated, recycled and used to produce renewable energy through a process called anaerobic digestion. The company also uses the heat produced by this technology as a by-product. That year, 199,000,000 kilowatt hours of renewable energy were produced through these methods.

To work like nature, what more could Leeds do?

Following nature's lead, Leeds could increase land allocation in the Council's Local Plan Update to support expanded renewable energy generation. This could take many forms:

- Land transformation – all available surface car parks, surplus south-facing land and flat roofs on residential and commercial buildings could be converted into solar photovoltaic production;
- Waterways – these provide significant capacity for microturbines and water pumps.
- Hinterland – to provide huge biomass capacity; and
- Topography – in Leeds, this lends itself to increased onshore wind capacity, especially community-owned

Additional benefits would come from supporting municipally- and community-owned renewable energy co-operatives to lead the installation process, especially in terms of employment, local buy-in and cost savings. A major study could identify and plan roll-out in these areas.

3. Air

Air is the third domain of the Local-Ecological lens, which is divided into two dimensions: purification and temperature regulation. Having clean air is central to safety and thriving, especially in terms of health at all stages of life.

a. Purifying air

Thriving nature is an extremely powerful force in air purification and nowhere is this process more starkly reinforced than in cities. Plant leaves can intercept ultrafine particulate matter from the air and break down pollutants, which are persistent in highly urbanised areas like Leeds. Air quality is a major public health issue. It has been widely recognised as a contributing factor to respiratory and cardiovascular health impacts, as well as the onset of various cancers.

City target and snapshot

The Council has set out its aim to achieve the targets on air quality set by the World Health Organisation.⁷³ **Air quality in Leeds is rated as Good in the WHO rankings, with concentrations of PM2.5 and PM10**, two main pollutants of concern, within the annual guidelines. Long-term trends associated with the shift from diesel and petrol vehicles demonstrate an improvement in air quality and as a result the Leeds Clean Air Zone was withdrawn. But areas like the city centre, inner ring road and along the major road network exceed the annual mean air quality objectives for nitrogen dioxide, another main pollutant of concern.

We suggest that future targets for air quality need to reflect the updated WHO guidelines which state that annual average concentrations of PM2.5 should not exceed 5 µg/m³ and for PM10 should not exceed 15 µg/m³. These are much lower than the current adopted targets in Leeds of 25 µg/m³ and 40 µg/m³ respectively.⁷⁴

What's already happening in Leeds?

The Council has set a new target to exceed all WHO guidelines by 2030 in its Air Quality Strategy. Work focuses on air quality behaviour change through 'Clean Air Leeds', a collaboration with regional

government to deliver the West Yorkshire Low Emissions Strategy 2016–2021 and ongoing traffic flow modelling.

Examples of good practice are emerging such as the Veolia Recycling and Energy facility in Leeds which has installed a large green ‘living wall’ to absorb pollutants. Though there is no data to assess its impact yet, the University of Leeds is installing sensors to measure these in partnership with the Council.⁷⁵

To work like nature, what more could Leeds do?

The Council’s Air Quality Strategy should be accelerated in order to continue to make progress and mitigate against advancing climate change impacts. Smart technologies such as air quality sensors around schools should be used to accelerate behaviour change, though given the social factors that influence people’s capacity to change behaviour, this is a sensitive wider societal issue. Going forward, low traffic zones near schools and district hubs can support cleaner air. Ultimately, an ultra-low emission zone will be needed across the city to meet the more stringent updated WHO guidelines.

As highlighted, all of these local-ecological domains have interconnections, so supporting biodiversity thriving will assist in improving air quality alongside traditional infrastructural methods and changes to vehicle use. The further mass greening of the city and the shift from grey to green infrastructure is one of the most productive ways to harness nature to purify our city’s air.

b. Regulating temperature

In nature, forests and trees cool local air temperatures through evapotranspiration and provision of shade. Air movement through trees also has a natural cooling effect. The urban heat island effect is a well-documented phenomenon that poses health risks, amongst others - particularly as climate change gradually increases average temperatures. Working with nature to regulate city temperatures, then, is a key part of adapting to a changing climate. It can bring wellbeing benefits for humans, plants and animals alike and in the face of future extreme heat, it can also save lives.

City target and snapshot

Currently, the urban heat island effect is not formally measured or quantified in Leeds, nor does the Council have an established target for reducing it. However, in partnership with university researchers across the city, sensors to measure heat island effect around the city are in development. **Monitoring and managing urban heat will be a key area for future work and target setting, especially in terms of monitoring the impact of continued growth of the city centre and South Bank.**

What’s already happening in Leeds?

A major public realm initiative ‘from grey to green’ is already creating new major greenspaces in Leeds, connecting new green space in Sovereign Square to the South bank, as well as new public realm in the Corn Exchange, City Square and Cookridge Street.

Artist Nayan Kulkarni and children’s play expert Tim Gill, supported by Arup, have proposed an urban woodland to transform Leeds City Square. One outcome of this will be to cool the air in the immediate area, which will be valuable given City Square’s location right at the heart of the city and inner ring road traffic.

To work like nature, what more could Leeds do?

Leeds should set a quantified target to eliminate the urban heat island effect through a comprehensive programme of greening projects across the city and planning targets for new developments. The co-benefits for this would be multiple, including enhancing biodiversity through expanded green corridors; carbon sequestration by increased plant life; managing water run-off at a micro level; and,

depending on the initiative, provisioning food at a hyperlocal level. Future work needs to focus on how new public realm spaces can provide shade and regulate temperature.

4. Matter

a. Processing waste

The concept of 'waste' is a human one; it doesn't exist in nature. All matter recycles and has its uses. Our planet's resources are finite, and we are living in a throwaway and high consumption culture that is at odds with sustaining and living within our ecological ceiling. High volumes of waste produced from excess food, textiles and plastics are also carbon-intensive, contributing to the wider issue of rising carbon emissions. As such, this is an area that can be powerfully reshaped to imitate nature's fundamental processes. High levels of waste from human activity are also a way to see negative aspects of our Doughnut approach – its impact on local biodiversity and pollution, reductions in local wellbeing, global impacts from exporting waste, and those from increasing GHG emissions.

City target and snapshot

Material in the waste stream enters one of three routes - energy recover through incineration, landfill or recycling/reuse/composting. The Leeds Integrated Waste Strategy covering 2005-2035 set an ambitious aim of creating a zero waste city, with an approach to prioritise the reduce/re-use/recycle element, maximise the reminding waste as a resource (through energy recovery) and no waste is sent to landfill.

In 2018-19, the proportions for household waste in Leeds were: recycling (including reuse/composting) 38.7%, Energy from Waste 59.7%, and Landfill 2.15%. As the UK Government updates its waste strategy, LCC is set to further increase its ambition in this area. In its current interim strategy, action areas include reducing the overall waste footprint across all sectors, reducing the carbon impacts of waste generation and waste volumes, to increasing public awareness and action on waste issues, promoting a culture of reuse rather than disposal and increasing the number of organisational exemplars of waste reduction in Leeds.⁷⁶ Much of the focus is on "refreshing and relaunching" existing infrastructure, such as that for kerbside collection, to increase recycling.

What's already happening in Leeds?

In 2004-5 the household waste recycling rate was 19.6%. At that time the city set itself an ambitious target to double this rate to 40% by 2020. This rate was almost achieved with the current recycling rate for domestic waste at 39%. This is slightly lower than the English average of 44%. However, household recycling rates in England failed to meet the government's own 2020 target of 50%.

One of the key developments over the last decade is the development of the Recycling and Energy Recovery Facility, which incinerates non-recyclable domestic waste and converts it into low grade heat for the Leeds Pipes network, which distributes heat to public housing.

Several pioneering projects are already emerging in Leeds. In 2021, a team from the University of Leeds received grant funding to develop a Yorkshire Circular Lab to support communities, government bodies and companies in the transition towards a circular economy⁷⁷. Moreover, the civic group Zero Waste Leeds is promoting and establishing a variety of zero waste initiatives across the city especially in terms of recycling, reuse and the sharing economy.

To work like nature, what more could Leeds do?

Building on the successful and ambitious approach to waste reduction in the city, to work more like nature there are opportunities to reduce the overall material footprint of the city through creating **specific policy aim of transitioning to a circular economy by 2040**. Through this, Leeds can be seen as a set of interconnected systems where waste outputs from one set of activities become the inputs of another – stimulating employment and income. This would allow Leeds to start to more closely mimic natural systems it depends upon.

Global-Social lens: What would it mean for Leeds to respect the wellbeing of all people?

The third lens of the Leeds City Portrait focuses on uncovering the ways in which Leeds is interconnected with the rest of the world. This understanding in turn shows us the ways in which we can respect and honour the rights of people everywhere. These global interconnections aren't usually a central area of municipal policy or strategy but are critical to honouring a city's global responsibilities.

Leeds – a deeply inter-connected history

This lens recognises the global connections between our societies, our actions today and importantly, our histories and societal structures. It focuses on the many ways in which actions and decisions taken here in Leeds have impacts on people and communities all around the world. This could be how our global supply chains connect lifestyle choices here in Leeds with workers across the globe, how our local policies and response to migrants influences how they are perceived and welcomed, or how our cultural connections can create solidarity with others. The previous lens highlighted our ecological and environmental global connections, whilst this lens draws on the ways in which we are connected socially, culturally, economically, politically, and beyond.

Let us first put Leeds into its historical context. Leeds is not an island. It has emerged under particular conditions and in a particular place in the world order. While there is poverty and inequality in Leeds, the city still ranks as one of the higher-income places in the world, in a high-income country that has disproportionately enjoyed the benefits of industrialisation, an extensive exploitative empire and a commonwealth of countries, favourable patterns and terms of global trade and cheap energy for several centuries. More recently, Leeds' national context has enjoyed relative peace and stability, relatively high levels of welfare spending and low levels of exposure to natural disasters.

Leeds grew rapidly during the Industrial Revolution, which relied on the huge flow of people and resources across the world. Many people prospered as a result of the rapid growth from the 1760s onwards, but many people also lived in squalor. Development in that period also came at a huge social cost to people locally and across the world, especially in the British colonies, and through the enforced enslavement of people from African countries. Essentially, since that industrial period, Leeds has developed and prospered, but often at the expense of others both globally and at home. The industrial mill owners and inventors created social progress and employment. But they were also part of a global economy that drew on the riches of colonial conquest and led to deeply uneven patterns of development at home.

The story of Leeds is one of endeavour and innovation: but it is also one of colonial and military domination abroad, the extraction of raw materials and exploitation of enslaved peoples. This is the beginning of Leeds' impact beyond its boundaries, especially in terms of its historically disproportionate impacts on carbon emissions, excessive material use, impacts on the planet's ecosystems and the devastation of people and communities at home and abroad.

A decolonising agenda

This is the story of Leeds that cannot be forgotten. It needs to shape our understanding of the present. Our intention is for the Global-Social lens of the Doughnut to tell this story too. It is a story of how a city grew, prospered and struggled in a context of imperialism, military and political conquest, the enclosure of land, slavery, exploitation and oppression as part of what is called a decolonising

approach to understand the present.⁷⁸ The decolonising approach asks us to understand how past colonial practices shaped how we got here and continue to shape the present day, through the way our local and global economies and politics works and how many people still face the daily reality of racism and structural oppression.

We have already highlighted how the Doughnut's inner ring contains such components as peace and justice, political voice and social equity to create a social foundation for the safe and just space for humanity. In itself, this is powerful and demarcates the Doughnut from more one-dimensional socio-economic approaches to city change. However, these aspects of our social foundation need further elaboration. We need to specifically name racism and colonial legacies – or anti-racism and decolonisation - as integral to the social foundation. Our Leeds Portrait, then, intentionally takes an anti-racist and decolonising position as key objectives in creating a new safe and just space for humanity.

For several reasons, a decolonising agenda is critical to the success, longevity and integrity of any new model for a city. In the first instance, decoloniality puts the voices of those who have been historically disregarded and marginalised at the heart of environmental and social action – in this case, the voices of black and brown communities in Leeds. More broadly, decoloniality identifies colonialism as one of the driving forces behind climate breakdown. Colonial legacies persist in countless ways, ranging from racialised exposure to air pollution to supply chains rooted in extractive exploitation and labour practices in countries that were previously colonised, to Leeds-based corporations who continue to support land dispossession and unfair terms of trade across the world. At the heart of this approach is climate justice: recognising that the people least responsible for the current climate and ecological crises are disproportionately bearing the harms and vulnerabilities from them.

Our approach

The Global-Social lens in this Portrait for Leeds examines the city's trade flows and supply chains, specifically mapping out its global-social footprint within these supply chains in terms of child and forced labour, air pollution, occupational safety, agricultural land appropriation and material consumption that results from the things we do and buy in Leeds. This is our first attempt to generate indicators to explore the social impact of Leeds at a global level. Through further work and conversations across the city, we will improve and expand these. Our key aim going forward is to try and understand the totality of the global impacts of life in Leeds, as well as that which stems from its development model.

As with the local-ecological lens, we have adopted a consumption-based approach that explores the social implications at a global level of consumption practices in Leeds. With the globalisation of supply chains, assessing the social impacts of a city's consumption has become a hugely difficult task. A single purchase in a high street store may be linked to multiple social issues that begin at the point of raw material extraction and continue through the various stages of manufacture and distribution. The complexity of these supply chains, as well as the increasing distance between consumer and producer, has made it far easier to hide social issues such as hazardous work,⁷⁹ offshored industrial pollution,⁸⁰ and child labour.⁸¹

At the same time, modern communication networks have made it easier to raise awareness of these social issues, and modern methods of social accounting have made it easier to track and connect them with the goods and services that are finally consumed.⁸² It is these social footprinting methods that we draw upon primarily for the Leeds Global-Social lens, methods that have advanced to the point of reporting countries' corruption footprints.⁸³

These methods mirror those used to calculate carbon and other environmental footprints and so they have similar advantages and disadvantages. They capture global supply chains offering good regional tracing of impacts. But they are approximations of products, meaning impacts are not easily assigned to particular purchases. Social footprints can also be more uncertain than their carbon footprint cousins, as social impacts are not always easily quantified, nor are they necessarily quantified consistently across different regions. Nonetheless, they have been calculated for a wide range of issues and hence provide a valuable stock of knowledge to draw upon.

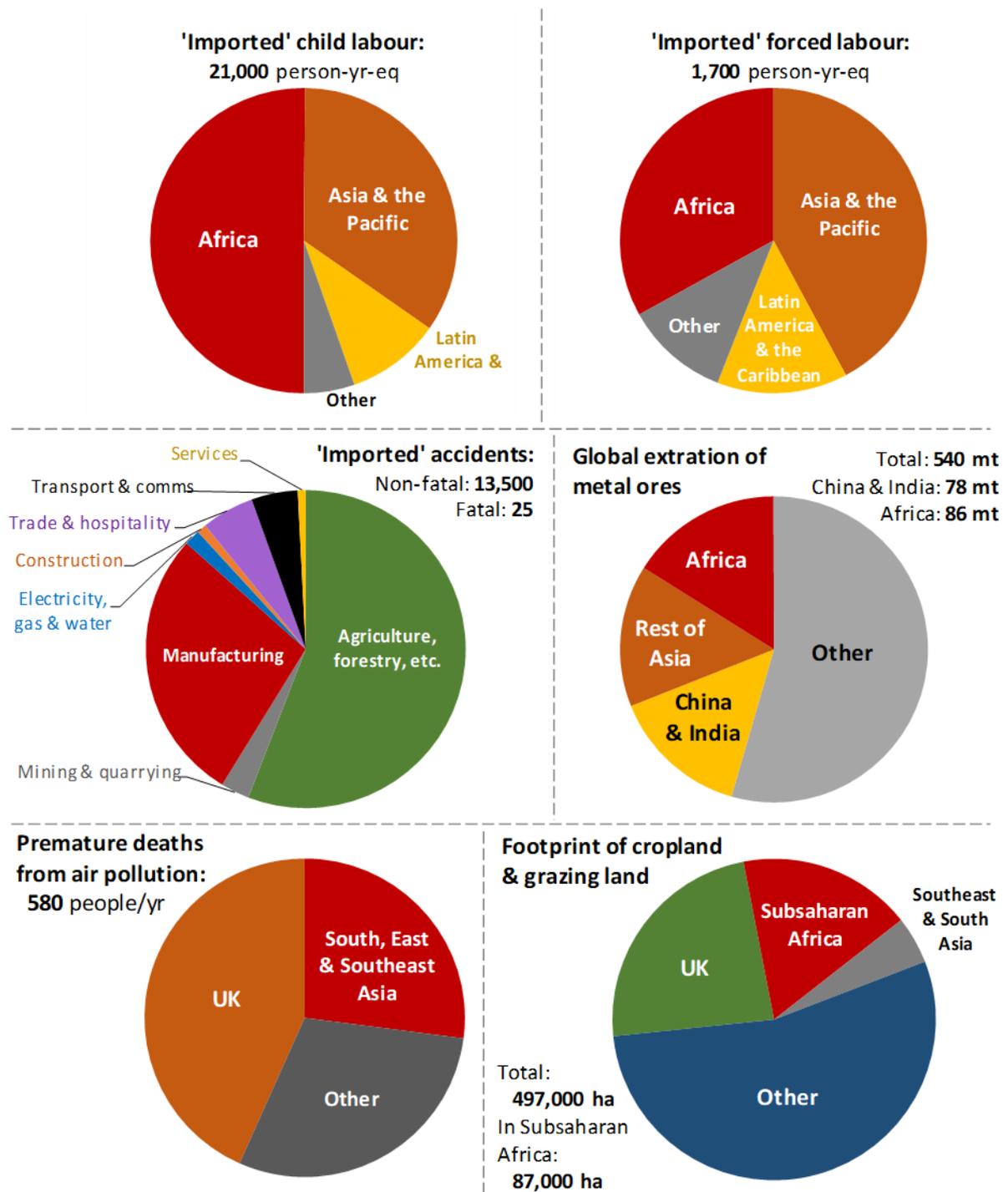
We were able to source social footprint data for a range of indicators, as detailed in Figure 3. These cover several social issues – work, health, hunger, extractive industries and so on – and hence are closely aligned with UN SDGs. However, as with most footprint analysis, the latest data is both out of date and not comprehensive at the city-scale. We thus use simple scaling factors to update social footprints to 2018 where possible – accounting for changes in key variables over time – and downscale to Leeds using methods borrowed from the Global-Ecological lens. The specific data and methodological approach for each dimension is discussed below.

Figure 3: The global social indicators used for the Leeds Portrait and the estimated values.

Original region (year) offers high-level detail on the sources we use – the region and year the footprints are originally calculated for. We start from this original data, forecast to 2018, and then downscale to Leeds. Sources are included in the *indicator* column. Note, *PM2.5* refers to particulate air pollution.

Doughnut dimension	Indicator	Leeds value		Original region (year)	Related SDGs
<i>enabled</i>	Child labour ^{20, 23, 24}	21,033	person-yrs.yr ⁻¹	UK; OECD Europe (2007; 2010)	4 – Quality education 8 – Decent work 16 – Peace & justice
<i>empowered</i>	Forced labour ^{20, 23, 24}	1,657	person-yrs.yr ⁻¹		
<i>healthy</i>	Occupational fatalities ¹⁸	25	persons.yr ⁻¹	UK (2010)	3 – Good health 8 – Decent work
<i>healthy</i>	Occupational injuries ¹⁸	13,509	persons.yr ⁻¹		
<i>healthy</i>	Premature death; PM2.5 ^{27, 28, 29}	580	persons.yr ⁻¹	Western Europe (2007)	3 – Good health 11 – Sustainable cities
<i>healthy</i>	Crop- & grazing- land use ^{11, 30}	497,109	ha.yr ⁻¹	UK (2007)	2 – Zero hunger 12 – Responsible consumption 15 – Life on land
<i>healthy</i>	Material footprint: metals ¹⁶	540	kt.yr ⁻¹	UK (2018)	11 – Sustainable cities 12 – Responsible consumption 15 – Life on land 16 – Peace & justice
<i>connected</i>	Material footprint: mining and extraction ¹⁶	3,106	kt.yr ⁻²		

Figure 4: The Leeds Global-Social Snapshot. Source: report authors (2022).



The global social impact of Leeds: a detailed look

1. Child labour

The issue

Childhood is a time of play, education, growth and development, not for working in sweatshops, factories, or mines. When work deprives children of their childhood, their potential and their dignity, it is often considered child labour. Child labour refers to work that is “mentally, physically, socially or morally dangerous and harmful to children; and/or interferes with their schooling by: depriving them the opportunity to attend school; obliging them to leave school prematurely; or requiring them to attempt to combine school attendance with excessively long and heavy work”. While child labour has decreased by 35% over the past two decades, the International Labour Organisation (ILO) estimate that in 2020, 160 million children are in child labour, equating to nearly 1 in 10 children worldwide.⁸⁴ Whilst we aspire for high participation and achievement in education here in Leeds (see Local-Social lens), we have a global responsibility to permit children everywhere the right to the same aspiration.

Leeds Snapshot

To calculate the child labour footprint indicator, we first take data on ‘bad labour’ footprints for seven global regions in 2007, including for child labour.⁸⁵ For the Leeds estimate, data for OECD Europe is assumed to represent the proportion of imported labour that is child labour (8.6%) and the regions in which this labour occurs (e.g., 50% of child labour imported into OECD Europe occurs in Africa). Second, we use data on employment footprints in more detail and more recently (including for the UK for 2010).

They estimate that to support UK consumption, 0.46 full time labourers in other counties are required for every person in the UK; almost identical to the estimate for OECD Europe of 0.47. Finally, we decrease our estimates by 26%, as the ILO & UNICEF report that globally child labour has decreased ~26% since 2007. We can thus estimate that the equivalent of ~1.9 million full time child labourers were required by the supply chains providing goods and services to the UK in 2018 ($0.47 \times 66 \text{ million} \times 8.6\% \times 74\%$). Finally, to arrive at our snapshot estimations, we then downscale this to the Leeds scale using local population data and the ratio of Leeds to the UK income.

From this methodology, **we estimate that there were over 21,000 child labourers in the global supply chains underpinning Leeds-based consumption in 2018**. This figure is close to the number of undergraduates at the University of Leeds (around 27,000 in 2020). Around half of these child labourers are in Africa and most are involved in agriculture supply chains.

2. Forced labour

The issue

Forced labour is defined by ILO as “all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.”⁸⁶ This dimension of forced labour therefore covers slavery and similar practices. These practices may involve threats or physical harm, restrictions of movement or confinement, debt bondage, withholding wages, retention of passports and identity documents, and threat of denunciation to the authorities when the worker has an irregular immigration status.⁸⁷ ILO estimates state that at any given time in 2016, 24.9 million people were in forced labour around the world, disproportionately affecting women and girls.⁸⁸

Leeds Snapshot

The indicator for forced labour followed the same methodology as that for child labour. However, for the dimension of forced labour, data from Unseen (2018) provides comparison with the situation in West Yorkshire. These estimates are, however, highly uncertain due to difficulties in defining and uncovering modern forms of slavery. **In 2018, activity resulting from Leeds-connected supply chains contained an estimated 1,700 forced labourers.** We also note that there were a reported 300-460 potential victims of modern slavery in the whole of West Yorkshire.⁸⁹

3. Occupational safety

The issue

Occupational safety is an incredibly important dimension to consider across globalised supply chains. For example, the 1,132 people who died in the collapse of Rana Plaza in Bangladesh in 2013 brought the working conditions faced by garment workers in the Global South into sharp focus. Meanwhile, the fire killing over 50 people in another Bangladeshi factory in July 2021 highlights that the risks remain. In this section we look at the estimated number of workplace fatalities and non-fatal injuries embodied in the goods and services imported into Leeds.

Leeds Snapshot

Alsamawi et al. (2017) provide estimates for the number of occupational injuries – non-fatal and otherwise – associated with national consumption in 2010, disaggregated to eight production sectors. We downscale the UK values of 2,303 fatalities and 1,239,000 injuries to Leeds accounting for population and income, thus obtaining estimates of 25 and 13,509, respectively (assuming that 2010 data remains valid). Data from the UK HSE (2020) provides comparison with the situation in Leeds where, over the past five years, 1 person per year suffered a workplace fatality and 898 were injured.

We estimate that the goods and services imported into Leeds entails 25 workplace fatalities and roughly 13,500 injuries a year. Roughly 50% of these are in agriculture and forestry and 25% in manufacturing. In Leeds itself, there are roughly 1 occupational fatality and 898 injuries per year.⁹⁰ On this basis, we can conclude that the working conditions along the global supply chains providing goods and services to Leeds are 15-25 times more hazardous than within Leeds itself.

4. Air pollution

The issue

Air pollution causes millions of premature deaths globally, predominantly due to fine particulate matter (PM10 and PM_{2.5}) and nitrogen dioxide mainly from petrol/diesel vehicles.⁹¹ Across all cities in the world poor air quality is a serious issue, causing thousands of preventable deaths and respiratory diseases. There are two aspects to the air quality issue. Elsewhere, we have assessed air quality locally in Leeds, and work is needed to continue to improve air quality. But there is a further dimension. There are air quality impacts through the production and transportation of goods and services that we consume in Leeds. As things are made and transported to Leeds this contributes to poor air quality in other places. This is the hidden story of air quality. In the UK, for example, the PM_{2.5} footprint resulting from Leeds' consumption footprint is nearly four times larger than the country's direct emissions.⁹²

Leeds Snapshot

Data linking air pollution-related mortality in places of production to places of consumption are available only for 2007 and at a coarse geographical resolution, with the world split into 13 regions for both consumption and mortality (Zhang et al., 2017). In other words, the data estimates how

consumption in each of these 13 regions is linked to air-pollution-related mortality across these same regions. Western Europe is among these, so we begin with this data, and to give a crude, high-level picture we aggregate the mortality estimates to three regions: domestic; South, East, and Southeast Asia together; and the rest of the world.

Assuming the per-person impacts of consumption in Leeds are the same as in Western Europe more broadly, this gives a total of 580 mortalities traceable to Leeds, with 251 of these occurring domestically (i.e., in Leeds), 157 occurring across South, East, and Southeast Asia, with the remaining 172 across the rest of the world. Comparison with data from PHE (2014) suggests this is not unreasonable: in Leeds, 350 mortalities were associated with air pollution in 2010, and this may now be closer to ~280 considering PM_{2.5} concentrations dropped ~20% in Leeds from 2010-2018. Whilst these estimates come with large uncertainties, the main point is fairly robust: air pollution associated with consumption in Leeds causes more deaths beyond the UK than within Leeds itself.

5. Agricultural land appropriation

The issue

Agricultural land appropriation is about how much land is used globally to support a typical citizen. As detailed in the previous ecological lenses, locally and globally, land-use indicators are of course an ecological indicator. However, through the global-social lens, we only focus on arable land, and in particular, that appropriated by residents of Leeds in global regions experiencing high levels of extreme hunger (i.e., Sub-Saharan Africa, South Asia & Southeast Asia).

Leeds Snapshot

Yu et al. (2013) offer land-use footprints for 129 regions in 2007. For the UK they estimate that consumption required 32,674,988 and 16,027,512 hectares of grazing- and cropland, respectively, tracing this to these same 129 regions. In addition, the Global Footprint Network (2020) estimates that the arable land footprint of the UK has decreased roughly 14% since 2008.

Assuming per-capita land-use requirements are the same in Leeds as the UK more broadly, **this gives a cropland and grazing land area required to support the city of Leeds as 497,109 hectares**, with 117,465 of this in the UK, 86,634 in Sub-Saharan Africa, 23,586 in South and Southeast Asia, and 269,424 elsewhere. In other words, for every acre of agricultural land in the UK used to provide for people in Leeds, another acre is used in Sub-Saharan Africa and East & Southeast Asia, world regions where extreme hunger is most prevalent today.

6. Material footprint

The issue

This dimension of the global-social lens looks at the material footprint in Leeds in terms of the amount of raw materials each person is responsible for per year. While the global ecological lens looks at the ecological degradation caused by continual resource extraction, here we focus on the extent to which the process of this extraction is socially harmful for many communities and people's livelihoods globally. Material footprint refers to the extraction and use of metals, biomass, construction raw materials, and fossil fuels. This extraction process leads to a number of social harms including unsafe working conditions, land displacements and lack of local control.

A material footprint based on consumption in Leeds measures the extent of material extraction to support consumption across Leeds. While this does not indicate a direct casualty between material

footprint and social injustice, it can be assumed that a higher material footprint is linked with greater levels of global social injustices.

Leeds Snapshot

Material footprint is the one indicator for which recent data (2018) is available at the national level (DEFRA, 2020). Data offered by the UK Government, from methods developed at Leeds, estimate the material footprint of UK consumption for four key materials – biomass, metal ores, construction raw materials, and fossil fuels – and track extraction to 14 key regions. Here we just focus on metal ores due to the well-known social issues with extraction, especially in terms of consumer goods such as electronics and mobile phones, and the tendency for mining to displace local communities. Accordingly, we highlight the proportion of metals extracted from regions where such issues are likely to be problematic. In addition, we highlight the total material extraction across Africa and Asia.

It can be estimated that the UK's material footprint of metal ores in 2018 was approximately 50 Million tonnes per year, and downscaled to Leeds using local population and income, this gives a consumption rate of 0.68 tonnes per person. **Therefore, consumption in the city of Leeds relies on 540,000 tonnes of metal ores every year – the weight of over 200,000 Range Rovers.** Around 16% of this is extracted from Africa, 15% from China and India and another 15% elsewhere in Asia. Nearly 90,000 tonnes of these metals are extracted in Africa, where working conditions can be coercive and hazardous and can lead to the displacement of communities.

Global-Ecological lens: how can Leeds respect the health of the whole planet?

Our fourth and final lens continues at the global level. The focus of this lens is the ways in which activities and lifestyles in Leeds impact the planet's natural systems. The Global-Ecological lens explores the ways in which Leeds is connected to, and impacts on, the whole planet through the energy it uses, the carbon it produces, the chemicals it creates, the products it imports and the stream of waste it exports.⁹³ It is essential to look at the ecological impacts of Leeds at a global scale alongside those already identified locally to get a complete picture of the impact of life in Leeds.³

Through this lens we can assess Leeds' footprint as a city and understand the extent to which this exceeds our shared global footprint. What we can see is that Leeds, as a high-income city in a high-income country, at least in global terms, is putting significant pressure on the planet's overall ecological systems and contributing to the overall overshoot of our finite global planetary boundaries. We must use these new insights to reflect on how Leeds can act on its global responsibility, how all can live well within planetary boundaries, and hence transition Leeds to within the safe and just space of the Doughnut. Ultimately, Leeds' broader impact on the planet's natural health hinders our ability to thrive and be safe locally. Leeds is not an island, so locally we must protect and nourish planetary health.

A footprint approach

Much of the ecological impact of cities occurs beyond their borders. But these impacts contribute to an overall overshooting of what is called global planetary boundaries.² Traditional environmental accounting methods that focus only upon direct impacts in a place fail to capture these global impacts³. This lens, therefore, tries to capture the impacts Leeds has on ecosystems outside of Leeds. For electricity, however - the most basic resource imported into cities - allocating the carbon emissions of the power-stations to the locations where the electricity is used is both a common and uncontroversial practice. Although less common, this same logic can of course be applied to all the goods and services that cities consume.

Our approach uses calculations to create what's known as a footprint approach. This is an accounting method to assess the impact of activities in a given place across a range of ecological impacts, from land use to air pollution and importantly how that place has impacts across a whole range of places outside its physical boundaries⁵. We use data from existing footprinting studies to assess the global-ecological impact of Leeds. In doing so, we aim to capture the impacts of all extraction, manufacture, distribution, retail and land use relating to consumption of goods and services in Leeds. So for example, when a smartphone is purchased in Leeds, the emissions from manufacturing it in, for example, China are allocated to Leeds, as are the emissions from mining the rare metals for its components in the Congo Basin; extracting the Russian oil used to make the plastic casing; transporting these materials to China and the smartphone to the UK; producing the electricity required by the user to recharge the phone; and running the network infrastructure providing mobile services. Accounting in this way has important implications for Leeds taking accountability for its share of global responsibilities in bringing humanity back within the safe and just space of the Doughnut.

Selecting indicators for planetary boundaries

The Doughnut draws on a study of nine planetary boundaries, which span all aspects of the stability and integrity of the earth-system. The original Doughnut theory drew on and modified these.

The indicators for the Leeds Portrait draw on these as a starting point and modify them with more recent work on planetary boundary indicators from O'Neill *et al.* (2018), as shown in Figure 5. Together, these cover the majority of the original 9 boundaries and the Doughnut dimensions. Global impacts on air pollution and ozone-depletion are not included in the Leeds Portrait because of the lack of available data, and the fact that they yet have safe and global boundaries defined.

Figure 5: Summary of the dimensions of Raworth (2017) and the indicators currently used for Leeds with their boundary values.

Doughnut dimensions	Indicators used for Leeds	Boundaries per person
Climate change	Carbon footprint	1.61 t.CO ₂ .yr ⁻¹
Ocean acidification		
Excessive land use	Ecological footprint	1.72 gha.yr ⁻¹
Excessive fertilizer use	Phosphorus	0.89 kg.P.yr ⁻¹
	Nitrogen	8.9 kg.N.yr ⁻¹
Freshwater withdrawals	Blue water	574 m ³ .yr ⁻¹
Waste generation	Material footprint	7.2 t.yr ⁻¹
Biodiversity loss	Biodiversity footprint	<i>Undefined (but certainly exceeded)</i>

From national to city-level footprints: accounting for inequalities

Footprint data for these indicators is generally only available at the national level (except for carbon). Therefore, the approach taken is to downscale this national data to Leeds. For this downscaling, we use local population and income, and for the latter we distinguish between three types of footprint indicator, namely, those *strongly*, *moderately*, and *weakly* coupled to income indicators. This is because some ecological impacts – like carbon footprints – tend to scale with affluence, i.e., a 10% increase in spending leads to a ~10% increase in footprint.⁹⁴

Coupling footprints to income results in large inequalities in footprints between the residents of a single city. City-scale studies are lacking, but more broadly, inequalities in carbon footprint between the bottom 50% of EU residents and the top 1% are vast, with the per person footprints for the top 1% over ten times the bottom 50%¹⁰. This is an important consideration, highlighting the inequalities in consumption that lead certain high-income groups across Leeds to over-consume, driving planetary degradation, whilst others continue to fall short of their essential needs, as shown in the Local-Social lens of the Leeds Doughnut.

By adopting the Doughnut model, we must consider the systemic drivers behind inequalities of consumption in our analysis and solutions to ensure equitable, fair transformations. Accordingly, we estimate inequalities in Leeds for the five environmental footprint indicators considered to be coupled to income, by downscaling inequality data for the UK to the city. We consider five income groups, from the bottom 20% to the top 20%.

Other indicators don't follow this pattern, such as the impacts relating to food, which may be similar across income groups within a country (food is a basic good that everyone buys⁹ and richer people can afford healthier, potentially lower impact food). Accordingly, we use an estimate of the income

distribution in Leeds to downscale *strongly* income-coupled indicators, but *weakly* coupled ones are assumed to be equal across Leeds' population.

Importantly, while these footprint methods give thorough, quantitative descriptions of ecological impacts of Leeds consumption, they give limited information about the impacts of specific products (for example, locally produced meat) as the categories considered are broad. Further, it is important to distinguish that by focusing on consumption data, we are by no means implying a sole focus on individual consumers in the transformation into the Doughnut's safe and just space for humanity. While changes in individual consumption patterns can also have positive effects, the broader challenge is to change the conditions of why people consume and how goods are produced in the first place.

Snapshot methodologies

Work by O'Neill et al. (2018) applied Doughnut thinking in analysis of planetary boundaries and social thresholds for more than 150 countries, including the UK. Results for the UK are shown in Figure 6 where it can be seen that as a country it exceeds five planetary boundaries (and falls short on two social thresholds). This data offers an ideal starting point to consider the global-ecological impacts of Leeds, but before downscaling to Leeds the data must be updated from its target year of 2011. We will discuss this relative to each indicator in the deep dive section below.

Figure 6: The UK's Doughnut Portrait. Source: O'Neill et al. (2018)

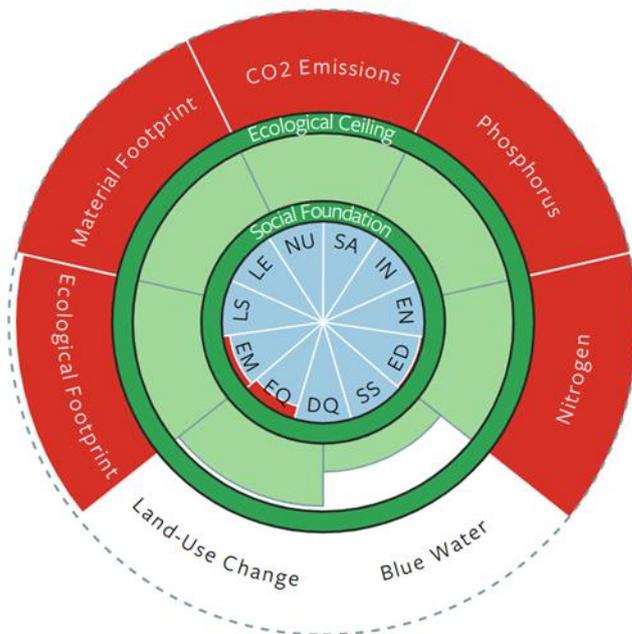
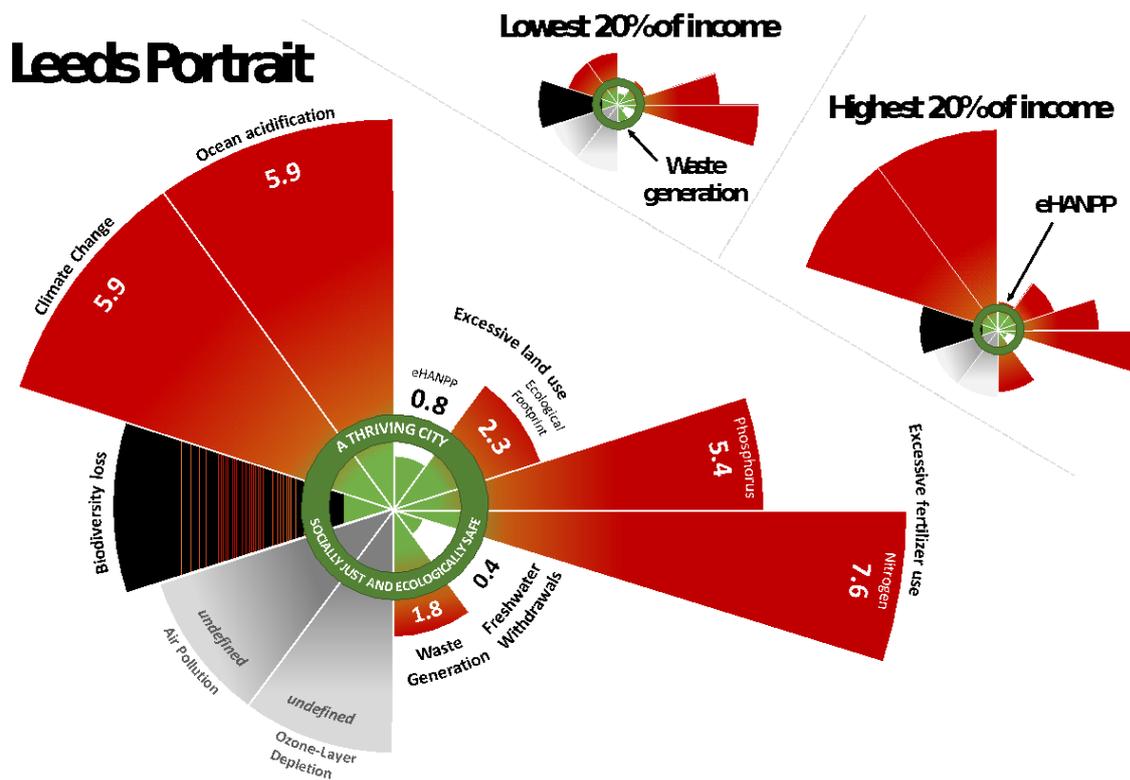


Figure 7: Leeds' Global-Ecological City Snapshot. Source: report authors (2022).



Leeds' ecological impacts globally: a detailed look

Here we examine each of the ecological global dimensions and assess whether they are exceeding recognised boundaries.

1. Climate change

The issue

Climate change refers to a change in the climate, meaning long-term shifts in temperatures and climate patterns, globally or regionally⁹⁵. Climate change is often used to refer specifically to the rise in global temperatures driven by the release of GHGs since the industrial revolution. Since this period, huge quantities of greenhouse gases have been released into Earth's atmosphere, trapping in heat from the sun inside the atmosphere, causing temperatures to rise and the planet to warm.⁹⁶ Carbon dioxide is the main GHG, but there are several others including methane.

It is well known that climate change is being driven by human activities and will significantly worsen over the decades ahead (IPCC, 2022). Humanity is witnessing rising sea levels, mass extinctions, increased severe weather events such as droughts, heatwaves, flooding, and forest fires, and ocean acidification for example. These impacts have severe consequences on livelihoods here in the UK and around the world, with implications on food insecurity, access to water, loss of homes and habitats, increased infectious diseases and pandemics, and a rise in climate-related migrants.

Climate change affects countries and regions differently around the world, with places with existing vulnerabilities and generally the lower consumption levels most likely to be hit hardest by the effects⁹⁷. This has important justice considerations for a country like the UK and a city like Leeds, in

terms of accountability for the impacts of current local consumption patterns and how these drive global climate change, as well as the historic carbon emissions produced by a city like Leeds given its leading role in the Industrial Revolution where coal burning released a huge amount of GHGs.

Leeds context

Leeds City Council's 2019 climate emergency declaration included a commitment to being carbon neutral by 2030. This set the city a challenging goal which reflects an acknowledgement of the role that each place has to play in limiting global heating no more than 1.5°C temperature increase, in line with the internationally recognised Paris Agreement⁹⁸. However, there are complications here. Carbon neutral is different to net zero. The former refers to just carbon emissions and the latter refers to all GHGs. The additional issue is that both these approaches to counting city emissions allow for offsetting - where emissions can be counted and traded outside the city, meaning less reductions are made inside the city. Therefore, there are debates whether the aim for the city should actually be absolute zero - meaning all carbon within a city is eliminated with no offsetting or savings counted outside the city. Ultimately some offsetting will be required, through for example, reforestation or carbon capture technologies, as not all excess carbon emissions can be eliminated.

We also need to be aware that the city's efforts on carbon reduction currently only accounts for carbon emissions produced in Leeds. Hence this target does not currently account for carbon emissions embedded in consumer goods and services that are imported into Leeds, or the travel of Leeds people outside Leeds, especially in aviation. As we discuss later, as a matter of global responsibility, Leeds needs to establish a commitment to reducing not just emissions in Leeds but also consumption-based carbon emissions to bring the climate change planetary boundary back within the safe and just ring of the Doughnut.

What is the boundary and how does Leeds compare?

This dimension is measured in the amount of carbon dioxide emissions each person is responsible for per year, measured in tonnes. This boundary is one of the few where there is reliable data at the global and national levels and where it is possible and makes sense to downscale this to the city level. We must stress that while it is useful to focus on an individual's carbon emissions, in terms of solutions we need to focus on what locks people into these high consumption patterns that lead to these emissions.

The current safe boundary is 1.61 tonnes of carbon per person per year. The method for calculating this has a few steps. First, we need to know how much carbon dioxide emissions the average person in Leeds is currently responsible for. Leeds-level data isn't available, so we downscale UK-level data, which states that **each person in the UK is currently responsible for producing 9.6 tonnes of carbon per year**. Leeds has a similar profile to this national figure. Clearly, these are averages and there are large differences above and below this figure, with people using much more or much less than the average.

We then need to identify the carbon emission target for each person in Leeds. This is based on the Leeds carbon budget: the amount of carbon that Leeds can emit within a certain amount of global warming. Based on a simple proportion of the world's total budget, the Leeds budget from 2020 to 2050 is 40 million tonnes of CO₂. Critical to remember is that 2050 is the year after which no more greenhouse gases may be emitted, in order for global warming to be kept within safe levels. Therefore, for the years left between now and 2050, Leeds has a maximum budget of 1.3 million tonnes of CO₂ per year. Dividing this total budget by the Leeds population of 790,000, we calculate that **each person in Leeds has a maximum emissions budget of around 1.6 tonnes of CO₂ per year**.

What is sobering to realise is that currently, Leeds is emitting around 4 million tonnes of CO₂ per year. What this means is that under current levels of annual emissions, our 40 million tonne city budget starting from 2020 would be spent by 2030: in 8 years' time at the time of writing!

We can now see the scale of the challenge ahead. A person in Leeds currently emits 9.6 tonnes, but the safe boundary is 1.6 tonnes - this carbon boundary is exceeded by almost 6 times. There are some complications to this. The first is how this differs by income group. What we found is that the richest 20% of people in Leeds are exceeding this boundary by a factor of 11, while the poorest 20% by just around a factor of 3. Second, this target assumes each person will use the same amount every year starting from a very low budget of 1.6 tonnes. It would be more realistic to assume that each person could produce a bit more now with further cuts later on. In any case, by the target year of 2050, all people and activities will need to be net zero. An additional complication is that Leeds has set itself a hugely challenging target date of 2030, much in advance of the UK net-zero target date of 2050. While this is to be applauded, it shows the even more rapid scale of the challenge ahead. The above figures would need to be met in 10 years rather than 30!

2. Ocean acidification

The issue

Ocean acidification is closely related to the carbon footprint. It is a process by which increased uptake of carbon dioxide (CO₂) by the ocean, causing the ocean's PH level to reduce and become much more acidic. Oceans absorb around 30% of the CO₂ that we release into the atmosphere and as we release more, the oceans absorb more and ocean acidification increases.⁹⁹ These acidic conditions make it difficult for many marine species; corals, as well as some plankton and shellfish species, are examples of organisms that find it hard to grow and survive.¹⁰⁰ Losses of these species would fundamentally alter the structures and dynamics of marine ecosystems, and could lead to severe declines in fish stocks¹⁰¹. Of course, this has implications for global food supplies, but will most likely hit poorer countries and communities hardest who are reliant on oceanic food supplies both nutritionally and economically, with fewer agricultural alternatives.¹⁰²

Leeds context

Given the global nature of this issue, it is understandable that Leeds has not created a city-based target or policy framework for this area. However, the approach taken in this lens is that Leeds has a broader global responsibility for a thriving planet and thriving people worldwide and this in turn sets a context for people in Leeds to thrive. Therefore, Leeds should consider how our local consumption here in Leeds is driving ocean acidification and ecosystem destruction around the world.

Ocean acidification is driven by greenhouse gas emissions, so in this methodology, carbon emissions and the per capita carbon *footprint* is used as a proxy measure. What we can see, therefore, is that **high-carbon activity and lifestyles in Leeds are also driving ocean acidification and exceeding this global boundary by the same as for the carbon footprint - a factor of almost 6.**

3. Land use

The issue

Humans have fundamentally altered earth's land use globally. We have converted forests, grasslands, wetlands and other vegetation types into agricultural land and, to a lesser degree, urban and industrial land. Of the 100 million km² of habitable land surface on the planet, 50% is used for agriculture, highlighting the global dominance of humans. This vast land-use change, especially since the 1950s, is a leading cause of rapid reductions in biodiversity, as well as earth's natural abilities to circulate

essential elements of living matter such as carbon, nitrogen and phosphorus - known as biogeochemical cycling.¹⁰³ Moreover, through human-driven land-use change, Earth's natural carbon stores, like forests, are destroyed, contributing further to the overshoot of other planetary boundaries, such as climate change and ocean acidification.

It is easy to dismiss or underestimate the role of Leeds in global land-use change, because it takes place beyond the city and even beyond the UK. However, looking at consumption levels in Leeds allows us to see the global impact of local actions. What this stresses is the need to also consider consumption-based indicators to ensure Leeds is working towards a healthy, thriving planet, not only a thriving city.

Leeds context

Whilst Leeds does have a local land use development plan, there are no frameworks at the city level to assess impacts on land use globally. In order to move into the safe and just space of the Doughnut, where local aspirations are matched within our global responsibilities, this is something that should be explored and quantified.

To account for the use of agricultural land, urban areas, forests and land-based carbon storage in Leeds' consumption behaviours, we draw on the ecological footprint indicator. According to the Global Footprint Network, it is the only metric that measures how much nature we have.¹⁰⁴ It measures the ecological assets (e.g. the amount of natural land), that a given population requires to produce the natural resources it consumes (including plant-based food and fibre, livestock and fish products, timber and other forest products and space for infrastructure) and to absorb its waste, especially carbon emissions.¹⁰⁵ For the Leeds snapshot, we have drawn on established datasets from the Global Footprint Network, which are available up to 2016. We have applied simple linear forecasts to project the UK ecological footprint to 2018 to match the target year used across the other planetary boundaries of the Global-Ecological lens.

The ecological footprint of a place is measured in hectares per person per year. The safe boundary limit is 1.7. Assuming Leeds is slightly lower than the UK figure, the average is 3.9 hectares per person per year. This means that **the global land footprint of an average resident in Leeds is 2.3 times the safe planetary boundary for land use. In other words, more than two Earths would be needed to support the current global population if everyone consumed like an average Leeds citizen.** Clearly this is unsustainable and not conducive to a thriving living planet for all people everywhere, highlighting the global imbalances of consumption levels as well as global environmental degradation.

However, it should be noted that the ecological footprint indicator has been criticised by some environmental scientists for being dominated by the land-use required to absorb our (very large) carbon footprints. Other indicators of land use are also available, which suggest that the impacts of a typical UK resident are much closer to a safe planetary boundary, or perhaps even slightly within it.

4. Fertiliser use — nitrogen and phosphorus

The issue

As global populations have increased and as inhabitants of wealthier countries, regions and cities started increasing consumption levels, demand for global food supplies has increased. This is causing drastic changes in Earth's land-use and increased use of fertiliser as a means to increase agricultural productivity and crop yields. Excessive fertiliser use drives anthropogenic flows of phosphorus and nitrogen, disrupting the natural balance – referred to as biochemical flows in the original planetary boundaries work.² Plants need nitrogen and phosphorus to grow, but excessive amounts, as released

by intensive fertiliser use, can damage ecosystems and the services they provide in complex ways. It is particularly harmful to soil health and aquatic ecosystems, impacting on wildlife, food supplies and natural capacities for carbon sequestration. As with much of the Doughnut approach, the cross-cutting intersections between the ecological and social lenses are apparent.

Leeds context

Understandably, Leeds has no existing target relating to global fertiliser use derived from local consumption patterns. The quantities of phosphorus and nitrogen measured in kilograms used per person per year are used for the indicator for the fertiliser use planetary boundary. The data used for the Leeds snapshot across both these indicators directly replicates that of O'Neill et al. (2018), due to a lack of availability of established and regularly updated databases on these footprint impacts at the national scale as far as we know.

Globally, planetary boundaries for phosphorus and nitrogen use are being breached by a factor of 2 to 3. Per-person consumption in Leeds is higher than the global average, thus exceeding safe per-capita limits by even more than this:

- The safe boundary for phosphorus is 0.89kg per person per year, with each person in Leeds responsible for 4.8kg per year - **exceeding the safe limit by a factor of 5.4.**
- The safe boundary for nitrogen is 8.9kg per person per year, with each person in Leeds responsible for 67.4kg per year - **exceeding the safe limit by a factor of 7.6.**

5. Freshwater withdrawals

The issue

Freshwater withdrawals refers to the amount of freshwater extracted from the ground or surface water sources (e.g., lakes, rivers, reservoirs) for human use - agriculturally, industrially or municipally, such as for public water supply, irrigation and industrial processes.¹⁰⁶ When there are excessive freshwater withdrawals, negative impacts on river basins and coastal ecosystems can occur (although what counts as excessive is highly dependent upon local water availability).

Leeds context

As with the other global ecological lenses, there is no established Leeds target for freshwater withdrawals globally. We adopt the indicator of Blue-water use for freshwater withdrawals, which measures the water abstracted from rivers, lakes, reservoirs and groundwater stores. This indicator draws on O'Neill et al.¹⁰⁷ without modifications, for the same reasons as above.

At 220 m³, the annual blue-water use of an average Leeds resident is about half the volume of a typical sports centre swimming pool. **A safe global boundary is 574 m³ per year per person. Fortunately, water is abundant enough in Leeds that current use is well within the global planetary boundary.**

6. Material footprint

The issue

Material footprint refers to the consumption of key raw materials - biomass, metal ores, non-metallic minerals and fossil fuels – things that are commonly extracted, rather than reused or recycled. Material extraction is linked to severe global ecological degradation as the production of these materials is highly energy intensive and significantly contributes to global greenhouse gas emissions, associated with several of the previously addressed ecological domains. Therefore, large quantities of

waste are produced in the consumption of these raw materials, both in production and at end-of-life disposal.¹⁰⁸

Leeds context

The material footprint indicator measures the consumption of four key raw materials – biomass, metal ores, non-metallic minerals, and fossil fuels in tonnes per person per year. It basically refers to the weight of all the fossil fuels, mined materials, and biomass required to support the consumption of a typical Leeds resident each year. For the Leeds snapshot, we have drawn on established UK government datasets from DEFRA as well as the O'Neill et al. (2018) datasets.

The safe planetary boundary for material footprint has been estimated 7.2 tonnes per person per year. **In Leeds an average person currently accounts for just over 13.2 tonnes exceeding safe planetary boundaries almost twice.** Leeds' consumption patterns, then, are causing global ecological degradation through its use of raw materials at a significant scale that far exceeds safe and just boundaries.

7. Global biodiversity

The issue

Biodiversity refers to the number and variety of all living species on the planet. Biodiversity underpins our livelihoods and our planetary ecosystems, through maintaining healthy and functional ecosystems. These ecosystem services upheld by rich biodiversity are central across food provisioning, water regulation, human health and climate resilience. Diversity across species is central for resilience against pests, infectious diseases and natural disasters for example. Biodiversity loss is the loss of this diversity across numbers of species, genetic composition within a species, and numbers between species. The main drivers of biodiversity loss are the demand for land for crops and animal feed, food, water and natural resources, which degrades ecosystems and the function of their vital services.¹⁰⁹

Leeds context

While there are a variety of local biodiversity targets in Leeds, there are no targets to establish the impact of a city on global biodiversity. A biodiversity footprint can be used to indicate losses of biodiversity associated with a region's consumption due to activities across agriculture, forestry, mining and extraction, and industry, along with land-use changes from urbanisation and transport networks.

Biodiversity loss is a complex issue. This boundary has not yet been quantified, partly as there remains much uncertainty about what constitutes a global, safe, planetary boundary. However, what recent evidence points to is that planetary boundaries for biodiversity have been exceeded across a majority of the planet's land surface, where a majority of people live.¹¹⁰

Further, the UK is beyond the safe threshold and, from a footprint perspective given what we know about high levels of patterns of consumption-based imports, is also a net importer of biodiversity impacts.¹¹¹ We can thus be quite confident that the biodiversity footprint of the UK is exceeding safe levels, even though the trend in high-income countries is decreasing.¹¹² Even if we make the assumption that Leeds is slightly better than the UK in general, **we can be confident that the average Leeds resident will have a biodiversity footprint exceeding safe planetary boundaries.**

A note on inequality

So far, we have been discussing the average impact of a typical resident in Leeds, but these impacts change substantially with affluence due to the extra consumption this entails. Impacts, therefore, are not shared equally across the people of Leeds. What we found is that because of greater consumption and travel, higher income drives higher levels of ecological and social harm, as well as an ability to stay above the safe limits of a social floor.

This is especially the case when we consider people's impact on resource use and carbon emissions. For example, while the lowest 20% of earners in Leeds exceed safe levels of carbon use by three times, while the highest 20% of earners exceed it by 11 times! Indeed, if the average carbon footprint of the global population was the same as the richest 20% of Leeds residents, a safe carbon budget that keep global warming to less than 1.5°C would be exceeded in 3 years.

Rather than everyone being equally responsible, this highlights the disproportionate global impacts that a specific income group in Leeds has. We have to make this inequality of responsibility central to our work.

While many of the results in this Portrait are provisional and more work is needed to deepen our insights, it can be seen that many aspects of life in Leeds either exceed the ecological ceiling or fall below the social floor of the Doughnut – how much of life is outside the safe and just space where all humanity needs to be. The findings do point to many aspects of life in Leeds currently falling below a social floor and exceeding an ecological ceiling. In summary:

1. Across several dimensions of local social life, **people in Leeds are not able to thrive** across a range of basic areas including housing, work, income and health. This reinforces the need to embark on a new direction - locally, regionally and nationally - so people are not falling below a basic social foundation.
2. Leeds has many rich and diverse ecosystems that support life in Leeds. But **many aspects of local nature are degraded**, polluted and not harnessed in a way that supports thriving lives. Much of this pressure on local nature comes from continued urban development in Leeds. If the city is to continue to grow, it needs to do so in a way that nurtures, protects and expands local nature.
3. Leeds has a **significant impact on the health of the planet**, especially in terms of the carbon footprint of its residents, the resources we are using and our impact on global biodiversity. This ecological footprint is not generated equally across everyone in Leeds. Higher income groups are much more responsible for these impacts.
4. Leeds, like many cities, has progress to make in living up to its global responsibilities and ensuring people across the world also thrive. Life in Leeds depends on supply chains of consumer goods and services that span the world and cause harm in the form of, for example, forced and child labour, workplace harm and land use. There are **many invisible global harms built in to consumption of goods and services in Leeds**: these need to be made visible and accounted for.

Opportunities for action

From this rather sobering baseline, the opportunities are huge. The Doughnut framework offers a compass for exploring what our local aspirations and global responsibilities could be. There is an opportunity to move away from a current economic model that generates social division and ecological degeneration to a new economy based on key principles:

Regenerative — how can we create development that nurtures and regenerates people, places and nature? How can we harness and work with the circular patterns of nature to restore and enhance our natural world in ways that creates human thriving? Examples include blue-green infrastructure, rewilding, water-centric design, zero carbon placemaking, active travel, 20-minute neighbourhoods, circular and zero waste initiatives.

Distributive — how can we create city economies that don't rely on constant extraction, linear growth and external ownership; but instead build an economy that creates work, income, local patterns of ownership and investment where everyone can thrive? Examples include community and co-operative businesses, income guarantees, local employment hubs, maker spaces, a sharing economy, community ownership of land and assets through local trusts.

While there is considerable work to be done to move Leeds towards the safe and just space of the Doughnut, there are many existing and emerging examples which help show the way. Of the many examples, here are a few:

- The Leeds Climate Commission's zero-carbon roadmap
- The Leeds Climate Change Citizens' Jury and its recommendations

- The Racial Justice Network’s additional Thirteenth Recommendation and climate justice activism work
- The Foodwise partnership local food strategy
- The Council’s transport strategy: a city where you don’t need a car
- Leeds Community Homes and its support for community-led housing
- Pioneering eco-developments such as CITU and Lilac Grove
- Work on anchor institutions and community wealth building
- The Yorkshire Circular Economy network
- The Leeds PIPES renewable heat network
- Zero Waste Leeds

Moving Leeds towards the Doughnut won’t happen overnight. It will take patient work across the different dimensions highlighted in this report and supporting the kinds of initiatives mentioned above. It will also need broader change at the regional and national level. Leeds cannot act alone, nor does it have the power or resources to get itself into the Doughnut. Ultimately, our work also has to focus on getting West Yorkshire and the UK into the safe and just space of the Doughnut. Our work has only just begun. Our intention from now on is to amplify, connect and support existing work across Leeds, to support pulling these threads into a broader city level planning process for a ‘zero-carbon, socially just nature-friendly Leeds by the 2030s.

Exploring inter-connections across the four lenses

One of the main reasons for using the Doughnut framework is to create a change of mindset – to think and work in an interconnected way across the challenges and solutions facing a place. Following the Doughnut method, this means taking a local and global perspective across our social and natural world – all at the same time. Broadening our ideas and policy making in this way can be unfamiliar and disruptive work. We are often more comfortable working in certain areas and focusing on what is happening locally. But ultimately, Leeds will only be a thriving place if all people and our whole planet are thriving too.

This Doughnut work points to a number of exciting opportunities for the city, and these are highlighted when we start to explore the interconnections across our four lenses and understand how they affect each other. There are two aspects here:

Lose-lose activities: which can be identified and minimised, where a negative change in one area creates a knock-on problem elsewhere. For example, poor planning decisions in local-social issues can increase carbon emissions with global-ecological health; neglecting issues of racial justice in local-social issues can create a hostile environment more generally at the global-social level.

Win-win activities: which can be identified and enhanced, where a positive change in one area can create gains in another. For example, increasing sustainable mobility in local-social issues can help reduce pollution in local-ecological issues and carbon emissions in terms of global-ecological health; stimulating local goods and services based on well paid jobs in the local-ecological domain can reduce our impact on people across the world in terms of dangerous, poorly paid labour at the global-social level; supporting local eco-housing in the local-social level can protect land at the local-ecological level and reduce dependency on external fossil fuels and corporate home builders at the global-social level.

An essential next step then, is to recognise the interconnections across the four lenses, and how they affect each other. This has big implications for how we organise our work and how policy is made in Leeds.

Where next for the Doughnut?

Rather than an end point, our work is an invitation to many groups in the city including:

- Young people – what does this mean for people under 30 years old who will live through many of the decisions being made now? How can we support them so their voices are heard and amplified? We are working in partnership with Angel House and Black Lives Matter Leeds to undertake youth engagement around what the Doughnut means for young people, as part of a broader project of decolonising the economy.
- Transition partners – what do particular sectors, like energy, food, housing, education and employment, look like through the four lenses?
- Communities taking climate action – what does your community look like in the Doughnut?
- Leeds City Council – how can this work inform Leeds’ strategic work to meet local aspirations within its global responsibilities?
- Climate and racial justice partners – how can we continue to decolonise the way we work and the ideas we generate, and use this approach to highlight the ongoing legacies of colonialism, racism and oppression?
- Leeds universities – how can we create an open platform for research and learning that supports the Doughnut?
- Leeds businesses – we are keen to reach out and learn from what the business community is doing. How can we support firms and entrepreneurs in Leeds to support local social and ecological aspirations alongside global responsibilities?
- Climate Action Leeds – we are showcasing the Doughnut work in a city centre venue as a climate emergency hub for the city

Using the Doughnut — our city planning process

The Doughnut Portrait is one of many steps in a journey towards transforming a city. It creates a first baseline, an initial Portrait of where Leeds is at. It offers a framework for changing how we see the issues, and how to respond. It is an invitation to ask how did we get here, how do we change course and what are we already doing that adds to this work? From hereon, we want to use this work to engage and reach out. We want to hold up these initial findings to scrutiny and critique – to see if they reflect people’s lived experience of Leeds. We want people to create their own Portraits and see how these compare, adding in new dimensions and aspects based on what is important to them.

Our aim is to use this initial Doughnut framework to support a longer-term city planning process. This work is part of Climate Action Leeds and its aim to create a zero-carbon, nature-friendly, socially just city by the 2030s. This planning process will need to work across all Leeds’ sectors, to amplify, learn and share. Our city planning process involves testing and learning from projects and groups across the city and looking at how to support and expand them. This will involve using the ideas in this report to support practical action planning.

We want to create a city-wide planning process fit for the challenges ahead. Many of these challenges are becoming more urgent. We need to halve our carbon emissions by the early 2030s to play our part in stopping dangerous climate heating across the world. At the same time, we have to find ways to recover and regenerate natural species that are rapidly becoming extinct and unlock the stubborn social problems that are far too widespread in our city. In particular, our Doughnut work needs to support COVID recovery in Leeds – to support new ways of living, working and staying healthy. How can we support what worked well, but also encourage us not to fall back into previous harmful patterns?

This is our decade of transformation, which this initial work supports. We hope that this Doughnut Portrait can provide a guide to what we need to do next. There is no room left for tinkering. To create a thriving, safe place for all will require a transformative approach – thinking and acting across boundaries, trying out new and disruptive ideas and creating conversations with those traditionally disempowered.

Our call to action

Would you like to try this Doughnut approach in your community or sector? There are of resources available to do this on the Climate Action Leeds and DEAL websites. Get in touch with us if you would like to explore the Doughnut approach, or join our group that is taking this work forward.

The Leeds Doughnut Project emerged from the work of a group of people that includes:

- Paul Chatterton – Strategy
- Jenni Brooks – Communications & Engagement
- Anzir Boodoo – City Planning
- Catriona Rawsthorne – Policy & Analysis
- Anisha Solanki – Internationalism & Climate Justice
- Joel Millward-Hopkins – Global Modelling
- Irena Bauman – Design & Ecology
- Andy Goldring – City Hub
- Shannon Jackson & Marvina Newton – Youth Partners
- Shannon Coles & Andrew Howarth – Otley 2030 Community Partners

Find out more about our work at www.climateactionleeds.org.uk/leedsdoughnut

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Appendix 1.

Dimensions of the Local-Social lens

16 social dimensions	Indicators	Leeds snapshot / value	Threshold	City target
Health	Inequality of life expectancy of birth (2018-2020)	Combined, the average inequality of life expectancy at birth is 10.55 years between the most and least deprived areas in Leeds (PHE).	2 years - based on best UK benchmarks (Barking & Dagenham for males: 2.3 years And Richmond upon Thames for females: 1.2) (PHE).	Leeds will be a healthy and caring city for all ages, where people who are the poorest improve their health the fastest. (Health and Wellbeing Strategy, 2016 - 2021).
Housing	Affordability ratio (Price - income)	On average, house prices in Leeds are 6.3 times more than median gross annual workplace-based earnings (ONS, 2020).	We propose a threshold of 4 based on a comparator case of Liverpool (ONS, 2020).	All Leeds residents will be living in good quality affordable homes, homes with appropriate levels of support and safe and harmonious communities.’ (Housing Strategy 2016 - 2021)
Water	People experiencing water poverty (paying more than 5% of their disposable income on water bills).	In 2019, across Yorkshire there are roughly an estimated 150,000 customers with a water bill that exceeds the threshold for water poverty (paying more than 5% of their disposable income). This data is not yet available at the Leeds scale. (Source: UKWIR, 2020)	0% - UKWIR suggested industry target by 2030 . (Source: UKWIR report, 2020)	No target identified.
Food	No. of people who accessed a food bank.	In 2019/2020, the Trussell Trust provided 31,526 food parcels across Leeds, 41% of which were provided for children. (Trussell Trust, 2021).	0% - UN Sustainable Development Goal 2 ‘Zero Hunger’	Target in development.
Connectivity	% of the population classed as digitally excluded due to lacking all of the foundational essential digital skills. % of the population without the essential digital skills deemed necessary for life. Essential Digital Skills (EDS)	In 2021, across Yorkshire and the Humber, 7% of the population are classed as digitally excluded due to lacking all of the seven basic digital skills. 23% of the population do not reach the level of essential digital skills deemed necessary for life (Lloyds/IpsosMori 2021). The data for Leeds	0% - LCC	For Leeds to be 100% digitally connected and competent (100% digital Leeds campaign)

		specifically is not yet identified.		
Community	Leeds survey respondents' satisfaction with their local area as a place to live	In 2020, 78% of Leeds respondents were satisfied with their local area as a place to live in the annual 'Your View Survey' (Your View Survey - 2019/2020 : Office of the police and crime commissioner, West Yorkshire).	Copenhagen - 98% (Source: European Commission report)	For Leeds to have strong, engaged and well-connected communities (Health and Wellbeing Strategy, 2016 - 2021)
Mobility	Number of serious injuries or deaths resulting from road accidents.	In 2019, there were 357 people in Leeds seriously injured or killed in road traffic accidents. (Source: Pedestrian Safety)	0 - LCC	'Zero people killed or serious injured on Leeds roads by 2040.' (Leeds Transport Strategy)
Culture	No. of visitors at local authority-run museums & galleries	Leeds Museums & Galleries is the largest local authority-run museum service in England, welcoming 1.7m visitors across its 9 sites in 2018/19 (BCP 2020-2025, p.23).	N/A	Leeds will be a city where local culture and sporting activities will be available to all (Best Council Plan)
Jobs	Percentage of Leeds' resident population who earned less than the National Living Wage. Percentage of Leeds' resident population who earned less than the Living Foundation's Living Wage in 2020.	In 2021, 9.9% of all Leeds working residents are estimated to have earned less than the National Living Wage, affecting 30,294 FTE residents. Compared to the Real Living Wage, this increases to 21.5% (65,900 residents). (Leeds observatory poverty factbook, via JSA)	Belgium only 1% experience low pay. (Source: Eurostat, 2018)	The city has a strong economy with quality local jobs (Health and Wellbeing Strategy, 2016-2021)
Income	Percentage of working age adults across Leeds affected by in work poverty	It is estimated that around 74,000 (14%) working age adults across the city are affected by in work poverty. (Leeds observatory poverty factbook, via JSA)	0% - LCC	'We want everyone in Leeds to...earn enough to support themselves and their families (Outcomes: BCP, p.11).

Education	% of 16- and 17-year-olds in full time education and training (includes apprenticeships and all other pathways).	85.9% of 16- and 17-year-old are in full time education or training (2021) - Dept for education, gov.uk	100%	To ensure every child and young person in Leeds has the opportunity and support to achieve their potential (3As strategy, 2019) 'We want everyone in Leeds to...Do well at all levels of learning and have the skills they need for life' (Outcomes: BCP, p.11).
Energy	Percentage of Leeds households considered to be in fuel poverty. Fuel poverty: Low Income High Costs definition, which considers a household to be fuel poor if they have required fuel costs that are above average (the national median level) and were they to spend that amount, they would be left with a residual income below the official poverty line.	2019: 57,429 households = 16.8 (17) % of households in Leeds (Department for Business, Energy and Industrial Strategy)	0 - LCC	'all homes in the city are of a decent standard and that everyone can afford to stay warm.' Leeds Affordable Warmth Strategy 2017-2030.
Peace & Justice	Percentage of Leeds resident survey respondents who feel safe in their neighbourhood	In 2020, of 5618 Leeds survey respondents, 84% of residents feel safe in their community. (Your View Survey - 2019/2020) : Office of the policy and crime commissioner, West Yorkshire). March 2019-2020.	100% - LCC	We want everyone in Leeds to... Be safe and feel safe (BCP, 2020-25, p.11).
Social Equity	Child poverty	In 2019/2020, 20% of children in Leeds were living in poverty before housing costs. (Leeds Observatory)	Less than 10% of children in poverty - Child Poverty Act (2010) 0 - new labour target (see JRF article - govt target to end child pov. By 2020)	Leeds to be inclusive, where all citizens are treated fairly. (BCP 2020-2025, p.26)
Political voice	Voter turnout in local elections and the WYCA mayoral elections (May 2021) (%)	Average voter turnout in Leeds was 34.3% in Leeds City Council's 2018 Local Elections. ¹¹³	51.4% - the local authority with the highest voter (Richmond upon Thames) turnout in	For Leeds to have strong, engaged and well-connected communities (Health and Wellbeing Strategy,

			2018. (Source: parliament UK)	2016 - 2021).
Equality in diversity	Number of hate crimes recorded	There were 3,654 recorded incidents of hate crime in the 12 months to the end of September 2021. This is up from 1789 in 2016, and 711 in 2014. (Sources: Best Council Plan scorecard (leeds.gov.uk) & Fol request, West Yorkshire Police).	0 - LCC	Leeds to be inclusive, where all citizens are treated fairly. (BCP 2020-2025, p.26)

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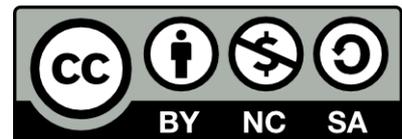
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