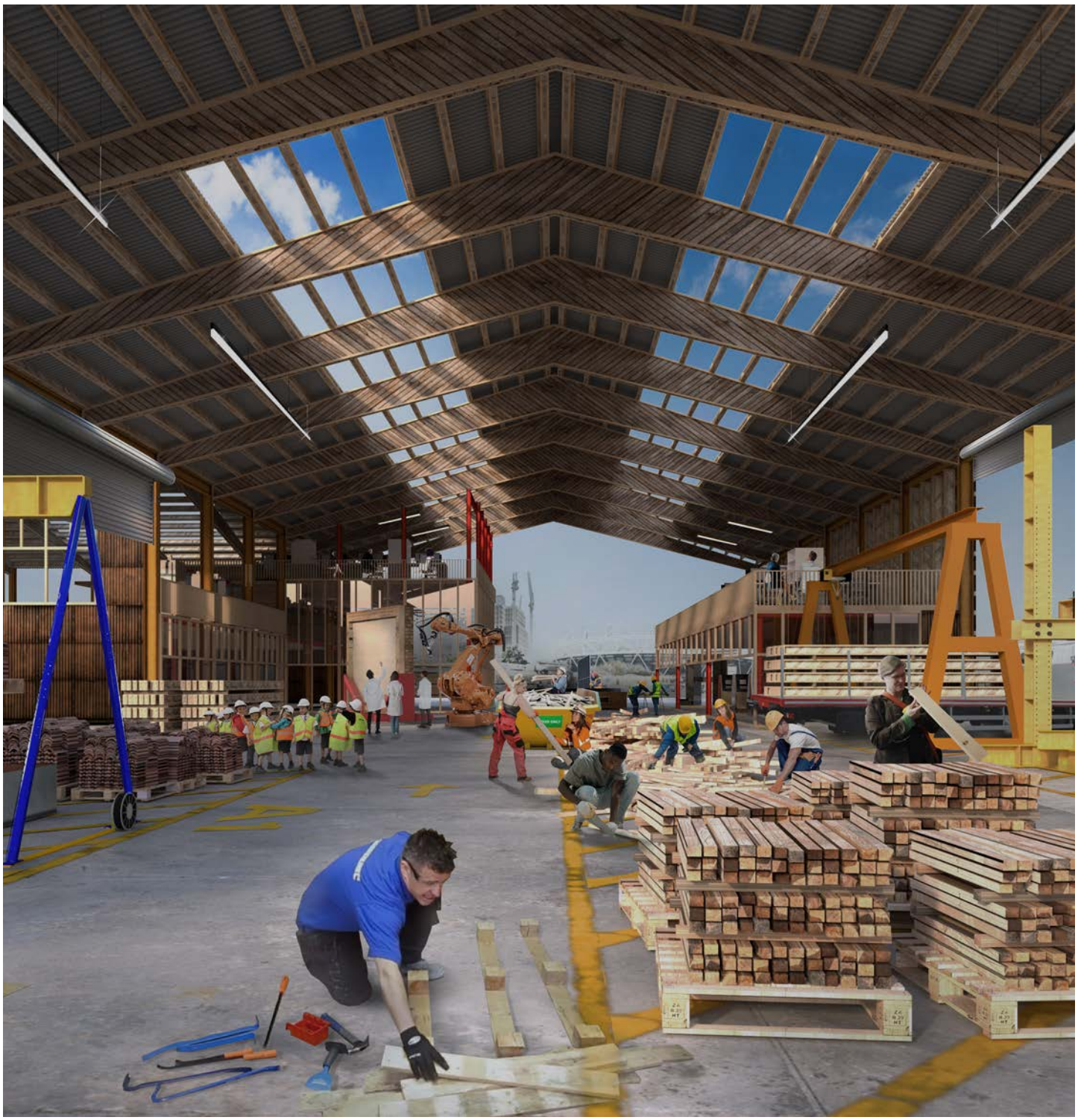
Circular Economy Construction Hub Newham



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Circular Economy Construction Hub Newham

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Foreword

As the UK faces a deep recession, austerity is again set to bite and London's boroughs face a £700m budget shortfall in the next financial year, what then is the relevance of sustainability and the circular economy? This is a particularly urgent question in a borough like Newham, the second most deprived in London and disproportionately affected by climate change and poor air quality but – importantly – one in which new construction and development projects have been rolling out at pace and scale since the Olympics in 2012.

This report, commissioned by the London Borough of Newham, reveals the potential of a circular economy as a route to responding to the climate emergency while creating new job opportunities, building community resilience and helping to grow a local economy in which everyone can participate.

It is a compelling case for developing a circular economy construction hub within the borough outlining both the business and environmental benefits that could be realised. The initial recommendation is for a 'circular starter hub' – a place where locally recruited people will refurbish, process and distribute a wide range of reused construction materials and receive training across a variety of manual and digital skills required for a career in the sector. This is proposed as the first iteration of the hub, which would lead on to a much more ambitious circular catalyst, offer a wider range of services and even more community benefits.

Given the scale of construction developments in the borough, such as the Royal Docks where around 30,000 new homes and over 40,000 new jobs will be realized over the next 20 years, delivering London Borough of Newham's goal to become 'London's greenest economy' is no straightforward task; and it will require a hard focus on sustainability and circular construction methods will be essential to ensure that developments minimize their environmental impact. The circular economy construction hub proposed in the following report will test and showcase ways in which developers and builders can reuse and repurpose more building materials, reducing their associated carbon impacts in the process.

The hub will also attract investment into the area and contribute to Newham's Community Wealth Building strategy, ensuring that investment benefits all residents. Critically, the report also identifies how the Council can use its purchasing power and regulatory influence to support the success of the hub and keep wealth within the local economy, creating resilient space and economies for their communities today and tomorrow.

At ReLondon we are excited and inspired by exactly this kind of systems-wide approach, one which is necessary to drive behaviour change and stimulate demand for circular products and services. The new hub will be a great example of the kind of city-based developments we are piloting and promoting through the Horizon 2020-funded CIRCuIT project and the next phase of this project can incorporate and build upon many of CIRCuIT's outputs in relation to planning policy, public procurement and the digital systems needed to support these.

We believe that this would be the first hub of this kind in the UK, which would not only be a vital building block for the London Borough of Newham, but also be a beacon project that helps many others to implement tangible circular economy initiatives at a local level which tackle the climate crisis, provide local jobs and build resilient communities of the future.

We are certain that London Borough of Newham will make a success of this; and hope that they continue to implement these kinds of pioneering ideas. Other local authorities can take inspiration from Newham's energy and commitment in hard times to delivering such a tangible outcome.

Andrea Charlson, ReLondon Built Environment Lead
November 2022

Glossary

Circular Economy	A circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources.[1]
Embodied Carbon	Embodied carbon is the total greenhouse gas (GHG) emissions generated to produce a built asset. This includes emissions caused by extraction, manufacture/processing, transportation and assembly of every product and element in the asset.[2]
Recycle	The process of turning waste into new materials. This process avoids waste disposal (landfill) and often includes waste incineration to create energy.[3]
Reduce	Part of the waste hierarchy as described in EU legislation[4], minimising waste through design is the highest priority within a circular economy.
Regenerative design	A selection of strategies, methods and technologies which understand the inner workings of an ecosystem to yield a design that has a positive, rather than depleting, impact on the support systems and resources on which it is built.[5]
Regenerative materials	Regenerative materials are those which can be extracted from cyclic processes of regrowth without reducing the capacity of that cycle to regenerate.
Remanufacturing	Somewhere between reuse and recycling, this takes a product's constituent part and replaces worn out and non-functioning parts with a combination of reused, recycled and new parts.[1]
Repurpose	Repurposing is the use of a product or material for a different function than it was originally produced. Repurposed materials are often associated with architectural design features and art projects. However, identifying alternative uses for outdated assets may not only save disposal fees but also save material costs spent elsewhere.[2]
Reuse	The process of taking an existing item and using it again for the same, or a different purpose, without breaking this item down. This is preferable to recycling as it reduces the amount of time, money, and energy required for this item and component materials to continue to be used. It will also minimise, if not eliminate, waste.[3]
Sustainable	Actions which meet the needs of the present without compromising the ability of future generations to meet their own needs, similar to the definition of 'Sustainable Development' as defined by the United Nations.
Whole Life-Cycle Carbon	Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from the materials, construction and the use of a building over its entire life, including its demolition and disposal. A WLC assessment provides a true picture of a building's carbon impact on the environment (Mayor of London).[4]

1 Ellen Macarthur Foundation, Circular Economy Introduction, u.d.
2 UK Green Building Council, Embodied Carbon: Developing a Client Brief, March 2017 https://www.ukgbc.org/wp-content/uploads/2017/09/UK-GBC-EC-Developing-Client-Brief.pdf
3 Department of Environment Food & Rural Affairs, Legal definition of waste guidance, https://www.gov.uk/government/publications/legal-definition-of-waste-guidance/decide-if-a-material-is-waste-or-not, 2-21
4 European Commission, Waste prevention and management, 2022
5 RIBA, Built for the Environment report, https://www.architecture.com/knowledge-and-resources/resources-landing-page/built-for-the-environment-report, 2022

1 Johnson, M.R & McCarthy I.P (2014) Product Recovery Decisions within the Context of Extended Producer Responsibility. Journey of Engineering and Technology Management
2 Circular Economy Practitioner Guide, 2018.
3 Department of Environment Food & Rural Affairs, Legal definition of waste guidance, https://www.gov.uk/government/publications/legal-definition-of-waste-guidance/decide-if-a-material-is-waste-or-not, 2-21
4 Mayor of London, London Plan Guidance: Whole Carbon Life Cycle Assessments, March 2022 https://www.london.gov.uk/sites/default/files/lpg_-_wlca_guidance.pdf

A Circular Economy Construction Hub Catalyst approach could achieve up to:

Figure 1: Key statistics from report

Potential investment in the borough (over next 10 years)	£137.3m
Potential GVA (over next 10 years)	£120m
Potential local market size (GVA)	£2,010m
Potential local market size (businesses)	3,950
Embodied carbon saved (kg$C0_2e$/ tonne)	3,932
Target CO_2e saved (tonnes)	19,986
Student Completions P/A	400 – 960
FTE on-site	252

Executive Summary

In *Towards a Better Newham: COVID-19 Recovery Strategy,* the London Borough of Newham sets an ambitious goal: to become the greenest economy in London. This report shows how transformation in the construction industry can help meet that goal, while also supporting high-quality jobs and unique training and educational opportunities for residents and newcomers alike. The key transformation is to shift away from the linear material use prevalent in construction today ('make, use, discard') and towards a circular construction economy. LB Newham is uniquely well-placed to do this. The borough already hosts significant industrial space, a young, diverse and ambitious labour market and significant ongoing real estate development, active across new build and refurbishment.In the report that follows, we show how LB Newham can capitalise on these resources by supporting a Circular Construction Economy (CCE) and establishing a Circular Economy Construction Hub (CECH) that can serve the whole of London and set an example both nationally and internationally. Aside from the significant cultural and environmental benefits, this new Hub could support over 250 direct jobs (gross), and opportunities for engagement with over 10,000 students per year while generating over £6.5 in new local spend, and additional investment of up to £137m over the next 10 years.

Why a CECH?

Climate change is the defining issue of our time. LB Newham and the wider governance structures within which it sits, including the Greater London Authority (GLA), the UK Government, and the United Nations, have all set ambitious targets to address climate change. Transformation of the building and construction industries are critical to meeting these targets, as they are responsible for 39% of global carbon emissions.[1] Embodied carbon, the carbon released during the extraction, processing and assembly of construction materials, counts for over 25% of the total carbon burden of buildings, a figure which the Ellen MacAurthur Foundation estimates we could reduce by 38% by adopting circular economy principles[2]. This is critical not just for carbon emissions, but for waste: construction and demolition waste accounts for nearly 2/3rd of global waste, and this figure is higher in areas undergoing rapid redevelopment,[3] causing contamination on a vast scale. A CECH would address these issues in an immediate, hands-on, and practical way while generating local economic growth, training and jobs.

1 World Green Building Council, Global Status Report, 2017.
2 Ellen Macarthur Foundation, Circular Economy Introduction, u.d.
3 UK Statistics on Waste – March 2020 update: https://www.gov.uk/government/statistics/uk-waste-data and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/778622/U K_Statistics_on_Waste_dataset_Feb_2019_rev_FINAL.xlsx

What is a Circular Economy?

A circular economy is a design-driven approach to decouple economic growth from the consumption of finite resources. In the context of construction, this means moving away from a linear model of resource use, in which materials are sourced, deployed in a building and removed at the end of their economic life – usually lasting between 60 and 90 years[4]. The circular approach is based on three core principles: to eliminate waste and pollution; circulate materials and keep assets in use (at their highest value); and regenerate natural systems. A circular economic model creates new sectors of activity and opportunities for businesses and start-ups, while decreasing human-caused climate change and resource depletion.

Construction presents unique strategic advantages for a gateway into a circular model: it is currently a waste-intensive practice with opportunities to change at every scale, from reusing door handles to redesigning policy frameworks, supply chains, and commercial infrastructure. Currently, only 1% of construction materials disposed of as waste are repurposed[5], leaving considerable scope for improvement across the market and across all materials. In this report, we show how the LB of Newham can be a national leader in the Circular Construction Economy, reducing carbon emissions and waste while improving construction practices and creating a better-built environment for all.

In what follows, we have conducted a thorough review of the field, including the policy and commercial context, and have undertaken precedent and stakeholder studies. We have identified five programme areas that will be pivotal in the transition to a circular construction economy. These range from material salvage through to testing and development. In response to both these programme areas and LB Newham's policy priorities, this report features four design propositions for a Hub, each offering an alternative means through which LB Newham could invest in the transition to a green, circular economy for the borough. These four design options range from a digital platform offering access to training opportunities in circular economy skills, through to a large-scale catalyst facility that addresses all five critical programme areas to enable and accelerate change in industrial practices. This is a project that aims to transform an industry, and will therefore require collaboration between the Council, business and training organisations at a range of scales. At the end of the section detailing options, we have summarised our research and suggested a set of potential partners, both locally and nationally. These range from adjacent businesses to training providers.

The options are evaluated by a range of metrics, including jobs and training opportunities, capital and seed funding costs and carbon emissions reductions. The report closes with a summary section allowing for quick comparison of the four options according to different selection criteria, followed by a Way Forward section outlining recommendations for the next steps. The first of these is a recommendation to establish a Circular Construction Economy action group within LB Newham to start to address both the levers and barriers to change at the local authority level. The second is to commission a thorough business evaluation of the preferred option for the CECH, a process which will both help de-risk any future action and shape a potential brief, set of job descriptions and organisational development work.

The background research which has supported the production of this report is shared in a series of appendices available alongside this document.

4 UCL, Lifespan and Decisions: A Factsheet, https://www.ucl.ac.uk/engineering-exchange/sites/engineering_exchange/files/fact-sheet-lifespan-and-decisions-social-housing.pdf

5 Interreg North-West Europe, A guide for identifying the reuse potential of construction products, 2020

Fig. 2: Propositional view of CECH: builders' merchant yard, external.

1 Introduction

1.1 Background and Purpose of Report

The London Borough of Newham, in partnership with ReLondon, developed the *CECH for Newham: Initial Scoping Report* that identified an opportunity to create a CECH in the south of Newham. Initial research and conversations with industry experts suggested that the scale of the economic opportunity and environmental benefits could be significant, and that the south of Newham, with its excellent infrastructure, industrial land and forthcoming developments, would be an ideal location.

As outlined in the scoping report, the intention of this hub is to "enable the reuse of construction materials at scale across London and beyond. It will also offer research and manufacturing facilities to support innovation in construction and offer jobs and training in this rapidly expanding sector".[1] The report put forward a vision to "enable the capital's shift to low carbon construction, drive significant opportunities in the green economy and play a major role in helping Newham meet its ambitious sustainability targets".[2] Following the *Initial Scoping Report*, the London Borough of Newham successfully secured funds through the Government's UK Community Renewal Fund to unlock the Green Economy opportunities in the south of Newham, through the development of an overarching business case and delivery strategy for Green Economy initiatives in North Woolwich and Beckton. Four sub-projects were funded, including:

- Project 1: Green Economy Business Case and Delivery Plan
- Project 2: CECH Feasibility Study
- Project 3: Spaces for Green Enterprise Feasibility Studies
- Project 4: Will Thorne Pavilion Cycle Hub Pilot

This report was commissioned under Project 2 in order to undertake a more technical assessment of the feasibility of the idea and to identify the key next steps to take the project forward.

1 Circular Economy Construction Hub for Newham: Initial Scoping Report, 2021
2 Idem

Fig. 3: Aerial shot of steel pipework stock at Cleveland Steel.

1.2 Methodology

In order to develop the evidence base for this feasibility study, we have undertaken a four-stage process: a desktop-based review of policy and best practice; stakeholder consultation and engagement; options development; and then evaluation of these options in order to provide the recommendations and next steps detailed in section 6.0.

The review of policy and best practice consisted of a desktop review of existing circular economy initiatives, both within the UK and worldwide. We identified existing interventions that focussed on construction and material reuse, as well as local businesses that were likely to interface with a potential circular economy construction hub. Following this identification, we undertook significant engagement with these stakeholders, conducting over 20 in depth interviews to understand the scale of the existing opportunity, the constraints of the circular economy, the business models and the opportunities for intervention.

From this work, and referring back to the initial scoping report, we moved through an options development process, using the UK Government's Green Book Guidance to structure this process, outlined below. We focussed on the service solution to develop the *elements* of a Circular Economy Construction Hub (outlined in section 4.1), which we identified as the key decision-making factor in the options development, i.e. defining the elements that will make up the hub substantially impacts all the other parts of the options development process, making it the 'driving factor'. This then developed four options which all scale in terms of how many programme areas they are able to support and, consequently, the extent of the impact they will be able to have on the construction industry, economy and jobs market in LB Newham and London as a whole. It is important to note that this report makes a set of estimations about scale and cost that, while rigorously generated, would need to be tested both through an in-depth business case and more detailed work with supporting partners.

Following the options development, the team applied the Council's evaluation framework, based on its objectives (outlined in section 2.3 below) in order to evaluate the options. These options have been evaluated against a series of quantitative metrics which measure alignment with the project's strategic objectives. This creates a golden thread between the Council's objectives and vision and the options themselves, ensuring the recommended option is demonstrably able to further the Council's strategic ambitions for Newham. Further detail on the technical evaluation methodology is available in Appendix B.

As a result of this evaluation, we have proposed the final recommendations and next steps, which have been informed by the current barriers to uptake, the levers available to the Council, the options themselves and the resulting cost and likely benefit impacts.

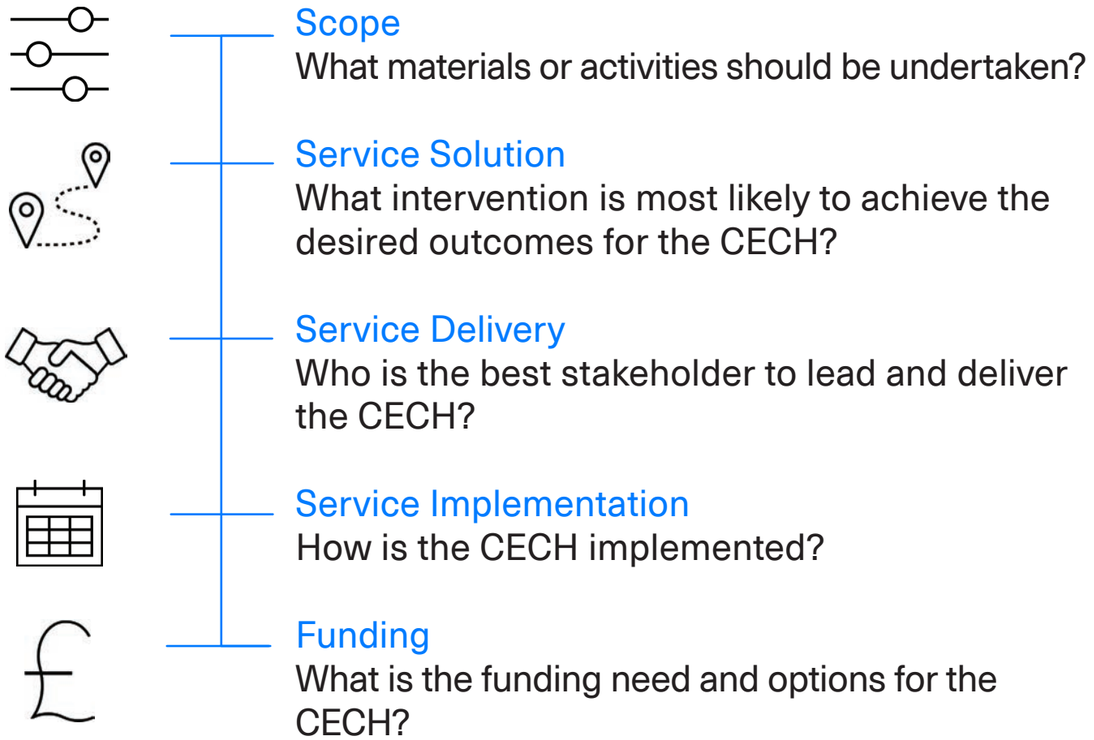


Fig. 4: Recommended next steps diagram.

1.3 Overview of Report

This report is presented in two parts – a long format summary of key findings and proposals (this document) and a set of appendices which offer significantly more detail on the background, context and research undertaken to inform the feasibility of the opportunity.

In the first chapter, The Case for Change, we've shown the scale of the climate challenge and the extent to which the construction industry contributes to climate change across the UK. We have identified the specific social, economic and physical context of Newham and how the pillars identified in *Towards a Better Newham* set a vision for developing solutions, defining the objectives for any intervention.

In the second chapter, The Opportunity, we explore the concept of a Circular Economy as one tool within a broader toolkit that can start to address the climate emergency. We've outlined the national policy areas that a Circular Construction Economy (CCE) would deliver on, and described the impact a Green Industrial Revolution could have on employment, skills and training, supporting up to 108,000 circular economy jobs nationwide. Summaries of the most relevant reports and policy documents are available in Appendix C. We have also explored the current barriers to a CCE and the levers available to the Council to start to address these barriers, and made recommendations on how the Council can create a favourable environment for a CCE in the borough.

In the third chapter, The Solution, we have explored the opportunity to develop a CECH for Newham, and the five key programmes of work a Hub may use to address specific areas of resistance: salvage, retail and reuse; training and continued professional development; research and development; testing; and business to business networks. We have reached out to other areas of the UK and wider Europe to identify precedents for each of these programmes, as a comprehensive CECH has not yet been established. We have described four ways in which LB Newham could act to realise this potential, and how these could deliver on at least five of the seven pillars identified in *Towards a Better Newham* by stimulating the local economy, improving skills attainment, providing high quality jobs, supporting sustainable growth ambitions, and supporting net zero ambitions. These options range in scale from a fairly light invention in which a digital platform would coordinate business to business cooperation, through to an ambitious, flagship reuse hub that would be the cornerstone of a new industry of Newham, and would be a resource for London and an example to both the United Kingdom and cities worldwide. Each option is described in outline, followed by a brief summary of the qualitative and quantitative benefits.

In the final chapter, Recommendations, we outline the next steps and a delivery action plan. This includes key questions that LB Newham will need to answer to establish a clear framework for action, and an outline of the key tools that will be required to start implementing this idea.

The Case for Change section below outlines the current context, policies and challenges that drive the need for change in this space, and then explores in more detail the specific risks and barriers to wider uptake of a circular economy approach to construction.

2

A Case for Change

2.1 National Challenges and Ambitions

The UK government has made a legally binding commitment to reduce all greenhouse gas emissions (GHGs) to net zero by 2050, with an interim target to cut emissions by 78% by 2035.[3] To meet this commitment, a local authority's own net zero targets should be in line with – or more ambitious than – this target.

From residential to commercial buildings, the UK's built environment is responsible for 25% of the UK's greenhouse gas emissions, and this share increases to 42% if vehicle emissions from transportation are included.[4] The UK Parliament's Environmental Audit Committee's May 2022 report highlights the urgent need for measures that go beyond operational emissions to tackle the whole-life and embodied carbon costs of construction. The report also emphasises that one of the major obstacles to decarbonising the construction sector is the lack of readily available low-carbon materials.[5]

The sheer scale of emissions produced by the UK's construction sector means this industry will be pivotal in determining national capacity to meet Net Zero carbon targets within the critical time frame. Enduring supply chain disruption during the Covid-19 pandemic, as well as that wrought by shorter-term incidents like the 2021 Suez Canal blockage, demonstrate the high price volatility and supply fragility of imported construction materials, making the development of local low-carbon alternatives increasingly economically and strategically attractive.

Transitioning to a net zero economy also creates employment risk: research suggests that one in five jobs in the UK (approximately 6.3 million workers) will have skills which may experience demand growth (approximately 10% of UK jobs) or reduction (approximately 10%) in the transition to a net zero economy.[6] This transition does not enable perfect job substitution: a job in the current economy does not perfectly match with a job in a net zero economy. Similarly, the Grantham Institute and UK100 have estimated that 3.1 million jobs will need support with skills and training (with an additional 3 million seeing a positive impact in their role) due to the move to a green economy, with over half a million of these in London.[7] As a result, significant upskilling is required nationally to minimise the impact on existing at-risk workers, with local providers & authorities best placed to understand the needs of their own local residents.

78%

Target decrease in emissions by 2035.[3]

500,000

Number of jobs in London that need skills and training to transition to a green economy.[7]

1 in 5

Jobs will be impacted by the move to a net zero economy.[6]

4,000

Almost 4,000 businesses have the potential too overlap with a CECH (see page 123).

Fig. 5: Green Economy stats.

3 Department for Business, Energy, & Industrial Strategy, UK enshrines new target in law to slash emissions by 78% by 2035, https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035
4 UK Green Building Council, Climate Change, https://www.ukgbc.org/climate-change-2/
5 UK Parliament's Environmental Audit Committee, Building to net zero: costing carbon in construction, May 2022 https://committees.parliament.uk/publications/22427/documents/165446/default/
6 Green Jobs Taskforce, Department for Business, Energy & Industrial Strategy, 2021
7 WPI Economics & Institute for Employment Studies, Green Jobs and Skills in London: cross-London report

2.2 Newham's Challenges and Ambitions

The borough is one of the few areas of London that is still actively industrial, with a range of construction-related businesses located along the river Lea and the Thames, including material salvage yards and material recycling. Initial assessments have identified almost 4,000 local businesses that have the potential to overlap with a CECH depending on the form and function of the hub.[8]

Newham contains around nine million square feet of industrial space, around two-thirds of which is used for logistics.[9] The largest warehouses and manufacturing units within the borough are congregated close to London City Airport and beside the River Thames, with good access to incoming river and air freight. Both the industrial space and key infrastructure connections are necessary for a thriving, diverse urban economy, and would directly support the establishment of the CECH. This space is also increasingly at risk: the area has lost more than half a million square feet of industrial stock through conversions and demolitions over the past decade.[10]

Parts of Newham, particularly around Stratford, Customs House, Canning Town and the Royal Docks, are undergoing significant regeneration. This level of development activity creates an ideal opportunity for Newham to leverage its own buying power to support the transition to a net zero economy and encourage a local circular economy. The borough also has a young and diverse population, with one of the fastest rates of growth, creating access to a large pool of students and potential future employees and entrepreneurs. Forecasts suggest that over the next five years, Newham will contain 20% of London's job growth and 78% of business growth, with over 60,000 new jobs by 2030.[11] This provides a significant opportunity

8 Arup, Analysis of companies house SIC code data to identify potential partners, July 2022. More detail available in Appendix B.
9 CoStar, Newham Industrial Submarket Report, Access July 2022
10 CoStar, Newham Industrial Submarket Report, Access July 2022
11 London Borough of Newham, Community Wealth Building, 2020

Fig. 6: View across Queen Elizabeth Olympic Park.

to future proof these new jobs for the green transition, by investing upfront in the green economy in order to attract employers and further external investment in this industry. Newham currently has low job self-containment, with the majority of residents travelling west (to Central London) to work.[12] Residents of Newham earn less on a weekly basis than those who work in Newham, with Newham having the 6th lowest resident pay in London.[13] Newham's existing job density is 0.55, which means that for every one person aged 16 -64, there are 0.55 jobs in the borough. By comparison, the median jobs density across inner London boroughs is 1.31 jobs per resident. While access to the central London jobs market is an overwhelmingly positive opportunity for Newham residents, there is a real opportunity to create local jobs and partner with local schools and providers to keep talent and residents local. This would support the borough's ambition to create 15-minute neighbourhoods, encouraging participation in the community for the current transient population,[14] and increasing local expenditure which can positively impact the area. Further details of Newham's socio-economic profile can be found in Appendix A.

At a local policy level, Newham has identified, through its *Towards a Better Newham – COVID-19 Recovery Strategy*[15] the need to make more fundamental changes to help create an inclusive economy, which addresses inequalities, including race, poverty and deprivation. The combination of industrial space, a growing population and economy, and significant development creates an environment that is ripe for positive intervention in order to position Newham for the coming transition.

Recommendation 1

The Council should consider opportunities for intervention across the green economy, in order to best position itself and its residents for the net zero transition. These opportunities are currently being evaluated through the Community Renewal Fund Programme's Project 1: Green Economy Business Case and Delivery Plan.

Fig. 7: 8 Pillar Framework from Towards a Better Newham - Covid-19 Recovery Strategy.

12 Datashine, using 2011 Census Data
13 ONS annual survey of hours and earnings – resident analysis, 2021
14 15% of the population either moved in or out of the borough in 2017 alone. London Borough of Newham, Community Wealth Building, 2020
15 Towards a Better Newham, COVID-19 Recovery Strategy, London Borough of Newham, 2020

2.3 Delivering Newham's Objectives

Locally, Newham is seeking an intervention that would support the following objectives:

1 Improve the quality of life for residents of Newham, improving access to opportunities including jobs and education;
2 Increase sustainable construction practices to become London's greenest borough and local economy;
3 Reduce greenhouse gas emissions and the use of raw materials;
4 Deliver a financially viable solution that attracts local investment in Newham;
5 Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices.

These objectives have been created in alignment with the pillars identified in section 2.2 above. In order to ensure that the options developed below align with Newham's strategic objectives, the following metrics have been identified as a way to quantitatively measure the performance of options against the objectives (right). These metrics provide a framework to assess which intervention is most likely to achieve the Council's desired objectives.

A note on Digital Skills and Technology:

Digital Skills were not included within the original scope of this report, however the research we have undertaken has shown that future technological, digital and data improvements will play a significant role in overcoming existing barriers to the circular economy. Recommendations for future digital and data projects are therefore outlined in section 4 below.

Strategic Objective	Metric
1 Improve the quality of life for residents of Newham, improving access to opportunities including job and education	Number of FTE employees supported on site
	Number of student completions (all training types) supported per year
	Student outreach - Number of students per year that the hub could interact with (based on pupils in the Newham area), e.g. through school visits
2 Increase sustainable construction practices to become London's greenest local borough and economy	Embodied carbon saved (kgC02e/tonne) Target CO2e saved (tonnes)
3 Reduce greenhouse gas emissions and the use of raw materials	
4 Deliver a financially viable solution that attracts local investment in Newham	Gross GVA (over the next 10 years)
	Potential investment in the borough (over the next 10 years)
	Local spend generation (over the next 10 years)
	Cost to Council to progress
5 Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices	Potential local market size (number of businesses and aggregated GVA)
	Collaboration potential

Figure 8: Proposed Objectives and Metrics.

3

The Opportunity

3.1 The Circular Economy as a Solution

For the purposes of this report, the circular economy is defined as a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy aims to gradually decouple growth from the consumption of finite resources,[1] relying on three core principles: to eliminate waste and pollution; circulate materials and keep assets in use (at their highest value); and regenerate natural systems (Figure 1).

National policy is currently heavily focussed on the transition to zero carbon as a response to the climate emergency. While this is a critical undertaking, a circular economy approach is designed to address multiple ecological constraints, beyond carbon emissions, by minimising waste and encouraging regenerative systems.

A circular economy approach is vital to achieving climate targets. 45% of emissions are generated by the manufacturing of products (as opposed to the more direct use of energy for heating and cooling homes, transportation, etc), including our use of cars, clothes, electronics, and construction.[2] The circular economy is a relatively new area for investment that both supports emissions reduction and good quality employment. Meeting the Mayor of London's waste and recycling targets, as set out in the London Environment Strategy could create as many as 284,000 jobs by 2030.[3] The recent Department for Environment, Food & Rural Affairs report, Waste Prevention Programme for England: Towards a resource efficient economy, recommended that Local Enterprise Partnerships, mayoral combined authorities and other local authorities should pilot "circular economy hubs" which support reuse, repair and remanufacture services and businesses.[4]

1 Ellen Macarthur Foundation, Circular Economy Introduction, u.d.
2 Ellen MacArthur Foundation, Completing the Picture: How the Circular Economy Tackles Climate Change, 2019
3 ReLondon,The circular economy at work: Jobs and skills for London's low carbon future, June 2022
4 Department for Environment, Food & Rural Affairs, Waste Prevention Programme for England: Towards a resource efficient economy, 2021

The circular economy agenda is also supported by independent reports from the Green Jobs Taskforce (convened by BEIS and Department of Education, 2021). They highlight the opportunity offered by a green industrial revolution, with growth in circular economy sectors such as repair, manufacture and refill having the potential to create between 54,000 to 102,000 net jobs across all regions in the UK by 2030. They point out that shifting towards more circular economy activities has the potential to decrease demand for imported goods and increase jobs locally, especially through repairs. The reports predict that workers will require skills in repair and manufacturing at A-Level to Undergraduate level skill equivalents (NVQ levels 3-6) as well as circular economy business planning at master's level, including engineers, material scientists and managers.

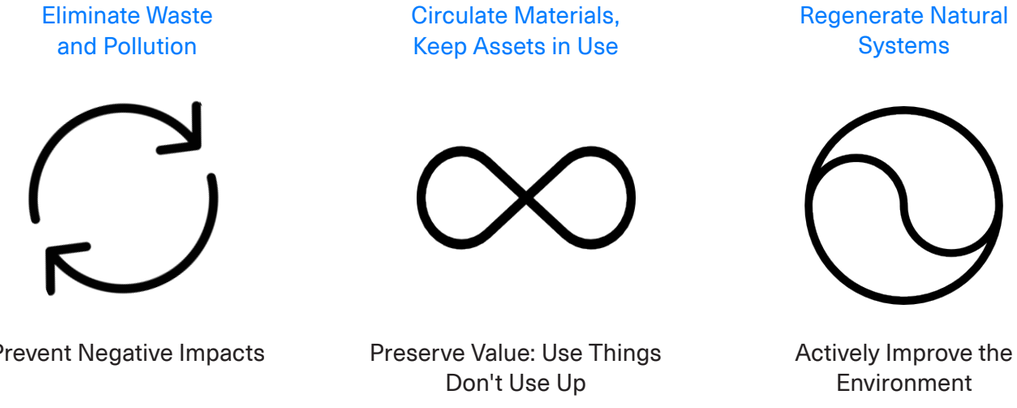


Fig.9: Circular Economy Approach from the Ellen MacArthur Foundation.

3.2 The Circular Economy in the construction industry

Why construction? Globally, the built environment generates nearly 50% of all greenhouse gas emissions[5] while the construction industry is responsible for 50% of the total use of raw materials.[6] Construction is, furthermore, a rapidly expanding sector, with global built floor area expected to double in the next two decades.[7] Investing in the technological, infrastructural, and cultural shifts needed to decarbonise construction is therefore a strategic priority with potential global impacts.

Newham has an estimated 6,000 construction jobs in the borough (approximately 5.1% of its total employment),[8] but with significant developments expected to continue through the Council's regeneration programmes, this number is likely to increase. The *Green Jobs and Skills in London* report identifies that there are approximately 14,000 jobs in the reduce, reuse, recycle industry in London (where a circular economy approach would normally be classified), and 56,700 green jobs within the Homes & Buildings industry (where most construction would be classified).[9] Furthermore, the Homes & Buildings industry is the most likely industry to suffer from a skills gap, increasing the security of jobs in the longer term industry. Along with the reduce, reuse, recycle industry, it is also one of the areas that has the most representation of skilled craft occupations, equivalent to an NVQ 3. This means that focussing on the circular economy in the construction industry has the ability to make a bigger impact in terms of jobs and skills for local residents than focussing solely on a circular economy approach, and that the opportunities most likely to be available in a circular economy approach align with the needs of Newham residents.

5 Architecture2030, Why the Built Environment, https://architecture2030.org/why-the-building-sector/
6 IEA, Global Status Report for Buildings and Construction, 2019 https://www.iea.org/reports/global-status-report-for-buildings-and-construction-2019
7 Architecture2030, Why the Built Environment, https://architecture2030.org/why-the-building-sector/
8 ONS Business Register and Employment Survey : open acces, 2020
9 WPI Economics and Institute for Employment Studies, Green Jobs and Skills in London, 2022

Despite these significant opportunities, there are deep systemic obstacles to the uptake of circular practices in the construction sector. Our report has identified specific barriers (see section 3.4 below) and concomitant levers (3.5). From this analysis, we identify five key areas of resistance (extensively addressed in section 4.1.3):

- Salvage, Retail and Reuse: Linear building designs make it challenging to identify, salvage, and reuse components at the end of a building's life cycle. The retail offer and design practices in the sector are also heavily geared toward reliance on highly standardised, brand-new materials, suited to the just-in-time supply style expected in the industry. These compounded difficulties play an important part in creating a high price, low demand cycle for circular construction materials.

- Training and Continued Professional Development: the circular construction economy requires a re-skilled workforce to deliver a range of new activities from extraction at the demolition site and reuse expertise and advice, to material testing and the data-driven management of material flows.

- Research and Development: the continued integration of additional materials into effective reuse streams requires designing, developing and testing new material technologies supporting low-carbon, high-longevity uses.

- Testing: one of the key barriers to the use of currently available reclaimed, recycled and refurbished construction materials is the lack of adequate testing provision to minimise and regulate the risk of using these materials for developers and buyers.

- Business to Business Networks: reconfiguring supply chains, design practices, workforce relationships and material flows within the construction industry to achieve circular practices requires establishing new commercial networks, including connecting sites for demolition to new building sites and forging relationships between designers and reused material retailers.

Fig. 10: Key Areas of Resistance.

3.3 The Circular Economy Policy Context

There is a national, regional and local mandate for positive action. Taking action in this space would align with the broader ambitions across central government departments to:

- Diversify the sourcing of the UK's critical goods, exploring opportunities around the process critical minerals, and their recovery, recycling and reuse to establish a viable circular economy[10] (HM Government)
- Become a more circular economy, keeping resources in use as long as possible by extracting maximum value for them[11] (Department for Environment, Food and Rural Affairs)
- Shift towards a more circular economy, decreasing demand for imported goods and increase jobs locally[12] (Department for Business, Energy and Industrial Strategy)
- Support the increasing need to transition to a zero-carbon global economy[13]

The accelerated transition to a zero-carbon global economy has been identified as a key requirement within the *Global Britain in a competitive age* report, recognising the key role that net-zero and climate initiatives will play, not just environmentally, but within industrial and employment opportunities.

The recent Department for Environment, Food & Rural Affairs report, *Waste Prevention Programme for England: Towards a resource efficient economy*, recommended that Local Enterprise Partnerships, mayoral combined authorities and other local authorities should pilot 'circular economy hubs' which support reuse, repair and remanufacture services and businesses, om order to maximise the value of resource use and minimise waste and the impact on the environment. The report states a vision to eliminate avoidable waste by 2050, and increase municipal recycling rates to 65% by 2035 as part of the resources & waste strategy, which is well above Newham's current average.[14]

The *Circular Economy at work: Jobs and Skills for Londons' low carbon future* report by ReLondon forecasts that London's circular economy currently contributes approximately £11 billion (2.5%) of London's economy, which could grow to a total of £24.2 billion by 2030.

Finally, *Towards a Better Newham* emphasises the importance of capturing opportunities in Newham for local residents, enabling a better quality of life and more life opportunities. It prioritises driving new investment into the borough in a way that benefits local residents, enabling good growth for the area.

A full policy review for this report has been undertaken and is available in Appendix C below.

10 HM Government, Global Britain in a competitive age, 2021
11 DEFRA, Circular Economy Package Policy Statement, 2020
12 DBEIS, Green Jobs Taskforce, 2021
13 HM Government, Global Britain in a competitive age, 2021

14 In 2019, Newham's recycling performance was 17%. Source: Cabinet Report – Delivering Improved Recycling Services for Newham Residents, 2021.

3.4 Current Barriers to a Circular Construction Economy

There is currently no full, industrial-scale circular economy hub in the UK or indeed the rest of the world. Globally, precedents that do exist are limited in size and scope, generally operating with 50 employees or fewer. Within the UK, there are a number of good practice initiatives that have been established but these are also limited in size.

Through the interview process, stakeholders clearly identified wider barriers to uptake that prevent the development of a circular construction ecosystem from occurring naturally. These have been categorised and outlined below.

Barriers to Demand

Pricing: The average margin for a construction firm is estimated at about 5%.[15] Given the relatively small profit margin for these providers, one of the key drivers for any decision-making process is the cost, and therefore the price of the material. The perception of a circular economy approach is that it adds significant cost to the development; feedback from the stakeholder interviews indicate that the cost differential between a circular material and a virgin material differs significantly between materials; with some circular materials being reused at a cheaper rate (for example, second-hand steel), and others being equal to or more expensive than virgin costs (such as bricks or tiles).

Market Maturity: Wider sustainable building practices are evolving into mainstream construction, however the circular construction economy remains in a fairly nascent and fragmented form. Unless clients are driving specification for reclaimed materials, it is often considered easier to use new materials.[16] But even clients (particularly end-user customers such as homeowners) find it difficult to navigate the available materials as there is no unified platform for reused materials.[17] It is therefore imperative to create a market that is clear, connected and easy to use to facilitate the adoption of reused materials and components on a larger scale.

Diversity of offer: The nature of reclaimed materials means that types and quantity of materials available is not as broad as those in the virgin material market.[18] For example, tiles that have been demounted from decommissioned buildings will likely be limited in number (depending on the size of the building and the room they were used in) and potentially of a style that may not appeal to current consumer choices.

This barrier is one which is likely to diminish as consumers become better-educated about the benefits of reuse and as more circular economy suppliers are able to reclaim an increasing number and variety of materials.

15 McKinsey & Company, The next normal in construction, 2020
16 Fran Williams, Virtuous circles: Can reusing building materials in new projects go mainstream?,
17 Graeme English, a CIRCuIT project team member in London, remarked how consumers are unsure of where to find the reused items they require, as they are listed across a number of platforms of different designs.
18 Rotor DC interview: the team outlined challenges with reclaimed tiles and the limitations on variations of materials.

Barriers to Supply

Slow-moving stock: Unlike a "just-in-time" virgin material supply chain, the reuse supply chain moves far more slowly, with reuse merchants often holding material on site for months, even years, before selling them.[19] This has multiple implications on funding and storage, detailed below. It also means that the organisation is not in a position to pivot to new material chains quickly, if demand were to suddenly change.

Funding: As with any business, cashflow is the most critical operational element. Circular economy materials businesses need to possess a large amount of working capital – as identified above, slow moving stock is a requirement of the operational model, however this means that large amounts of capital are locked up in this asset. This means that, in addition to upfront capital start up costs, there are key pinch points within the business growth that require additional capital in order to move into new material markets, creating constraints on the ability to scale up.

Storage & Space: With a slower turn-around, and greater quantity of stock required, reuse merchants require more storage space than virgin material sellers,[20,21] which in turn increases rental overheads. Rotor DC mediates this issue through working closely with clients and suppliers to reduce the length of time between material reclamation and reuse; other providers simply locate themselves in areas that have cheaper land costs.

Data & lack of record of older buildings: The lack of historic records of older buildings means that many opportunities to re-use materials are missed, because it is impossible for potential users to understand and access the massive volume of materials held in existing building stock[22] without considerable data collection work. For similar reasons (lack of historic records on existing buildings), there are challenges in identifying where materials are and when they'll be available (through the demolition process).

Regulation & certification: Existing regulations and certification schemes have not been written with reuse in mind.[23] Stringent requirements around regulation and certification result in prohibitively high costs for reclaimed materials, as potential reuse items would need testing. While this barrier is unlikely to be solved at a local scale, the Council has the power to lobby for changes to regulation and certification that account for the certification and use of reused materials. There is ongoing work on an international scale to look at Materials Passports,[24] which may help to address these issues.

Risk, Testing, Certification & Insurance: As with a mainstream construction project, the risk profile of particular materials is a core consideration in specifying a project. In order to enable greater uptake of reused materials, testing and insurance is required. Without them, the reuse market is limited to non-structural elements such as fixtures and finishes as structural elements are too risky for most to reuse. Exceptions exist where practitioners are able to find insurance to sell structural items based on their proven experience and the known tolerance and behaviour of certain materials, such as steel, over time.[25]

Skills & Education: Newham is not training enough people in construction at all skill levels to account for future demand, despite having the course places to do so,[26] there are limited courses that specialise in the circular economy, and no identified courses that look at the specificity of individual material flows. As a result, there are issues in scaling up organisations within the circular economy and reuse suppliers need to undertake time-consuming in-house training of employees.

In addition, Colleges have identified that "the key to getting the green skills agenda right in the future was to focus on employers' demand for skills, and the funding availability for them".[27] This employers' demand is dependent upon commissioners of building works (such as Councils) creating a reliable pipeline of work that employers can organise around.

More broadly, contractors and other construction professionals are under-educated on the circular economy. On site practices, such as cutting steel sections down so that they can fit into skips, result in an inability to viably reuse material as it is no longer of reasonable length. If these materials were installed and dismantled with greater consideration for their end-of-life they could be reused more effectively.

Furthermore many of the companies currently engaged with the reuse sector are small companies lacking the resources and knowledge required to deal with the complex contracts associated with deconstruction of larger buildings.[28] Misunderstanding of the 2021 CE regulations led to shrinkage of the steel reuse market due to how the new rules were interpreted as applied to reused steel.[29] Training in these instances would help to grow the reuse sector.

19 According to Rotor DC, this can often be up to 18 months

20 Jenni Sarna of the Helsinki Reuse Centre speaks of this challenge, as their site requires a lot of empty space to be available at any one time to accept materials as and when they become available.

21 Roy Fishwick of Cleveland Steel also noted that although their 100 hectare yard contains 80,000 tonnes of steel and allows them to constantly buy surplus and salvage steel as it becomes available, clients still frequently comment they do not have enough stock.

22 An exception to this is the historic building records that exist in Copenhagen, detailing the principle construction materials used in buildings. These are being used by Emil Rasussen and team to create a 'Material Matchmaking' service, connecting potential users with buildings slated for demolition.

23 Examples of this include steel incorrectly deemed unsuitable for reuse. This is also explored in Circular economy in urban planning and building permits – possibilities and limitations by CIRCulT, 2021, which identifies a number of unintended consequences of regulations which have not taken reuse into account.

24 A material passport is a data-driven solution which outlines the materials used in a product or construction, thus enabling a recovery, recycling and reuse value.

25 Interview with Cleveland Steel, 2022.

26 Interview: Martin Mannion, Workplace Newham, 2022

27 WPI Economics and Institute for Employment Studies, Green Jobs and Skills in London, 2022

28 This was an observation made by Rotor during interview in which they mentioned conducting research for their Opalis.eu project, which catalogued reuse companies across the Benelux region and France.

29 according to Roy Fishwich of Cleveland Steel, interviewed on 30th May 2022

3.5 Newham's Levers to Implement a Circular Construction Economy

As both the planning authority and a local landowner, the Council is uniquely positioned to create a positive Circular Construction ecosystem in the borough and address many of the barriers identified. The Council-specific levers identified below are actions within LB Newham's control. They do not include national or international levers (such as regulatory change).

Demand-side Levers

Signposting: One of the lowest-investment opportunities for the Council to leverage is the creation of an easy-access signposting portal for developers, contractors, and consumers to access within Newham. This could be as simple as establishing a circular material web page within the existing Council website, linking through to existing offerings like the Meridian Water Materials Exchange or Enviromate.co.uk.

CIRCuIT is working on a *Material Exchange Portal* which is a digital tool to connect existing reuse businesses with a wider range of consumers, meanwhile building consumer confidence and gathering data on the market. This data can be used to encourage existing market players to increase their investment in reuse, and encourage others to enter it, creating a feedback loop wherein supply satisfies demand and vice versa, and the reuse economy grows. This would support existing material flows through digital platforms, rather than duplicating efforts.

→ Barrier Addressed:
Market Maturity, Skills & Education

Procurement: As a major landowner and one of the largest operating entities in the borough, Newham Council's procurement process could be a powerful tool to encourage circular construction processes in the delivery of its ambitions for sustainable, inclusive growth. Newham has already identified within its Community Wealth Building Strategy that there is an opportunity to adopt a strong procurement policy that supports social value, though this does not appear to currently be publicly available. The opportunity exists to incorporate ambitions in relation to the Circular Economy Construction Hub into this existing approach and to leverage existing procurement activities and projects to support a CECH.

→ Barrier Addressed:
Market Maturity, Diversity of Offer, Data & Lack of Record of Older Buildings, Skills & Education

Planning Policy: The Council as the local planning authority has a significant role to play in terms of the nature and scale of spatial policy in the borough. The Council is currently working through the local plan drafting process, with a draft local plan anticipated in Summer 2022.

While the existing local plan identifies policies related to environmental resilience, energy and zero carbon, flood risk and drainage, biodiversity and air quality, there is not currently an explicit statement in relation to the Circular Economy or guidance on how to enable a Circular Economy approach to development through the planning process. The Council has an opportunity now to define how it would like planning to support the Council's Circular Economy aspirations beyond simply utilising a more efficient waste hierarchy. This could consider elements such as:

- A preference for refurbishment, refit or retrofit over new developments;
- Requirements during the demolition process to enable demounting of materials that could be reutilised;
- Requirements during the specification process to enable reuse of materials stocked through the CECH;
- S106 or CIL contributions towards funding the Circular Economy Construction Hub (or associated research & development projects that seek to expand the materials that can be reutilised).
- Support urban mining approaches by adopting planning pre-conditions that require a pre-demolition survey to identify materials for reclamation and ensuring enough time in a demolition programme to allow for such reclamation. A report undertaken by CIRCuIT, *Circular economy in urban planning and building permits – possibilities and limitations*, looks at the different planning & policy approaches that can be taken to overcome barriers, with many of the above suggested.

→ Barrier Addressed:
Market Maturity, Diversity of Offer, Data and Lack of Record of Older Buildings, Skills and Education

Supply-side Levers

Funding: There are multiple potential funding mechanisms that Newham Council could explore in order to support a CECH and overcome some of the barriers associated with the circular economy.

Green business loan fund: The Green Business Loan Fund has been identified within Newham Council's Climate Emergency Action Plan (activity reference 3.2) with an aim to focus "specifically on businesses demonstrating a green-focussed ethos or proposals".

This could be used to support green businesses as a potential revolving fund, providing additional capital funding when required at key growth 'pinch points' for an organisation at a rate that is in line with the social interest of the borough (i.e. potentially below open market rate but above the Council's own borrowing rates).

Something like a loan fund could be particularly useful in addressing the capital funding barrier outlined above.

S106 / CIL: In line with a policy approach to increasing demand, outlined above, the Council could consider seeking s106 contributions to support the CECH, particularly in relation to skills and employment focussed outcomes.

→ Barrier Addressed:
Funding, Slow-Moving Stock

Using the Apprenticeship Levy to Improve Skills: As a major employer within the borough, the Council is required to pay the Apprenticeship Levy introduced in 2017. Under the Apprenticeship Levy rules, the Council is able to transfer up to 25% of its unused apprenticeship funds to help other employers pay for apprenticeship training.[30]

While the level of unused levy funds will fluctuate (or even drop to nil) on a year-by-year basis, the implementation of a Council policy that seeks to allocate these funds to support small businesses or the CECH in upskilling and implementing circular economy-related apprenticeships will support the business in a key operational costs, particularly in its early years. This would also enable the Council to incentivise businesses to prioritise Newham residents for these positions.

→ Barrier Addressed:
Skills & Education

Access to Space: One of the key barriers identified through the stakeholder interviews was the need for relatively large amounts of space at sub-market prices. This is particularly relevant for any sort of materials hub, where the density of materials and employment is relatively low.

Likewise, the Council, as one of the key landowners in the borough which also has a programme of significant development that is likely to last decades, has the opportunity to proactively identify potential land options to house and prioritise towards the circular economy, particularly by supporting meanwhile uses in the area.

One of the precedents in section 4.1 below, Rotor DC, has benefitted significantly from this approach. Brussels has implemented a policy approach that requires underutilised land to be made available for circular economy businesses. This decreased overhead cost is one of the key elements that allows Rotor DC to be a viable business – which has won numerous awards as a result.

→ Barrier Addressed:
Storage & Space

30 UK Government, Website: Transfer Allowance,https://help.apprenticeships.education.gov.uk/hc/en-gb/articles/360020549819-Calculating-your-transfer-allowance, 2022

Barrier and Lever Alignment Summary

The table below summarises how the individual levers can address the barriers identified before: Some barriers, such as pricing, regulation and certification, slow moving stock, and testing and certification have levers that are outside the control of LB Newham. For example, it is at the national level that concerns around regulation and certification can be addressed. Others, such as pricing, are simply market forces and difficult to address in a way that is sustainable long-term.

Barriers	Levers	Barriers	Levers
Pricing		Funding	Funding: Green business loan fund
Market maturity	Planning policy	Education	Apprenticeship Levy to Improve skill
	Procurement (Specification, social value, evaluations)		Funding: S106/CIL
		Data & lack of record of built stock	Planning precondition for demolition
Diversity of offer	Signposting (portal)	Slow moving stock	
		Storage	Access to space (i.e. targeted peppercorn rents)
Regulation and certification		Testing, certification, insurance	

Fig. 11: Mapping between the (macro) barriers to uptake and the levers that the Council can use to address them.

Recommendation 2

There are a variety of options identified below for a Circular Economy Construction Hub. Regardless of whether these options are brought forward, the Council has a significant opportunity to address barriers to construction uptake of the Circular Economy through the levers identified above. As a result, we recommend that the Council moves forward with a Circular Economy Activation Project that seeks to 'pull the levers' outlined above. Details of this recommended project are provided in Section 5.1 below.

4

The Solution

This section has five parts.

1 First, we discuss the essential programme areas required to support a shift towards a circular construction economy. These include infrastructure for salvage, storage and retail, training and continued professional development, research and development business to business networks, and the development of robust partnerships, all of which require some support from a mix of organisational, digital and physical infrastructure.

2 Secondly, we offer a small set of carefully-chosen, relevant precedents, which show some of these ideas working in other contexts. As the idea is relatively new, there are only a handful of projects operating with sufficient ambition and scope to be useful learning and proof of concept.

3 After this, we move on to give a summary of the options for ways a circular construction hub might be realised in LB Newham – highlighting how each of the programmes described is enabled by each of the options.

4 The fourth part outlines each of the options in detail, summarising their advantages and shortcomings and measuring their performance as against the five programme areas.

5 The fifth section describes the potential partner organisations and businesses in LB Newham, and nationally where relevant, that would make up the basis of the initial industrial and organisational eco-system required to launch the hub as an effective agent of change.

This section closes with an evaluation of the options proposed.

Fig. 12: Propositional view of CECH: builders merchant yard, internal.

4.1 What is a CECH

A Circular Economy Construction Hub (CECH) is a radical idea: an institution designed with the sole aim of enabling the construction industry to shift into a circular economy. The hub would facilitate integration of pre-used materials, low-carbon refurbishments and regenerative design. Making the shift effectively requires a mix of tactics to both release the potential that already exists and providing more facilities and capacities where they are missing. These include practical and logistical facilities, capacity to undertake material research, development and testing and workforce training. Together, this holistic approach would enable the LB Newham to use the hub to work across the construction industry, creating the insight and action that would enable it to tackle the many cultural, regulatory and economic barriers to decarbonizing the built environment, whilst enabling existing and new businesses to move into this space.

In what follows, we have described in more detail the range of activities the hub would need to support to be an effective agent of change. We have detailed several options, at a range of scales, and described the relative benefits of each strategy. Whilst we have proposed an initial intervention at the scale of single hub, it is clear that it is a project that could scale. Once the model and market have been established, the construction industry could potentially support a number of hubs across the borough.

A truly circular construction economy would require several changes in existing construction practice, principally:

- A shift towards the refurbishment of our existing building stock,
- Work to enable new build construction to be based on primarily regenerative materials,
- The reuse of materials from buildings which need to be dismantled,
- Improvements in and development of business to business networks to enable co-ordination on circular economy activities

This report considers how each of these connected activities could be implemented in LB Newham. Each of the four propositions address all areas, to varying degrees. Below, we have broken down what new capacities need to be introduced to make these changes, and which could be provided by a CECH: salvage, retail and reuse; training and capacity building; research and development. The hub itself requires a high level of intervention to create the right conditions, and making it function will mean working in partnership with a wide range of existing businesses and training programmes.

The programmes a hub would be able to support are listed in the following pages.

A. Salvage, Retail and Reuse.

One of the key barriers to a circular construction economy is recovering materials from buildings at the end of their useful life, and making them available to contractors and other people who are making or refurbishing buildings. This programme area addresses this issue.

Meaningful carbon emissions reductions in the construction industry depends on better access to good supplies of pre-used and refurbished materials. Currently, the supply of pre-used materials is poor, a barrier which has kept demand low. It is usually simply too time consuming for designers and contractors to access information about what might be available, let alone access the materials themselves. There is insufficient infrastructural support for those demolishing buildings to offer materials to other projects, and little or no guidance on the reuse of materials.

Retail, Salvage and Reuse activities require large areas of storage, both internal and external, as well as extensive workshop space for the refurbishment of materials. However, the rising prices of new materials, together with the industrial character of LB Newham mean that the opportunity is there to create this space. There is also an emerging culture of improved material re-use, and our research suggests that the industry ready to make a shift. (see stakeholder consultation with the Old Slate Yard, Newham, and Cleveland Steel, Yorkshire).

Another barrier to material re-use is that there is little capacity in the existing industry for the standardisation of materials. Requirements for testing and grading vary across reuse material streams, determined by the need for structural or thermal performance. However, the precedents outlined below show that introducing testing and standardisation in reused materials is viable.

Cleveland Steel, a longstanding retailer of price-cutting reused steel section, outsources its testing of structural steel as needed. Rotor DC, in Brussels, a reputed consultancy and deconstruction organisation, sells reclaimed construction materials for reuse, and carries out its own in-house grading and sorting to facilitate this, while Rotor BC, their partner organisation which occupies the same site, consults developers, designers and contractors on how to integrate reclaimed materials into their projects.

This programme would aim to enable reuse by:

- Enabling salvage, by removing viable materials from buildings at the end of their useful life,
- By processing, storing and testing materials gathered,
- By making information on the materials available to a general market.

The key requirements for this programme are:

- co-ordination of demolition activity;
- space to store and process materials,
- a platform which enables people involved in construction to access and integrate materials into design and construction processes.

Fig. 13: Propositional view of CECH: worker in builders merchant yard refurbishing structural timber.

B. Training and Continued Professional Development.

One of the key barriers to a circular construction economy is the lack of a readily available pool of skilled workers, who are embedded in the cultures and processes required for re-use. Re-skilling our construction industry workforce at all levels, from designers to contractors is essential to changing the stagnant culture of the built environment industry. Green Skills are much talked of and poorly defined – there are only a few options for prospective students, and many courses which only offer highly specialist skills without wider grounding in the competencies needed to work more broadly in the construction industry and develop transferable skills. The hub presents an opportunity to work with partners to develop training opportunities which spread the practical skills, knowledge and digital capacities required to support a transition to a circular construction economy.

The skills component of the hub would ideally operate at every level in the industry, including:

- New long-term degree and postgraduate research programmes, delivered in partnership with existing universities,
- Full- and part-time apprenticeships, delivered in partnership with existing secondary and higher education institutions,
- Continued professional development for designers, subcontractors, either run by the hub or with an independent training provider,
- Executive courses aimed at senior management level.

There are immediate opportunities to introduce Circular Principles to existing curricula as well as longer term opportunities to develop specialised programmes.This has the potential to put educational partners in Newham at the forefront of change, establishing best practice criteria, creating courses which would attract students and professionals from across the UK, and the chance to capitalise on the economic opportunity this training presents. In the pages below, we've outlined some potential initial partner organisations already working in Newham:

- Building Crafts College,
- Newham Construction College
- UEL Sustainability Institute.

More details on each of these is available below.

Fig. 14: Propositional view of CECH: visiting school groups.

C. Research and Development.

Many of the barriers to reuse relate to lack of certainty about material performance, and the ways in which reclaimed and regenerative materials need to be processed and detailed to create high-quality, high-functioning construction materials. Construction technology has moved fast over the last 50 years, and as buildings of this generation are demolished, more research is required to understand how to extract, work with and certify the materials that can be salvaged. An overall brief for research and development facilities would include:

- Working with new ways to process and add value to materials otherwise destined for landfill
- Developing mechanisms to integrate reclaimed materials into standard design and engineering systems, including CAD and BIM.
- Developing capacity building programmes with educational partners.

D. Testing.

The reuse of certain material streams in the construction industry today (such as tiles) is understood, even commonplace. These tend to be materials that are easy to inspect visually, and which do not have to perform critical structural or thermal roles. Other types of higher value material, such as steel, are increasingly reclaimed and inspected by specialist new businesses. However, the bulk of materials used in construction have little or no culture of reuse. This is partly because contractors rely on warranties and standards, and these are rarely if ever applicable to reclaimed materials.

Material Testing is crucial to unlocking greater material re-use in a risk averse construction industry in which insurance relies on material certification, guarantees and warranties. Material Testing can take a number of different forms, from simple sorting and grading (See Stakeholder consultation with Rotor, below) through which onsite staff could be trained, to accredited testing of individual materials through to building systems, composite build ups of walls and roofs. There are a number of private material testing providers across the UK with whom franchise partnerships could be established to support onsite or offsite commercial scale testing services (See Stakeholder consultation with the British Board of Agrement (BBA)), as well as some surplus material testing capacity at higher educational facilities within Newham (See: UEL Sustainability Institute and QMUL) which could offer support the need for the small scale batch testing of the Research and Development work at the hub.

New, updated or revised testing and certification systems, like a Reuse Material Warranty could solve this, opening up new markets and significant quantities of material to the re-use market. A good example of this is insulation. Our consultation with the British Board of Agreement suggested that although insulation is currently sent to landfill after one use, it would be amenable to being re-tested using the same, standardised process that new materials are subject to. Establishing such a system could allow for materials to be recertified for a further 25/50 years.

Fig. 15: Propositional view of CECH: builders merchant, external.

E. Business-to-Business Networks

Fundamentally, the shift towards a circular economy means behaviour change across a wide range of industries and activities. The hub can fill in capacities that the market does not currently supply to stimulate demand and catalyse change, but it will need to work in close partnership with businesses and organisations, both to deliver circular economy services, and to support businesses to enable internal change.

LB Newham is home to an exceptionally rich reuse and recycling sector, with three major local facilities, including a site operated by EMR, one of the UK's largest recycling companies. Local concrete and steel reuse and recycle capacity would make it possible to use the CECH as a triage facility, channelling materials toward these sites, as well as to partners at the national level.

Fig. 16: Idem

The CECH would work in symbiosis with the businesses in this ecosystem, focusing on the materials which are not yet commercially reclaimed on a large scale, and benefiting from the processing and storage capacity of these commercial partners to increase the reach of our operation.

Business-to-business networks are vital to the CECH's functioning, and any possible iteration of this facility will be embedded in and aim to augment LB Newham's important existing material reuse and recycling facilities (the full list of key business partners is outlined at the end of section 4.4). The vision for the CECH is to act as a hub within this network, diverting material processing and salvage work to these established businesses specialised in reclaiming and recycling materials such as concrete, timber, and steel. This would both increase the volume of waste being processed in these facilities, and liberate resources at the CECH to focus on the materials that are not yet systematically reclaimed, reused or recycled.

Precedents: This section offers precedents relevant to the programme envisioned for the Circular Construction Economy Hub in Newham, first physical infrastructure precedents, followed by digital infrastructure precedents.

Newham's CECH would be the first facility of its kind, providing groundbreaking impetus to the introduction of Circular Principles in the construction sector in the Greater London region. While no direct precedents exist that have the same level of scope and ambition as what is proposed below, the practices and networks listed below have, in their different contexts: demonstrated the economic and practical viability of reused construction materials, gathered and systematised important bodies of evidence-based knowledge on material reclaim and reuse; and developed certification. They also offer significant learning on practical approaches to testing and repurposing, and examples of long-term financial strategies to ensure the competitiveness of circular building in the context of the global construction industry.

In the options section, there is also a list of potential future partners and collaborators. Some of these businesses and organisations are already working in specific segments of this field, and should this project progress to business evaluation, there may be more specific learnings to be gained by examining their work in more detail.

Physical Infrastructure Precedents: These practices are among the first to attempt to build with reused materials in systematic ways, and in order to do so have had to devise systems for risk-management, certification and extraction of reclaimable materials. They hold valuable learnings for the CECH both in terms of material solutions and of organisational designs: the demands of the construction ecosystems that circular construction practices need to adapt to mean that building in-house capacity to carry out demolitions, extraction and certification is critical to the financial and ecological success of these operations.

Digital Infrastructure Precedents: The reuse of specific building elements has always held clear architectural and cultural value, but since the early 1990s environmental concerns have greatly expanded the scope of these practices. We now have a wide number of highly developed networks for sourcing, selling, testing, certifying, and sharing information on the reuse of construction materials. These networks connect London, the UK, and northwest Europe. They gather practical information on material identification and salvage from demolition sites, provide forums for those interested in implementing circular design practices, and act as specialist open platforms for knowledge sharing where research findings and material tests can be publicised, giving impetus to the circular construction industry.

Fig. 17: Recycled materials at Rotor, Brussels.

Physical Infrastructure Precedents
Rotor DB and Rotor DC

- Location: Brussels, Belgium
- Employees: 35 (20 in yard, 15 consultants in office)
- Site Area: 2,500m2/0.25ha

Rotor DB began by carrying out and disseminating research through publications and exhibitions; their success led to the launch of Rotor DC, the trading arm which dismantles, processes and trades salvaged building components. Rotor has built its success through cultivating relationships with local contractors, non-profits and other organisations to help them become part of a large and healthy ecosystem of reuse within the city and beyond.

Originally trading only in materials salvaged by their own employees, they went on to develop sets of practices and certification systems enabling them to sell components from third parties, including demolition contractors and real estate companies. The organisation is separated into three departments: ‘In’, ‘Process’ and ‘Out’. These deal with sourcing & inventorising, dismantling and processing, and advising and selling respectively. Rotor DC has recently undertaken a crowdfunding exercise to raise additional working capital in order to expand material offerings.

Continually devising and improving methods to expand the spectrum of what can be extracted for reuse, ROTOR have developed specialist processes for repairing lighting, removing mortar from ceramic tiles and cleaning and preparing sanitary equipment, as well as logistical approaches to plan and organise salvage operations in large and complex buildings. Rotor DC has been the recipient of numerous awards including a Global Award for Sustainable Architecture from the LOCUS Foundation under the protection of UNESCO in 2015.

Fig. 18: Idem

Physical Infrastructure Precedents
Lendager

- Location: Copenhagen, Denmark
- CECH Partnership Potential: Precedent for fully circular developments

Copehangen-based Lendager's built designs deploy circular principles, relying on reused and recycled materials, including timber and concrete, allowing some of their housing projects to achieve, by their estimate, carbon savings as high as 50% over a 60-year period. The practice also works to disseminate the possibilities of circular material flows and experiment with reuse and repurposing through exhibitions and published work.

Lendager's organisational structure has evolved to meet some of the key obstacles to circularisation in construction: starting as a typical architecture practice, they have grown into a tripartite structure that works across design, material manufacture, and demolitions. Adding these competencies has been necessary in order to be able to guarantee material quality in the eyes of clients. Lendager's methods for material manufacture, carbon calculations, and extraction of reclaimable materials would all make this practice a key precedent and consultant toward the CECH.

Fig. 19: Lendager, Copenhagen.

Digital Infrastructure Precedents

Excess Materials Exchange, Meridian Water

- Location: Meridian Water, Enfield
- Site Area: N/A

The Excess Materials Exchange has been set up as part of the sustainability strategy of Enfield Council's 25-year, £6bn regeneration programme, Meridian Water, which will see the creation of 10,000 homes and 6,000 jobs in the London Borough of Enfield. The Excess Materials Exchange is a new digital platform that aims to make material reuse normal practice by offering cheaper than virgin materials and thereby reducing the environmental impact both of new developments and of retrofit.

The Excess Materials Exchange website aims to be a platform for information exchange, enabling the partners, contractors and consultants of the London Borough of Enfield to trial an approach in which 'donor' buildings slated for demolition are listed, outlining details about the materials they contain for the benefit of potential 'recipients'. The construction of Meridian Water will launch and actively promote the use of the platform, creating large-scale demand for reclaimed materials and setting up a key precedent for widespread use of reclaimed materials in a large commercial construction project in London. For the CECH, Meridian Water would be key strategic partners, with the data gathered through their Exchange platform making it possible to accurately identify gaps in provision and material needs, and to access local suppliers and markets of reclaimed construction materials.

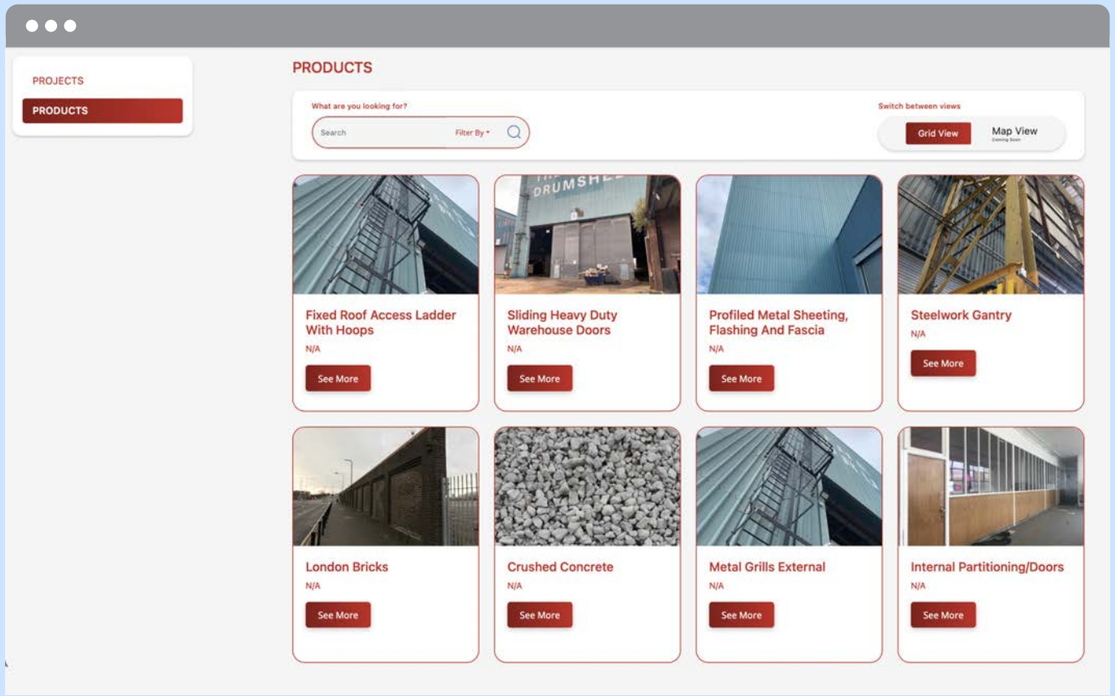


Fig. 20: Excess Materials Exchange digital platform.

Digital Infrastructure Precedents
CIRCuIT Exchange Portal

- Location: London
- Site Area: N/A
- Turnover: N/A

The CIRCuIT Material Exchange Portal was launched under the auspices of the Circular Construction in Regenerative Cities (CIRCuIT), a EU-funded collaborative digital platform launching between 2019 and 2023 and comprising 31 partners in four cities: London, Copenhagen, Hamburg and Helsinki.

In partnership with ReLondon, the London Mayor's circular economy initiative, CIRCuIT have commissioned waste management software Dsposal to design and build this digital resource, which will be hosted on a public, open-access information platform called the 'Circularity Hub'.

Rather than setting up a new marketplace, the project aims to increase use and awareness of the large number of existing suppliers of reused and salvaged construction materials. Quantification and streamlined procurement of reused materials are major obstacles to the circularisation of construction which this initiative will begin to address. Data obtained through the Portal's use will provide detailed profiles of the existing demand for reused materials, helping to expand and promote these circular markets.

Initially developed for the Greater London area, the Portal will aggregate existing listings from active platforms across the city, extending search functionality across existing platforms by type, date, location and quality. It will also gather further information about the material exchanges that exist within the Greater London area and provide 'best practice' information for users.

Digital Infrastructure Precedents
SalvoWeb

- Location: UK
- Site Area: N/A

Salvo was established in 1991 to promote the reuse of construction materials. In 1995, following a three-year consultancy, they defined the Salvo Code, a voluntary set of good practices for dealers of salvaged, reclaimed and antique architectural pieces. Nowadays SalvoWeb hosts an online marketplace and a comprehensive directory of salvage yards in the UK and beyond. They were a partner in the Rotor-led Opalis project, a transnational initiative to promote information, form networks and provide resources for the reuse of construction materials.

Salvo are also behind futuREuse, a digital network launched in 2021 as a resource library and forum on sustainable practices such as identifying reusable materials in existing buildings and a platform to help circulate, source and specify reclaimed elements in construction and interiors projects.

Salvo's new Truly Reclaimed initiative offers material certification on a product level, an approach which could be explored for the work of the Hub. Truly Reclaimed will have integrated QR codes which evidence that the products are genuinely reclaimed, where they are sourced from and their embodied carbon, following a similar line of thought to material passports.

4.2 How the CECH could support Newham's ambitions

The impact of the COVID-19 pandemic led LB Newham to approve a recovery and development strategy resting on a set of key pillars which prioritise the health, happiness and wellbeing of the local population. They set out the ambition to make LB Newham the greenest economy in London, and make a commitment to improving employment, with particular focus on the transition to the new economy. The pillars further emphasise the importance of support and opportunities for young people and commit to building high-quality affordable homes and aim to improve civic and social provision in the borough.

A Newham-based CECH would lead to substantial developments along these priority areas by placing Newham at the forefront of the transition toward a new green economy, creating skilled jobs and training opportunities, and multiplying the benefits of building affordable high-quality homes by ensuring that much of that construction could be developed by local circular economy contractors, workers, and suppliers.

Nationally, the construction, demolition and excavation industry accounts for 62% of the UKs total waste generation, totalling 66.2 million tonnes of waste in 2016.[1] This represents an enormous economic opportunity in a circular economy.[2] The recycling and waste management sector are important elements of Newham's economy and its employment opportunities. The Borough's technical colleges and research institutions, such as Newham College and the UEL are also exceptionally well-suited to work in tandem with a facility such as the CECH, meaning that Newham is better-positioned than most to play a role in kickstarting the circular construction economy.

1 The Environment Agency blog, 2021/03/28 https://environmentagency.blog.gov.uk/2021/03/28/construction-and-demolition-sites-do-you-know-whats-in-your-waste/
2 The Ellen MacArthur Foundation and Arup, First Steps Towards a Circular Built Environment, 2018 https://emf.thirdlight.com/link/ufe6ol7qbkm-a9mzju/@/preview/1?o

LB Newham currently struggles with higher than average unemployment rates, and a significant number of residents leave the borough for work – a challenge worsened during the Covid-19 pandemic.[3] In this context, the construction industry's efforts to meet the government's zero carbon by 2050 targets[4] represent a unique opportunity for the LB Newham to level up with the national employment market as the demand for skilled green and circular economy jobs increases.[5] ReLondon has found the circular economy can provide a range of well-paid job opportunities across a diverse range of sectors and skills levels: wages in core circular jobs are on average £710 per week, which is substantially (183%) above the London Living Wage. This growth could also create significant economic value, with the potential for circular economy businesses to contribute a total of £24.2bn to London's economy by 2030.[6]

The research, employment and training opportunities afforded by the vision of a CECH in Newham have the potential to make the borough a key driver of the transition toward a green economy within London.[7] Since this facility would be the first of its kind, LB Newham would become a national and international reference and destination for designers, engineers, material scientists, and both young people and mature students seeking to for the needs of a green economy.

The impact of the hub would be amplified by a partnership approach to enabling skills and training across the borough, creating a hub of national significance that can also be leveraged for local residents. Much like a construction academy, the physical space provides a conduit to change, but is a proving ground for wider impact.

The social impacts of this initiative can also be far-reaching. 73% of Newham residents are from Black, Asian and Ethinic Minorities communities. While CECH's primary focus is on the transition toward a green economy, a key strategic priority is that the provision of

3 LB Newham, Get involved in Shaping Newham's future together, Local Plan Refresh, 2021
4 UK Government, Net Zero Strategy: Build Back Better, 2021 https://www.gov.uk/government/publications/net-zero-strategy,
5 Green Jobs Taskforce, Department for Business, Energy & Industrial Strategy, 2021
6 ReLondon, The circular economy at work: Jobs and skills for London's low carbon future, June 2022
7 The London Plan – The Spatial Development Strategy for Greater London, Mayor of London, 2021

technical skills training and high-quality employment opportunities should be delivered in tandem with local youth and community organisations, ensuring enhanced access for these communities.

A CECH in Newham could unlock the following opportunities:

- Stimulate the local economy, through generation of local jobs to increase the total value of the construction ecosystem within Newham
- Support sustainable growth ambitions, improve access to job opportunities to support attraction of skilled workers to Newham
- Improve skills attainment, address the existing skills gap at higher-qualification levels (i.e. NVQ3 – NVQ4) through provision of circular economy educational offer within Newham (and leverage the large pool of potential students and the young population within Newham). ReLondon have reported that there is currently a large skills gap in London, for both existing circular businesses and those transitioning to become more circular, requiring more targeted training provision at a school, college, university and workplace level to fill the skills gap.[8]
- Support net zero ambitions, through promotion of circular economy practices including the re-use of materials

A CECH thus has the potential to play a pivotal role in meeting the ambitions of both the Mayor of London and the London Borough of Newham to tackle consumption-based emissions while creating more, better jobs for local people.

8 ReLondon, The circular economy at work: Jobs and skills for London's low carbon future, June 2022

Primary Focus:

1 Enhance the quality of life for residents of Newham, improving access to opportunities including jobs and education

2 Increase sustainable construction practices to become London's greenest local borough and economy

3 Reduce greenhouse gas emissions and the use of raw materials

4 Deliver a financially viable solution that attracts local investment in Newham

5 Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices

Fig. 21: Objectives for the CECH aligned to LB Newham's Development Pillars.

4.3 Outline of Options for a CECH in Newham

As described above, the shift towards a circular construction economy will require activity in the following areas:

- Salvage, Retail and Reuse
- Training and Continued Professional Development
- Research and Development
- Testing
- Business-to-Business Networks

These programme areas can be supported through the creation of new physical and/or digital infrastructure focused on skilling the workforce, creating new demand, supporting innovation and accelerating change.

These strands are all interdependent and complementary. The options detailed in 4.4 scale in terms of how many programme areas they are able to support, and, consequently, the extent of the impact they will be able to have on the construction industry, economy and jobs market in LB Newham and London as a whole. It is important to note that this report makes a set of estimations about scale and cost that, while rigorously generated, would need to be tested both through an in-depth business case and more detailed work with supporting partners.

The table below (Figure 3) summarises the key differences among the four different options, from the simplest, an online training provider, to the most ambitious: a large-scale facility hosting research and development of a wide range of construction materials, running wide-ranging in-house certification schemes, offering advanced training, and housing a major retail park for reclaimed materials.

These options scale up iteratively in terms of the size, complexity and capability to deliver in house. They can be viewed as individual options to pursue, or as a number of phases in a broader strategic plan to address reuse in the construction economy, beginning with lower-risk models which grow in remit and economic impact as the cultural practices around them develop and are strengthened. It is worth noting, however, that there are significant barriers to widespread systemic change, so that the more incisive the intervention, the wider the collaboration and potential escalation for the industry.

Although they can be viewed as incremental stages, each iteration's potential impact is not simply cumulative: it is multiplied with each step. This is because the potential benefits and influence across the construction sector in LB Newham and London depend on the hub's capacity to generate the critical mass for a self-sustaining regional circular economy, absorbing the skilled workers who are trained, creating long-standing material flows, and establishing a exemplar, competitive retail facility capable of producing and selling enough circular materials to begin to significantly affect the vocabulary of construction across the region.

It is critical to read the Options in 4.4. alongside the Potential Partnerships section, as none of the Hub's iterations imagine LB Newham as the sole actor, and the capacity of the intervention to galvanise and make the most of existing capacities in organisations and businesses will be a key indicator of success.

The rigorous methodology which guided the development of these options is detailed in Appendix C. Its main tenets are to prioritise the Council's strategic objectives while linking barriers and levers in order to define how the Council can move forward.

	Option 1: Circular Academy	Option 2: Circular Economy Prototype	Option 3: Circular Economy Starter Hub	Option 4: Circular Economy Catalyst
Materials Targeted	n/a	Ironmongery, lighting, doors, sanitary ware (e.g. sinks)	Ironmongery, lighting, doors, sanitary ware, brick, timber, tiles	Ironmongery, lighting, doors, sanitary ware, brick, timber, tile, insulation, steel
Spatial Configuration	n/a	Small store	Medium, material yard, outdoor and indoor space	Large, networked to existing partners
Retail Activity	n/a	Specialised store small selection of materials	Shopfront and department store	Department store
Digital Configuration	Online training platform	Basic web presence (e.g. modern yellow pages), inventory software support	Basic web presence, inventory, virtual shop window (to enable online purchase)	Basic web presence, virtual shop window and material trading
Training	see above	Informal, site-based training for staff (no external training provided).	Formalised site-based, partnership with existing educational providers and 'placements' on-site.	Full apprenticeship accreditations, links to higher-level providers, continued partnership with existing educational providers
Training Topics	Retrofit co-ordination, building management system installation,[1] and all courses listed right (prioritised based upon market demand).	Inventory management, Deconstruction, Sorting and reprocessing, Repair and manufacturing	Inventory management, Testing and certification, Deconstruction, Sorting and reprocessing, Repair and manufacturing, Circular economy business planning/ development	Inventory management, Testing and certification, Deconstruction, Sorting and reprocessing, Repair and manufacturing, Circular economy business planning/ development, Circular economy R&D
R&D	n/a	n/a	Partnership with existing educational providers for best practice	In-house, independent R&D (and potential consultancy arm)
Testing/ Certification	n/a	Grading: in house Testing/certification: N/A	Grading: in house Testing/ certification: third party, off-site	Grading: in house Testing/certification: in-house

Fig. 22: The Four Options: Key Features

1 Note that these have been identified as areas of need within the Green Jobs Taskforce. While not explicitly circular economy, they contribute to more circular approaches within the construction economy.

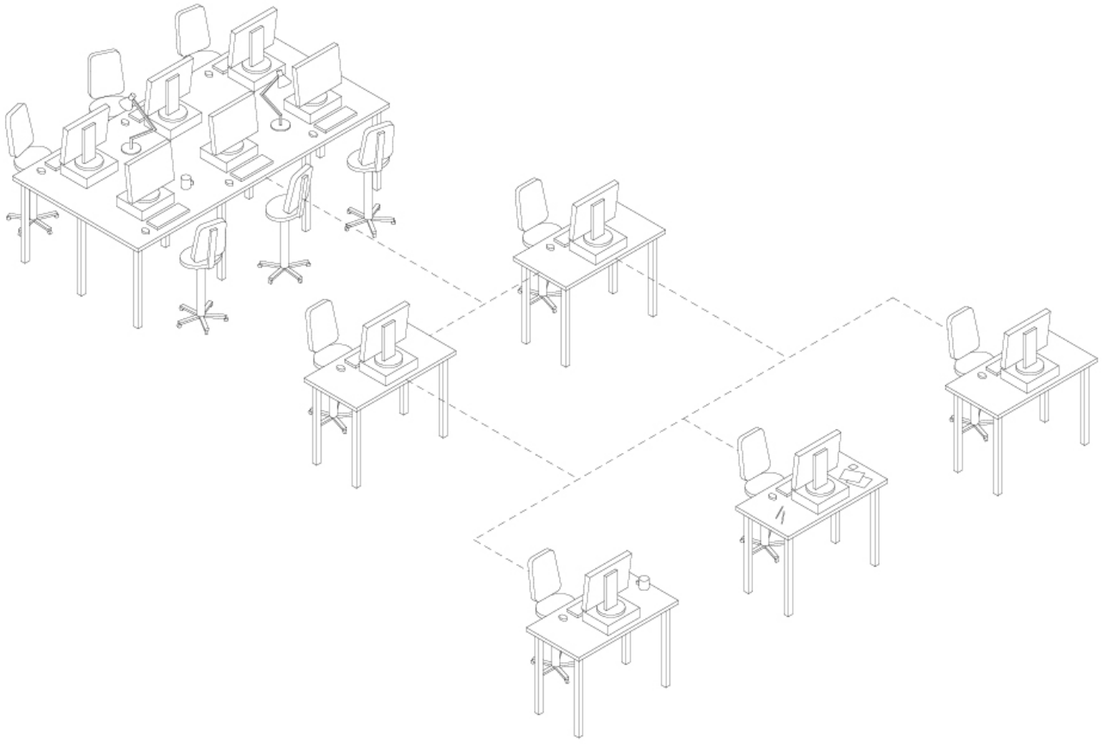
The individual options and their impacts are outlined below. Given the differences in the level of scale, the order of priority and mpact 'lens' becomes a key differentiating factor in which option may be best for LB Newham to pursue.

	OPTIONS			
BARRIERS	1	2	3	4
Pricing				
Market Maturity		■	■	■
Diversity of Offer			■	■
Regulation & Cert.				■
Risk & Testing			■	■
Slow Moving Stock				
Funding			■	■
Storage			■	■
Skills & Education	■	■	■	■
Data				
	OPTIONS			
LEVERS	1	2	3	4
Signposting		■	■	■
Planning Policy			■	■
Procurement			■	■
Funding	■		■	■
Apprenticeship Levy	■		■	■
Access to Space		■	■	■
	OPTIONS			
OBJECTIVES	1	2	3	4
Objective 1 Improve the quality of life for residents of Newham, improving access to opportunities including job and education	4	3	4	5
Objective 2 Increase sustainable construction practices to become London's greenest local borough and economy	3	4	4	5
Objective 3 Reduce greenhouse gas emissions and the use of raw materials	2	4	4	5
Objective 4 Deliver a financially viable solution that attracts local investment in Newham	4	5	4	4
Objective 5 Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices	3	5	5	5

Fig. 23: Options and Impacts Lens.

Fig. 24: Propositional view of CECH: builders merchants yard, interior.

Circular Economy Academy 0m²



This option primarily addresses programme area Training and Continued Professional Development, establishing local pathways for the provision of training in the skills required in a shifted economy.

The primary focus of this project would be to work with existing institutions to develop new modules, courses and programmes that skill and reskill students for circular economy roles. It would focus on expanding education provision through the offer of new Green Skills Courses at NVQ levels 1-7 while developing partnerships with tertiary institutions to address the wider skill base including material research, design innovation, digital development and circular economy management skills. Courses would be offered at four key levels:

- NVQ Levels 1, 2 & 3 – Introduction – A-Level equivalent: Entry-level apprenticeships
- NVQ Levels 4 & 5 – Higher School Certificate – Foundation Degree equivalent: Specialised circular-economy training
- NVQ Levels 6 & 7 – Undergraduate to Masters Degree equivalent: Bootcamps for continued professional development at management/ senior management levels
- Postdoctoral research level

The digital infrastructure would take the form of a website with a simple interface consisting in listings and a booking system for courses. Classes and course content would be delivered through a third-party platform for video conferences. The website would also offer listings of key partners to stimulate an incipient local circular economy network.

The organisational infrastructure would remain minimal in this option, comprising limited managerial duties such as website management and accounting, and teaching duties such as syllabus design and course delivery, to be carried out by teachers and industry experts appointed on a limited, case-by-case basis.

Physical infrastructure is absent from this option, which relies on the spaces of partner businesses and institutions.

The delivery pathway for this option would be through a partnership mechanism. Potential partners are outlined in the section below, and could include the Building Crafts College, Newham College, and the new London City Institute of Technology.

The development of a completely new apprenticeship is a time-intensive process that normally involves the setup of a Trailblazer group, comprised of at least ten employers who are likely to use the apprenticeship once it is set up, and be recognised by the Institute of Apprenticeships. The Institute of Apprenticeships will require an occupational proposal, occupational standard, an end-point assessment plan, and approval from the Institute before any apprentices can undertake the course[1]. Practically, this would mean that the earliest timeframe for a student completion of a new apprenticeship is 2 -3 years (assuming a 12 month apprenticeship) from the start of the process. In reality, many Trailblazers have found that the need for collaborative working to develop the apprenticeship can slow this process down, extending the setup time for an apprenticeship.

As a result, the recommended delivery pathway for this option would be the establishment of a proto-Trailblazer taskforce to understand the market appetite (of employers) for this type of apprenticeship. The taskforce could also identify interim activities such as incorporating circular economy modules into existing apprenticeships, supported by the Council's recommended Circular Construction Economy Activation project (detailed in Recommendations below). One such interim activity has been identified as a quick win, below.

Council funding would be required to support the coordination and project management of the taskforce and to support the production of necessary materials, but otherwise the likely funding call is limited, as partners are expected to incur the additional costs of teaching (as well as any additional funding).

1 Developing New Apprenticeships Overview, Institute of Apprenticeships, 2020

4.4 Option 01

Circular Economy Academy 0m²

SUMMARY

This low-risk, low-investment option would leverage local partners' capacity to deliver one-of-a-kind training schemes that would set a new precedent for curricula across London and the UK. A significant shortcoming is that, since it does not address other barriers to the uptake of circular economy practices in the sector, long-term employment outcomes for Academy graduates are not guaranteed.

An expanded but still relatively low-investment approach could be achieved by running Option 1 in combination with Option 2 below.

- ☐ Salvage, Retail and Reuse
- ☒ Training + Continued Professional Development
- ☐ Research and Development
- ☐ Testing (off-site)
- ☐ Business to Business Networks

Potential investment in the borough (over next 10 years)	£2.2m	GVA (over next 10 years)	£3m
Local spend generation (over next 10 years)	0	Cost to Council to progress	£0.16m
Potential local market size (GVA)	£25m	Potential local market size (businesses)	111
Embodied carbon saved ($kgC0_2e$/tonne)[1]	0	Education Providers	15
		Student Completions P/A	14–34
Target CO_2e saved (tonnes)	0	Student Outreach	1,901
		FTE Off-site	3 – 5[2]

ADVANTAGES

- Minimal costs: leveraging existing businesses and partnerships that exist in Newham, no physical space is required.
- A website that has the potential to be broadly accessible to wide audiences.
- Courses addressing current skills gaps in Newham, with a particular focus on higher NVQ levels at approximately level 3-4.
- Engaging interested stakeholders through a large potential ecosystem – (i.e. Newham Construction College and Building Crafts College).
- Alignment with "Newham Sparks" initiative.

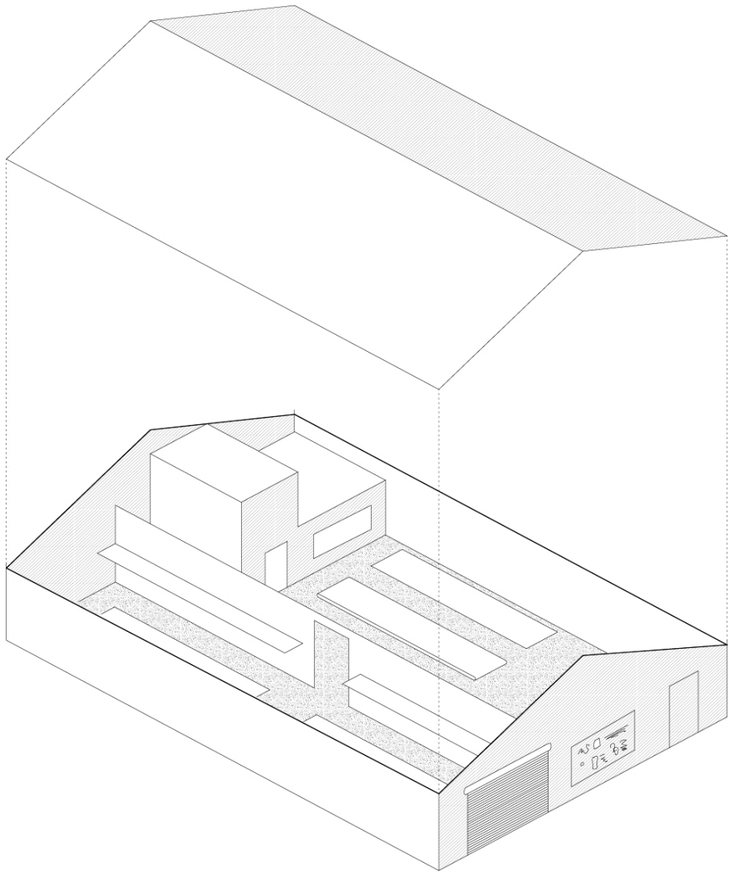
DISADVANTAGES

- Indirect environmental benefits for Newham: no tangible reduction in embodied carbon.
- Lack of physical space or 'shop-front' limits the visibility of Circular Economy practices in Newham
- Fails to address the supply and demand barriers to uptake in the industry.
- Slower impact – new trailblazers take time to set up and must have cross-industry involvement.
- Does not support the industry and businesses to shift practices to create jobs which require these new skills
- Addresses one of five programme areas.

1 No material reuse to underpin direct embodied carbon savings, but it should be noted that a circular economy skills & employment offering will influence future business practices and support wider uptake of a Circular Construction Economy. .

2 Assumption based upon this hub not requiring its own administrative infrastructure for training, e.g. by partnering with providers such as UEL, or the Building Crafts College. Note that the Building Crafts College has circa 43 employees, running at a cost of circa £2.7m per year

Circular Economy Prototype 475m²



A low-risk testing ground, the Circular Economy Prototype is primarily a circular economy retail facility, working with existing local contractors and developers to procure materials and stimulate market demand for construction material reuse. Based in a mixed-use commercial and industrial building, the Circular Economy Prototype supports the reuse of ironmongery, lighting, and sanitaryware: high-value, high embodied carbon per kilo, low-volume materials which are readily extractable from buildings prior to demolition. These materials generally require grading (i.e. classification for quality) but not technical testing; as such no testing provision is included within the option.

Our qualitative interviews indicate that the Prototype is likely to be a viable business concern which would not need long-term external funding (such as from the Council) in order to run. Seed funding may be required to incentivise the setup of the organisation within Newham specifically, and in-kind support, such as peppercorn rental pricing for the space, is likely to be needed.

The digital infrastructure would both itemise and manage the stock and provide connections to partner businesses working in adjacent fields. The scale of the operation would not initially include online purchasing for individuals. Potential partners would include projects like Meridian Water's Excess Materials Exchange, minimising the cost to create the inventory management provision.

The organisational infrastructure would be focused on three areas: working with LB Newham and local contractors to identify sites and facilitate the extraction of materials; construction retail expertise and advisory capacity to ensure material integration and reuse; network building for future work in the circular economy. As a standalone option the Prototype does not hold the space or human resource capacity for much of the formal training that would generate the accredited skills required by the wider industry. The Prototype would offer site-specific, on-the-job training rather than formalised qualifications. It could, however, be run alongside the Circular Academy to improve training and accreditation provision without requiring additional physical infrastructure.

The physical infrastructure consists of a large industrial shed with a Gross Internal Area (GIA) of 500m². A large shop front comprises about 30% of the total area, behind which there is space for sorting, grading, processing and storage alongside an office. The building will be situated within the borough, taking advantage of its active construction ecosystem and good infrastructure connections.

There are two potential delivery pathways for this option:

1 The Council decides to act as a catalytic enabler for this option by instigating a competition to incentivise the setup of this type of business in the borough. The Council develops a seed funding support package (such as start-up capital and access to premises on peppercorn rent for a specified time period) and invites proposals from entrepreneurs or industry companies that details how the business will be run and the outcomes it achieves. This would limit the Council's liability and risk longer term but also its control over the business. The next steps for this project would be undertaking more developed market testing with local stakeholders (and identified potential partners below), developing the support package 'prize', the terms of the competition and the marketing strategy.
2 The Council decides to retain an interest in the business. If so, the Council should consider the most appropriate entity for this work and whether a separate commercial vehicle is required. A seed funding package will be still be required, and it is recommended that the Council seeks an appropriate partner with expertise in the circular economy to support the venture, but there may be the opportunity to capture any surplus from operating revenue to support wider circular economy activities. The next steps for this project would involve completing project inception documents and developing a full business plan.

4.4 Option 02

Circular Economy Prototype 475m²

SUMMARY

The Prototype option would enable LB Newham to test the water and learn first hand about work in the circular economy. The market for preused interior fittings of the kind this option proposes to work with is well established elsewhere, making this option relatively low risk. However, it is critical to note that this option is self-limiting. It is not at a scale that allows LB Newham to engage in work with the materials that make up structure and building fabric, which contain the majority of embodied carbon and make up the majority of the material that goes to landfill.

With little room for technical innovation, it is unlikely that this Prototype will shift existing practice significantly, however, it could act as a proof of concept, and provide a low-cost way to initiate circular economy approaches in the area.

☒ Salvage, Retail and Reuse
☐ Training + Continued Professional Development
☐ Research and Development
☐ Testing (off-site)
☒ Business to Business Networks

Potential investment in the borough (over next 10 years)	£7.3m
GVA (over next 10 years)	£4.6m
Local spend generation (over next 10 years)	£0.3m
Cost to Council to progress	£1.25m
Potential local market size (GVA)	£1,159m
Potential local market size (businesses)	1,167
Embodied carbon saved ($kgC0_2e$/tonne)	10,477
Education Providers	15
Student Completions	0
Target CO_2e saved (tonnes)[1]	N/A
Student Outreach	1,901
FTE On-site	12

ADVANTAGES

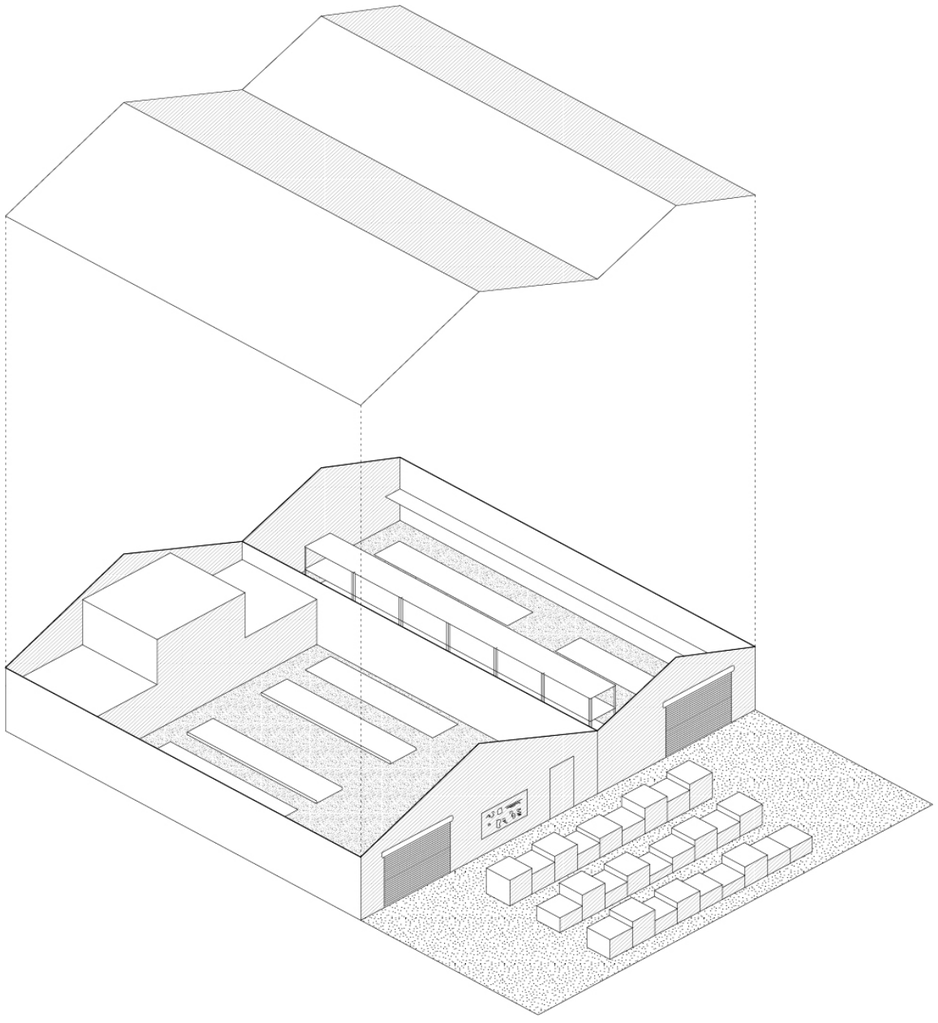
- A large potential ecosystem where stakeholders are engaged and interested in partnering.
- Physical space, increasing the awareness of Circular Economy practices in Newham.
- A website with the potential to be broadly accessible to wide audiences.
- Focusing on materials with high value and low risk.
- The opportunity to create a viable ongoing business.
- Supporting the development of repair skills, material cataloguing, and digital skills.
- Supporting the physical space with a digital platform, reaching a broader audience.

DISADVANTAGES

- The physical constraints of the hub would limit supply to small- and medium-sized construction projects.
- No testing capacity: material sorting and grading only.
- No significant creation of new circular material flows; focusing on enhancing existing reuse streams.

1 There are no data sources on current levels of hardware, lighting, door or sanitary waste streams in London.

4.4 Option 03 Circular Economy Starter Hub 2,300m²



The Circular Starter Hub works with a larger palette of material flows: as well as the high-value interior fittings processed in the Prototype, the Starter Hub also works with brick, timber and tiles. The Hub would use both a digital platform and physical premises to network with and signpost to local construction businesses.

The digital infrastructure Starting with a shared database of local construction businesses and materials similar to that outlined in Option 2, this option requires significant investment in a high-functioning digital platform, and would develop in digital data systems that can start to record materials as buildings are built, using design information to create an inventory accessible at the point of demolition. As the scale of materials reclaimed becomes suitable for medium-sized projects, a robust infrastructure enabling designers and contractors to access information about what is available becomes critical. This digital infrastructure would also include a database of other businesses in adjacent areas. (For more on how these proposals intersect with the Newham Sparks initiative, please refer to the Digital Links section below.)

The physical infrastructure The Circular Economy Starter Hub is housed in a large mixed-use, commercial and industrial building whose activities are supported by an outdoor material storage yard. The building will be situated within Newham, taking advantage of the industrial land and good infrastructure connections within the Borough. The Gross Internal Area (GIA) of this hub is 1500m², with roughly one third storage, one third retail and one third for training and processing, including grading.

Organisational Infrastructure The organisational infrastructure in this case will need to be developed to enable more complex project management – with some expertise in design, construction, digital infrastructure and retail, whether this is at a project management or at a delivery level, depending on the exact model. This option includes working with LB Newham and also with UEL and Queen Mary to carry out R&D in order to enable the new material research required to find reuse streams for these materials. These partnerships also support an extended offer of accredited education programmes.

The delivery pathway for this project must address each of the aspects of the hub, and so should be treated as a relatively complex programme. The immediate next steps would be to secure Council mandate for the programme and create a CECH taskforce, broken into project-specific subgroups. Collectively, this taskforce would work to create a business plan that spans the projects within the hub and to appraise the partnership considerations – such as potential training and testing partnerships, etc. While the appetite for partnership has been established through this commission, the details of the commercial and other arrangements have not been discussed and will be material to the shape of the programme.

4.4 Option 03

Circular Economy Starter Hub 2,300m²

SUMMARY

The Circular Economy Starter Hub has the capacity to independently refurbish, process and distribute a wide range of reused materials, as well as increasing the industry's demand and absorptive capacity for reused materials and skilled workers within the local and regional economy.

An extensive digital platform supports business-to-business networks, material tagging, and retail, leveraging the work of key potential circular construction partners such as Meridian Water's Materials Exchange Portal.

The Starter Hub undertakes onsite grading, while testing is delivered in partnership with local third parties such as the UEL Sustainable Research Institute and the British Board of Agrément (BBA). Through its collaboration with these institutions and its own capacity, the Starter Hub will support onsite training opportunities for 37 – 40 students a year.

The Starter Hub can become an important agent in promoting circular construction both by stimulating demand and availability of circular materials and a trained workforce and by fulfilling an important dissemination role on the efficacy of circular construction practices. This iteration can be viewed as critical testing ground for, and a potential step toward, the Catalyst Hub in Option 4, which introduces the R&D capacity needed to produce industry-wide impacts.

☒ Salvage, Retail and Reuse
☒ Training + Continued Professional Development
☐ Research and Development
☒ Testing (off-site)
☒ Business to Business Networks

Potential investment in the borough (over next 10 years)	£16.7m	GVA (over next 10 years)	£9m
Local spend generation (over next 10 years)	£0.7m	Cost to Council to progress	£3.38m
Potential local market size (GVA)	£1,800m	Potential local market size (businesses)	2,794
Embodied carbon saved ($kgCO_2e$/tonne)	2,242	Education Providers	49
		Student Completions	37 – 40
Target CO_2e saved (tonnes)	7,512	Student Outreach	5,834
		FTE On-site	26

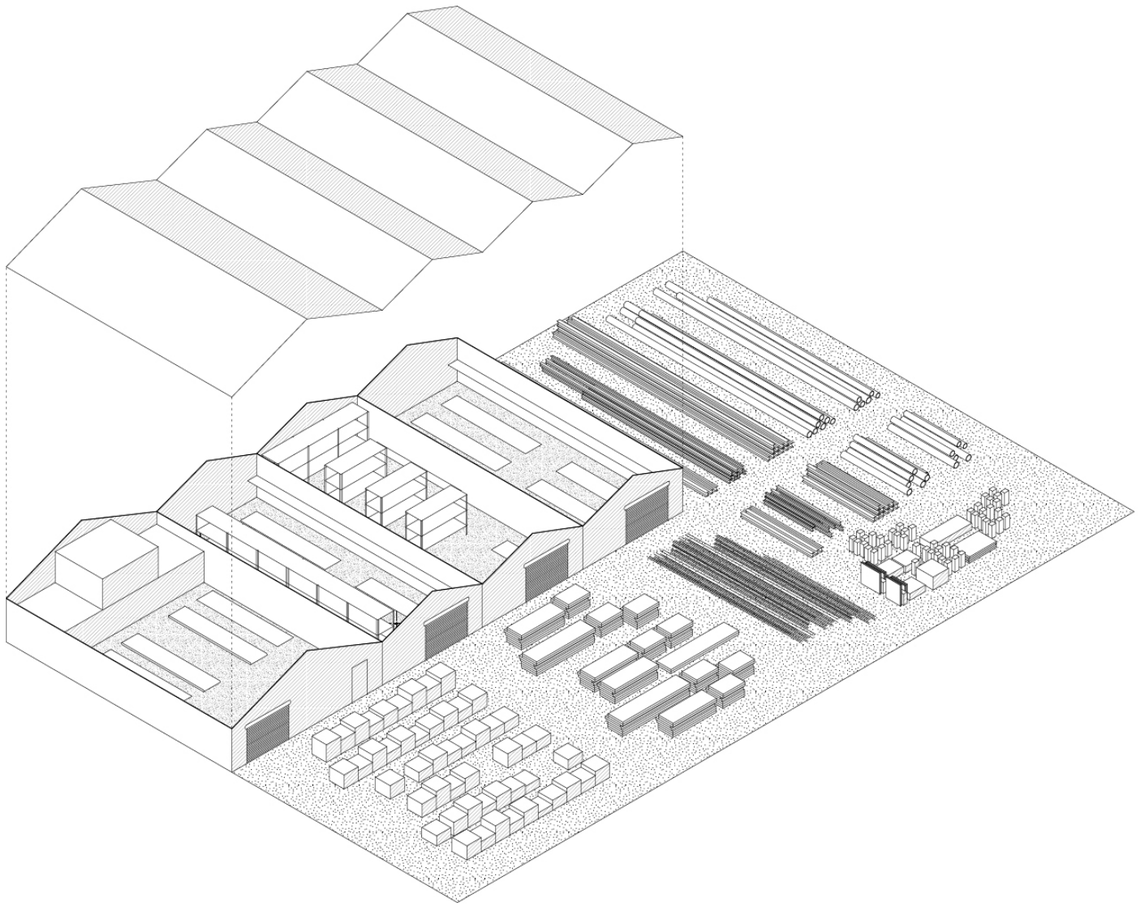
ADVANTAGES

- A large potential ecosystem where stakeholders are engaged and interested in partnering
- Physical space – helping to provide visibility/ awareness of Circular economy practices in Newham.
- The online retail function that has the potential to be broadly accessible to wide audiences.
- Capitalising on the existing stakeholder interests to partner and provide training and skills programs in Newham.
- The multi-faceted programme may enable a circular economy 'cluster' approach in the borough.
- Scope for extensive partnerships with research institutions enabling the development of reuse solutions for materials not yet in mainstream reuse.

DISADVANTAGES

- The limits of testing to material sorting, grading and testing off-site.
- There are likely to be key pinch points in the scaling up process that may require public sector support to overcome (for example, working capital loans for new material streams). This could be offset by an organisational approach to grant-seeking for appropriate funding.
- Formalised apprenticeships are likely to have a relatively long lead-in time (however this could be mitigated in the short term by adapting existing courses).

4.4 Option 04 Circular Economy Catalyst 250,000m²



In addition to the material streams identified in Option 3, this hub facilitates the reuse of more challenging and impactful materials, including insulation and structural steel. Reusing these materials represents a greater technical challenge due to the performance requirements they must meet but in tackling these challenges the hub would begin to steer large-scale systemic change.

Compared with previous options, this flagship centre vastly increases R&D capacity, resulting in a much more important role as an independent training and research facility with a potentially extensive environmental impact.

The digital infrastructure would feature the same functionalities as option 3, albeit increasing the scope for development of material tracking and data tagging tools as well as data banks of the materials existing in buildings. This would be achieved through information modelling systems, to be developed in partnership with university research labs. Once developed these systems have the advantage of being easily adoptable and replicable anywhere in the world, representing an important contribution to the circularisation of construction cultures beyond our immediate context. (For more on how this meets the Newham Sparks initiative, please refer to the Digital Links section below.)

The physical infrastructure is based on a site of 25,000m², comprising both interior and exterior space. The main hub would be housed in a three-story facility with enhanced storage. One third of the ground floor area is given over to yard space to enable the flow of materials in and out of the site; roughly one fifth of the overall area is used for purposes of certification, testing and R&D labs, while half of the available floorspace is devoted to storage, given the type and quantity of materials involved. In practice, however, rather than starting from a single site, this option is likely to grow incrementally out of Option 3 by prioritising display space on a smaller main site and gradually expanding storage capacity on secondary sites. Physical space could also develop through the rolling use of meanwhile plots across the borough, enabling an organic expansion as the business grows.

The organisational infrastructure in this iteration would require extensive expertise across a variety of areas, from logistics to design, digital data and information management and circular economy management skills. These areas of specialisation would accrue to the competencies already cited in earlier options, covering construction, materials research, retail and training and education delivery. The complex organisational configuration required by this operation would in part be devised by expanding on and responding to the practical needs arising from trialling of Option 3.

The delivery pathway for this option is less clear than for other options, though there are two main options. Traditionally, attracting a large business (categorised as having 250 or more employees) would be an inward investment proposition, where the Council would target desired employers and offer incentives to setup in the area. This could be done through co-working with London & Partners, the London region's inward investment organisation.

Given the nascent nature of the circular economy, and the lack of full-scale precedent for a circular economy construction hub, an inward investment proposition may have limited impact: there may not be an appropriate provider already delivering the type of work that the Council is seeking, particularly when considering the variety of activities the Hub could undertake.

The alternative pathway would be to view Option 4 as a long-term ambition – a scale-up evolution of some of the other options outlined above. The delivery pathway would therefore be the same as the other options in the short term, however with considerations around governance structure, partnerships, funding and financing to be taken with a view to building a larger-scale, viable business in the long term.

4.4 Option 04

Circular Economy Catalyst 250,000m²

SUMMARY

This option houses an independent R&D laboratory. The retail component expands from being focused only on reused materials to new, regenerative biobased materials, promoting a further-reaching transition in construction culture toward low-embodied carbon, sustainable and biodegradable materials. These new materials streams constitute a potentially lucrative revenue streams for the Catalyst.

Training capacity is vastly increased, catering to an estimated 400-960 students, whose learning would take place primarily at the demolition and construction sites as well as in the Hub's testing, certification and R&D labs. Greatly expanding the construction industry's capacity to salvage materials and incorporate reclaimed, refurbished and reused materials in construction projects, the Catalyst would create important professional employment streams in the circular construction economy in LB Newham and beyond.

☒ Salvage, Retail and Reuse
☒ Training + Continued Professional Development
☒ Research and Development
☒ Testing (off-site)
☒ Business to Business Networks

Potential investment in the borough (over next 10 years)	£137.3m
GVA (over next 10 years)	£120m
Local spend generation (over next 10 years)	£5.7m
Cost to Council to progress	£4.31m
Potential local market size (GVA)	£2,010m
Potential local market size (businesses)	3,950
Embodied carbon saved ($kgC0_2e$/tonne)	3,923
Education Providers	138
Student Completions	400 – 960
Target CO_2e saved (tonnes)	19,986
Student Outreach	10,585
FTE On-site	252

ADVANTAGES

- Opportunity to become a global research institution for reused materials and low carbon construction practices
- Capacity to focus R&D on the creation of new circular material flows.
- Interface with training programmes and providers support Newham residents and provide access to local circular economy opportunities.
- Capitalising on the existing stakeholder interests to partner and provide training and skills programs in Newham.
- Facilitating partnerships and networking across the Borough as an anchor education provider.
- Physical space helping to provide visibility & awareness of Circular economy practices in Newham.
- Creating circular economy employment opportunities across multiple construction industry partners.
- The scale of delivery is such that it makes the supply of reused materials more viable.

DISADVANTAGES

- There is no existing model for this option; LB Newham would be pioneering the approach.
- Traditional inward investment approaches may be unlikely to be successful (due to the lack of existing businesses in this space).
- This is more likely to be successful as a long-term proposition – it will not be delivered over a short-term timeframe.

Digital Links

The London Borough of Newham has an ambitious plan to harness the potential of a growing data sector to provide more than 5,500 new jobs. This ambition aligns with the ambitions of the Circular Economy Construction Hub which will rely on the collection and analysis of data to maximise its impact and to contribute to the case of greater use within the borough and beyond.

Opportunities

There are some clear opportunities to utilise the overlap between the circular economy and digital skills and technology. The initiatives outlined below would all further the circular economy agenda but would also provide the opportunity for digital and technology skills & jobs for residents in the borough.

Leveraging Newham Sparks

The recently published '*Newham Sparks, Chapter 2*' details five key recommendations which will allow the borough to maximise benefit from the data sector. These are:

- Data Citizenship – giving all residents the skills and tools needed to understand the value of data for doing public good
- Spark Centres – starting " incubators" enabling digital innovation entrepreneurship alongside shared service such as libraries and community kitchens.
- Spark ID – lead an initiative to establish a London-wide digital identity system
- Data Exhanges – engaging with partners across London to align and consolidate data and they way it is collected, without compromising the privacy and freedom of residents
- Digital Dependencies – establish a network of "Universal Basic Services" which enable access to data sector, removing barriers to its development

Spark Centres could be located within, or alongside, a Circular Economy Construction Hub, sharing services and facilities, such as IT, training and support spaces. This delivers greater value for money to the council, and increases engagement with the Spark Centres and CECH. This pairing would furthermore emphasise the importance of data in the future Circular Construction Economy. Data exchange within the construction sector could be improved as a consequence, becoming a flagship data project for Newham's Newham Spark programme.

Overcoming Data Barriers

One of the key barriers identified in Section 2 above is around *data & lack of record of older buildings.* If greater materials records were established, this could help enable better harvesting of materials from sites. While the cost of retroactively establishing this information in existing buildings is likely to be prohibitive, the Council could consider implementing a 'digital twin' programme that requires this information through the planning process in future, bridging this identified gap moving forward.

An additional challenge is the user interface of any material reuse centre. While a standardised retail materials distributor (for example, B&Q) offers materials of the same variety, size, and quality, the materials available through a CECH will be highly variable. As a result, it is far more challenging to create a website which offers real-time information of stock but which does not take significant human capacity to maintain.

Amplifying Existing Data Ecosystems

There are a number of Materials reuse websites, and one of the key elements of the CECH should be to amplify rather than duplicate existing provision. As a result, signposting to and takeup of the existing platforms is an important element of the CECH.

Potential Partners

Among the London boroughs, Newham has an exceptionally rich industrial reuse and recycling sector, with three major recycling facilities present in the borough. The CECH would leverage the processing capacity of these businesses, diverting the material streams they specialise in, such as concrete, plasterboard or steel, toward their facilities while focusing in-house capacity on lifting barriers to the reuse of other construction materials, such as timber.

The local training and education ecosystem is also particularly favourable to an initiative like the CECH. Support from local research institutions will be key for material testing processes as well as training delivery. We have identified high partnership potential from local education providers, as well as significant DfE and GLA funding for adult upskilling. The additional capacity brought to the borough by CECH would create strategic streams for the allocation of this funding toward the transition to a green circular economy.

Testing

The British Board of Agrement (BBA)

- Location: Watford, Greater London
- Employees: 185
- Site Area: 7100m2/0.71ha
- CECH Partnership Potential: Material testing partner, both onsite and outsourced

Providing research, auditing, inspection, testing and certification, the BBA, or British Board of Agrément, was established in 1966. Agrément Certificates produced by them prove a construction product, or installation method, is fit for purpose and in compliance with British building regulations. These certificates cover products from 200 sectors, the largest of which are roofing and insulation. For insulation, the BBA has run an approved installer scheme for the past 30 years covering injected cavity installation. This system provides the BBA's approval of the installation, and assurance it meets certain standards. The BBA also provides inspection for the Fenestration Self Assessment Scheme (FENSA) and the Federation of Master Builders to ensure installers demonstrate good practice on site. They also run the Highways Authorities Product Approval Scheme (HANSA) similar to the Agrément Certificate scheme for highways products.

Formerly publicly-funded, employees of the BBA maintain a connection with central government, often sitting on select committees concerning the built environment. The BBA is a company limited by guarantee, which means that much like a not-for-profit, any profits generated by the company are reinvested in the construction industry or for the public good.

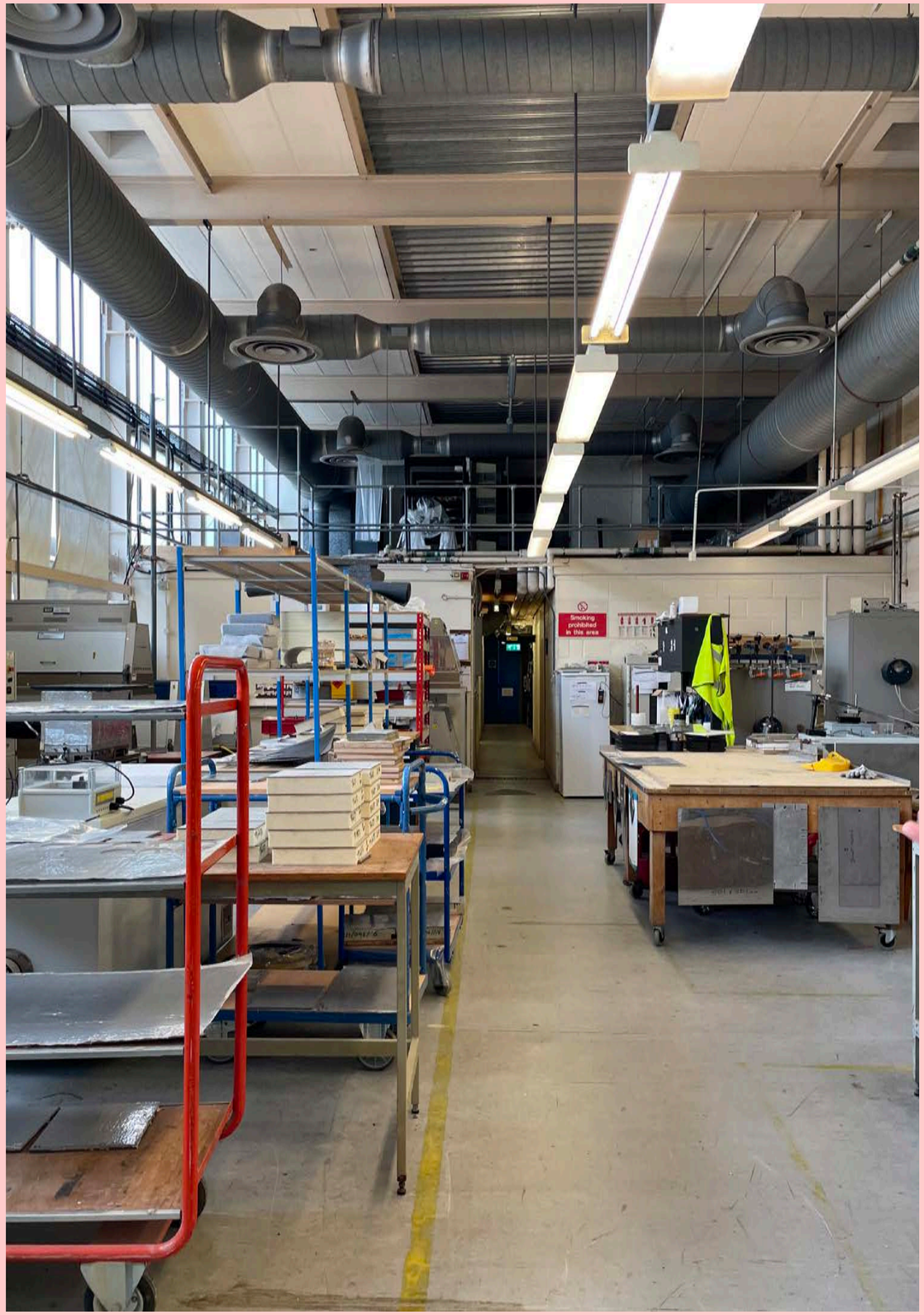


Fig. 25: BBA test set-up.

Training
Newham College London

- Location: Stratford, Newham
- Site Area: n/a

CECH Partnership Potential: There is potential for Newham College to act as a construction skills education partner to the new Circular Economy Construction Hub (CECH). Newham College is interested in partnering with the CECH, either through networked training opportunities at their existing facilities or in establishing new pilot skills programmes hosted by the hub.

Newham College is a general Further Education College. They support 10,000 learners a year, 20% of whom are 16-18 year olds. The remaining 80% are a mix of approximately 500 apprentices, 1000 students on adult education programmes and the remainder are involved in a combination of skills training courses and boot camps. These courses focus on supporting skills development for the workplace associated with specific industries. They also offer 1 year accelerated programmes to support mature students into University courses. They have a range of Engineering, Electrical Technology and other courses related to construction in the green economy that are taught through workshop teaching spaces across a number of sites.

Newham College is part of the London City Institute of Technology, one of only 12 Institutes of Technology within the UK. The Institute specialises in higher technical education and apprenticeships with a focus on STEM subjects, such as engineering, digital skills and construction. A collaboration with the Queen Mary University of London and numerous employers, the Institute has received £28million worth of funding from the Department of Education and the Greater London Authority to provide upskilling and reskilling opportunities for adults, and they have confirmed that they would welcome the opportunity to collaborate with the CECH's training and upskilling programmes. There are upcoming opportunities for the IIT to expand its focus to include Green Skills in the near future. Newham College is involved in Newham Sparks (see Digital Links section).

Training
The Building Crafts College (BCC)

- Location: Stratford, Newham
- Site Area: 3,500m2/0.35ha
- CECH Partnership Potential: Construction skills education partner

Founded by the Worshipful Company of Carpenters in 1893, the Building Crafts College sits within a purpose built building in the heart of Stratford. The college educates 400 students a year in courses for carpentry, joinery, construction, building conservation and stonemasonry. Education is offered from Level 1 to degree level in historic building conservation or construction management. Their students are highly employable, with an apprenticeship retention rate of 87%, above the national average of 65.7%.

Testing & Training

University of East London,
(UEL) Sustainability Research Institute

- Location: Newham
- CECH Partnership Potential: Construction Skills education, Research and Development partner, Material Testing partner

The Sustainability Research Institute (SRI) is UEL's centre of excellence for environmental research and development. Established in 2001, the SRI was one of the first dedicated sustainability research institutes in the UK and it has since built an excellent international reputation for groundbreaking research and development in the real world. The SRI focuses on three urban and rural sustainability challenges, including Green Infrastructure, spanning areas such peatland ecology and conservation, the design and monitoring of urban green infrastructure and invertebrate conservation, Resource Management, encompassing materials engineering, energy efficiency and the circular economy and Sustainable Society, covering adaptive governance and community engagement and asset management.[9]

Stakeholder engagement with the SRI identified excess capacity within certain laboratories for material testing equipment, including a number of weathering machines appropriate for Research and Development work around construction material testing. The department are interested in partnering with developers and contractors to innovate in the construction materials market, an area in which they have a proven track record. The SRI have also begun conversations with the BCC in Stratford (See D1), another potential Skills Partner.
The SRI is beginning a new focus on supporting low-carbon construction practice with the help of £10.8million ERDF funding. The Institute is keen to collaborate with a potential CECH hub.

9 https://www.uel.ac.uk/our-research/sustainability-research-institute-sri

Testing & Training

School of Engineering and Materials Science,
Queen Mary University of London

- Location: Stratford, Newham
- CECH Partnership Potential: Research and Development partner, Material Testing partner

The Queen Mary, University of London (QMUL) School of Engineering and Materials Science (SEMS) provides degree and postgraduate programmes coupled with internationally-leading research. They offer taught postgraduate programmes in a number of Science and Engineering departments, including a Materials Engineering department through which they are partnered with Newham College in the new London City Institute of Technology. They carry out research and development primarily on resin-reinforced composites and metals, frequently through collaborations with external companies. They have material testing infrastructure in-house, namely quasistatic and fatigue tests, environmental chambers and wind tunnels for construction materials.

Although space in the mechanical testing laboratory itself is currently limited, placing restrictions on opportunities for the hub to outsource testing in the immediate future, the SEMS is very keen to collaborate with the CECH and establish a partnership to make these goals attainable.

Reuse And Recycling Partners

EMR: Metal Recycling

- Location: Canning Town & Multiple National & International Locations
- Site Area: 18,800m2/1.8ha

With 65 sites across the UK, and dozens more globally, EMR is the UK's largest metal recycler. At the national level they recycle 5 million annual tonnes of material, of which 4 million are ferrous and 1 million non-ferrous. 1 in every 8 cars in the UK are recycled by EMR. Their site in Canning Town, Newham, accepts iron and steel, as well as a range of non-ferrous metals such as aluminium and copper, scrap vehicles and batteries, cables and large and small domestic appliances, and uPVC windows. These are processed and separated before being sold on to other parties to be recycled. Due to the low availability of electric arc furnaces in the UK, 80% of the steel recycled by EMR is exported.

Alongside their Canning Town facility they have additional premises in Erith and Tilbury in South and East London, as well as Mitcham and Willesden. Their Erith site is beginning to specialise in reuse, and they are already engaging with developers who directly supply them with reused steel. They conduct their own testing through a mix of onsite and laboratory testing, offering reused steel at around the same prices as virgin material. As the reuse market grows, they are receiving increasing numbers of enquiries and aim to expand their offer to include new material streams such as façade systems and bricks.

Fig. 26: Aerial picture of EMR Canning Town.

Reuse And Recycling Partners

Bywaters: Plasterboard Recycler

- Location: West Ham & Gateway Road, Newham
- Employees: 420 (all sites + transport)
- Site Area: 38,000m2/3.8ha (Gateway Road), 36,000m2/3.6ha (Lea Riverside)

A family-owned business with two Newham sites, Bywaters has provided waste management services in London for the past 60 years. Their West Ham facility processes predominantly household waste, alongside smaller fractions of commercial waste and plasterboard, while their Gateway Road operation processes predominantly construction and demolition waste. Both facilities separate waste into individual streams that can be sent on for recycling through their Materials Recovery Facility (MRF) processes and trommel screens. These processes include a series of roll screens, infrared optical sorting, magnets, and eddy currents which sort waste through air tunnels. Under the supervision of 30-50 employees, the MRF can deploy mechanical processes to extract cardboard, wood, bricks, metals and more from construction and demolition waste, before bailing these to be sent to reprocessing partners. Residual materials are sorted to extract fine matter such as soil. Any remaining matter is sent to generate electricity for the National Grid, ensuring nothing is sent to landfill. The sole byproduct of this process is ash, which is used in the construction industry as an aggregate in road surfacing.

Across all their facilities and including drivers, Bywaters employ 420 staff. Their plants operate 365 days a year, 24 hours a day, with a break in the evenings to clean and check the machinery. Monitoring of waste provides information for clients about the types of materials being recycled, their variation over time, and their associated emissions. This data is accessed through a dedicated reporting platform. Bywaters will soon start using their first electric vehicle, charged by the solar array spread across their main building's roof. This will be a significant moment in their operations as transport remains by far the biggest emissions challenge for their operation, since most of the machinery already operates on electricity generated by the aforementioned solar array.

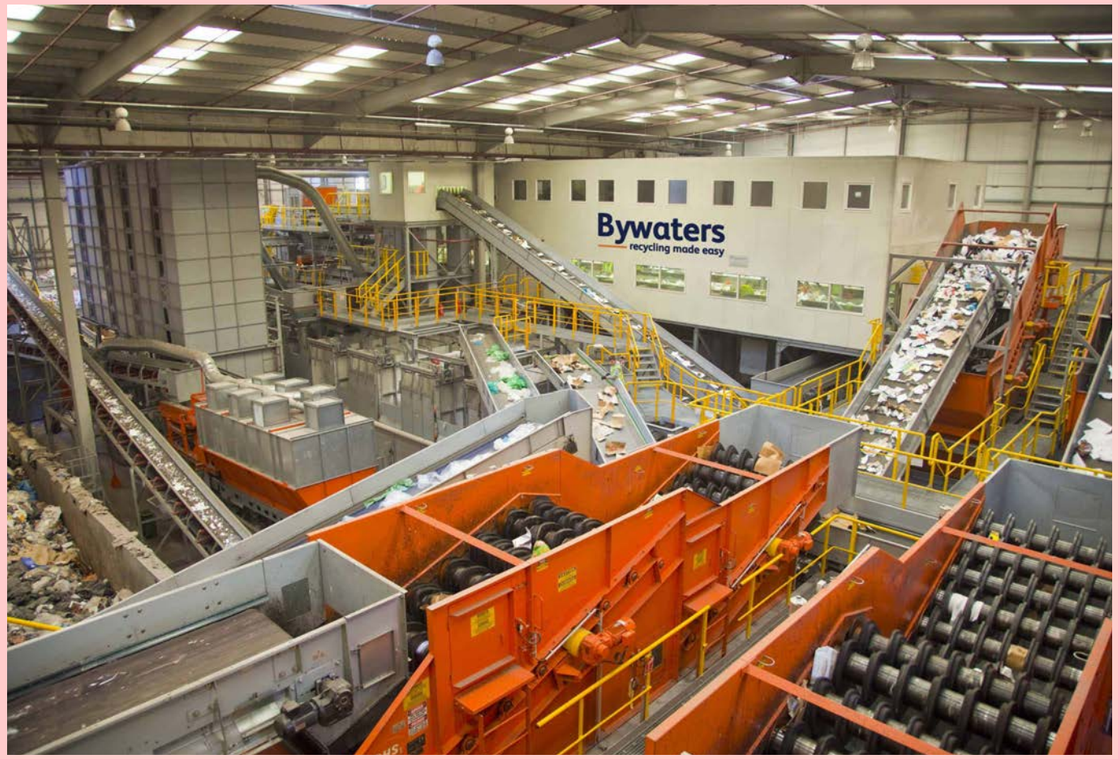


Fig. 27 + 28: Aerial image of the Bywaters recycling facility and internal image of the facility.

Reuse And Recycling Partners

RMS: Concrete Recycler

- Location: Silvertown, Newham & SE London
- Employees: 80 (Silvertown)
- Site Area: 25,000m2/2.5ha

Founded in 2007 with a single tipper, RMS now operates across 3 different sites, with 100 lorries in East and South London. They process around 230,000 tonnes of waste annually, offering services including crushed and washed aggregates, tipper hire, grab lorries, roll-on-off lorries, skip hire and dust carts. At their facility in Silvertown, Newham, they collect, sort, process and recycle concrete construction and demolition waste. They offer a variety of industry classifications from 6F5, through to screened shingles, sharp sand and Type 3. Customers have included large contractors suchs as Keltbray, Balfour Beatty, and Bam Nuttall, as well as Crossrail, GRS Group and Redhammer Demolition.

Fig. 29 + 30: RMS: Concrete Recycling Facility.

Reuse And Recycling Partners

Old Slate Yard: Architectural Salvage (Bricks, Tiles)

- Location: Newham, London
- Employees: 7 (on site) + 16 (temporary demolition & processing staff)
- Site Area: 650m2/0.065ha
- CECH Partnership Potential: Brick, Tile and Slate Reuse

The Old Slate Yard, located west of Forest Gate Station in Newham, was established as a reclamation business in 1981. Carrying out demolition themselves, they primarily trade in bricks, but also tiles, slates, other architectural ceramics such as chimney pots, and timber which is directly acquired from demolition sites.

Bricks are cleaned on the demolition site with workers hired on a job-by-job basis to clean the bricks with an axe. Roughly 3000 can be cleaned by one person in a day, generating 6 palettes of 500 bricks per cleaner. Where reclaimed supply does not exist or is very expensive due to the difficulty of reclaiming particular types of brick, Old Slate Yard import a small fraction of their retail supply, but have remarked that rising transportation costs are making the price per palette of the reclaimed alternatives increasingly competitive. While their site in Newham serves their needs, they also rely on collaboration among their business network, with similar businesses further outside London storing materials when space is not available in Newham.

Fig. 31: Recycled materials at Old Slate Yard, Newham.

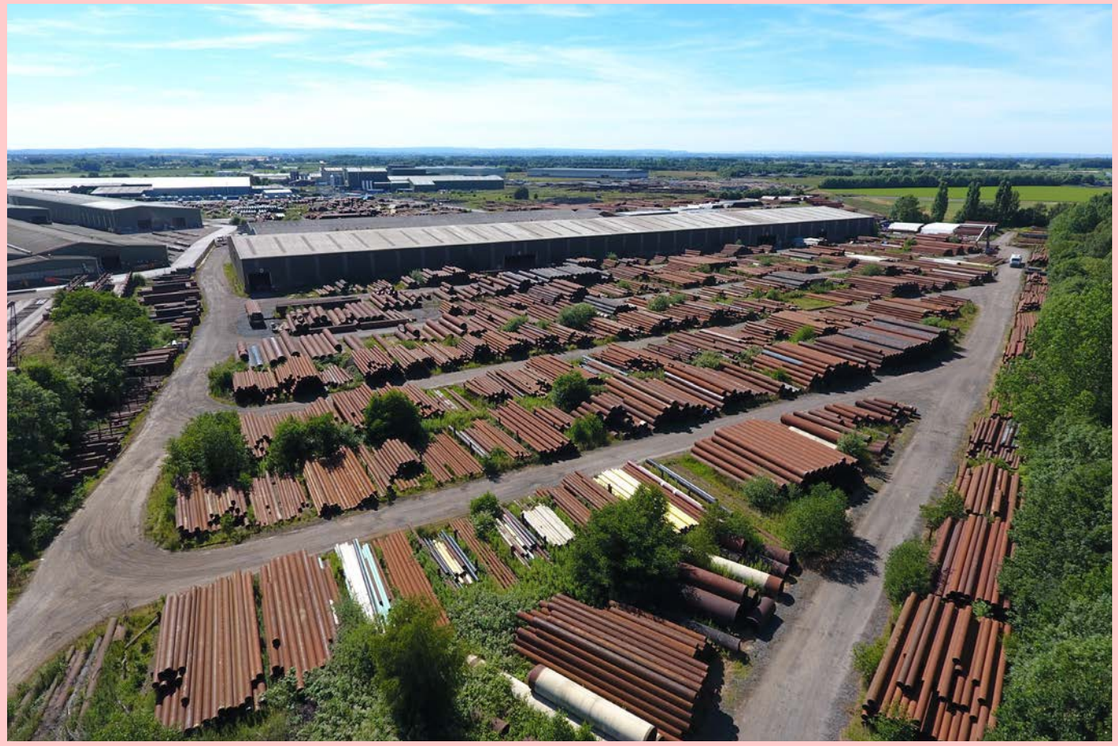
Reuse And Recycling Partners

Cleveland Steel: Steel Reuse Merchant

- Location: Thirsk, Yorkshire
- Employees: 55
- Site Area: 1,000,000m2/100ha (Internal 23 600m2)
- Turnover: £14.6 million / 16,650 tonnes

Established in 1973, Cleveland Steel is a founding member of the multinational Bianco Group. 80,000 tonnes of tube are held in stock at their North Yorkshire site, which contains 20,500 m^2 of warehousing across a 100-acre facility. They stock surplus and reused steel, predominantly tubular steel sections, typically measuring 4.5m to 15m. They have begun to try and build an inventory of I-beam sections recently, but due to the current practice of cutting sections down to fit into skips on demolition sites, this is proving difficult. Stock turn is typically 5 years, compared to perhaps 5 times per year for a typical virgin steel supplier. They are BS EN ISO 9001:2015 certified for their quality management system which enables them to provide customers with reused products that meet their specific regulatory requirements. Cleveland supplies to a number of industries including civil engineering & construction, defence, mining & quarrying, oil and gas exploration, piling, rail, renewable energy & power utilities, and sports & leisure.

Cleveland Steel supplied large amounts of reused steel in the construction of the Olympic Stadium in London. Of the 3,850 tonnes of steel used in its construction, 2,500 tonnes were surplus steel provided by Cleveland. Within the roof structure 65% is surplus setel, with 20% of the total construction being surplus steel. Another project for a warehouse for NTS (National Tube Stakeholders) demonstrated £650,000 savings associated with reused materials, and 51,000 miles of saved HGV transport. 20,000 tonnes of road planings for a nearby motorway resurfacing project were used in the building's foundations contributing to emissions savings of 96%. The building's portal frame was designed in such a way that it can be recycled at the end of its life.



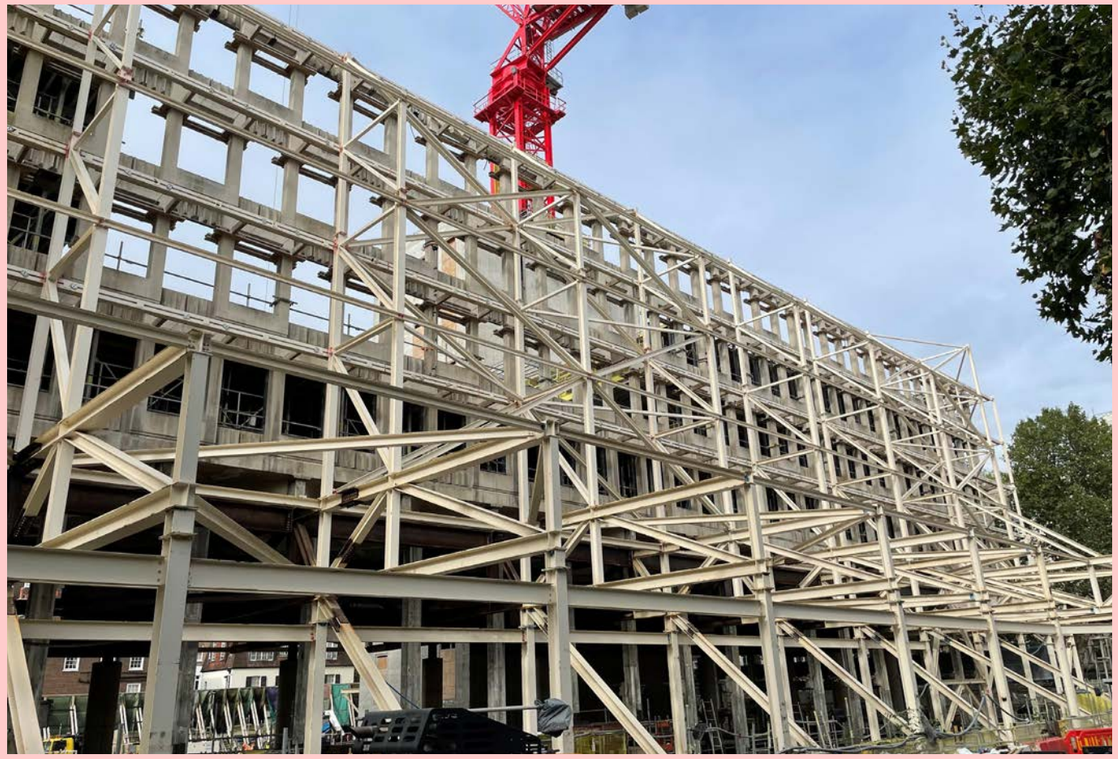


Fig. 32 + 33: Steel reuse merchant from Cleveland, Yorkshire.

Reuse And Recycling Partners

Community Wood Recycling:
Wood Recycling Social Enterprise_

- Location: Various locations, UK
- Employees: 259
- CECH Partnership Potential: Timber recycling, processing, training and storage

Community Wood Recycling are a network of 30 social enterprises that have recycled wood since 1998. Their mission is to help reduce waste and damage to the environment whilst providing workplace opportunities to disadvantaged people. They charge a fee to collect wood from companies, such as contractors running building sites. The wood is then processed and prepared for resale, with some manufactured into saleable products such as furniture. The also accept commissions to make specific items for customers. In 2021 their social enterprise gave work to 406 local, unemployed people and created 259 jobs. They were recently involved in saving waste wood from the construction sites of the Elizabeth Line, where they made 221 collections from Crossrail sites between 2011 and 2017. This rescued 265 tonnes of timber, saving an estimated 132 tonnes of carbon. This partnership trained 9 people and provided jobs for a further 3 people. They currently do not operate any sites in central London, with the nearest to Newham being in Essex or Croydon.

Figure 34 + 35: Timber reuse centers.

Table 3:
Summary of Options Impact

Strategic Objective	Metric	Option 1	Option 2	Option 3	Option 4
Improve the quality of life for residents of Newham, improving access to opportunities including job and education	Number of FTE supported employees on site	0 (3-5 off-site)	12	26	252
	Student completions: number of students that can be supported on an academic term basis (September - June)	14 - 34	0	37 – 40	400 – 960
	Student outreach: Number of students per year that the hub could interact with (based on pupils)	This option could be focused on a target market of 16 – 18 Performance Schools – 15 education providers ~ 1,901 students	This option could be focused on a target market of 16 – 18 Performance Schools – 15 education providers ~ 1,901 students	This option could be focused on a target market of 16 – 18 Performance Schools – 15 education providers ~ 1,901 students and Secondary Schools - 34 education providers ~ 3,933 students, a total of 49 education providers ~ 5,834	This option could be focused on a target market of all school/education providers, a total of 138 education providers ~ 10,585 students
Increase sustainable construction practices to become London's greenest local borough and economy Reduce greenhouse gas emissions and the use of raw materials	Embodied carbon saved	0	Total Embodied Carbon Saving: 10,477 kgC02e/tonne ● Light fittings (6,025) ● Ironmongery (2,824) ● Doors (Timber – Glulam, 100% FSC, PEFC) (1,628)	Total : 2,242 kgC02e/tonne ● Light fittings (6,025) ● Ironmongery (2,824) ● Brick (210) ● Tiles (clay roof tiles) (404) ● Timber (Glulam, 100% FSC / PEFC) (1,628)	Total: 3,923 kgC02e/tonne ● Light fittings (6,025) ● Ironmongery (2,824) ● Brick (210) ● Tiles (clay roof tiles)(404) ● Timber (Glulam, 100% FSC / PEFC) (1,628) ● Steel (UK open sections: British Steel EPD)(850) ● Insulation (831)
	Total CO2e saved	N/A	N/A	7,512 tonnes	19,986 tonnes

Table 3:
Summary of Options Impact

Strategic Objective	Metric	Option 1	Option 2	Option 3	Option 4
Deliver a financially viable solution that attracts local investment in Newham	Contribution to the local economy (Hub's GVA, gross, over the next 10 years)	£3m	£4.6m	£9m	£120m
	Potential investment in the borough (over the next 10 years)	£2.2m	£7.3m	£16.7m	£137.3m
	Local spend generation (over the next 10 years)	0	£0.3m	£0.7m	£6.7m
	Cost to Council to progress	£0.16m	£1.25m	£3.38m	£4.31m
Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices	Potential local market size (number of businesses and aggregated GVA)	111 businesses, with an aggregated GVA of £25m	1,167 businesses, with an aggregated GVA of £1,159m	2,794 businesses, with an aggregated GVA of £1,800m	3,950 businesses, with an aggregated GVA of £2,010m
	Collaboration potential	● The London City Institute of Technology ● Building Craft College ● Newham Construction College ● London Design & Engineering University Technical College (UTC) ● London Construction Academy ● NewVic	● The London City Institute of Technology ● Building Craft College ● Newham Construction College ● London Design & Engineering University Technical College (UTC) ● London Construction Academy ● NewVic ● BBA ● Sustainable Research Institute, University of East London ● CIRCuIT	● The London City Institute of Technology ● Building Crafts College ● Newham College London ● London Design & Engineering University Technical College (UTC) ● London Construction Academy ● NewVic ● BBA ● Sustainable Research Institute, University of East London ● CIRCuIT	● The New Institute of Technology, Building Craft College, Newham Construction College ● Mike Wye/ Eco Merchant ● Community Wood

4.5 Summary & Evaluation

If the priority is Minimising cost to the public sector Option 2: Circular Economy Prototype

The Circular Economy Prototype is the most likely option to be entirely delivered by the private sector. It could be instigated by the Council's allocation of seed funding and access to space for an entrepreneurial startup chosen through a public competition requesting expressions of interest.

The low-risk, high-value approach to materials mean that the complications and barriers related to risk would be lower, and the research undertaken for this project indicates that it is likely to be a viable going concern if space is provided on a peppercorn basis.

If the priority is Deliverability: Option 3: Circular Economy Starter Hub

The Circular Economy Starter Hub offers the best all-around fit with the Council's strategic objectives: it is a more active intervention in the medium term that also starts to address some of the barriers to the circular economy, particularly barriers to supply and demand.

The Starter Hub option will have a multi-year implementation phase and will require investment from the Council in terms of seed funding, access to space, and resources. There will be both capital and revenue costs but the opportunity to leverage partners behind a vision is significant: a Hub that is both physical and networked, that leverages partners and creates a circular ecosystem within the borough, and which directly links to both training and job outcomes.

If the priority is Skills and training Option 3: Circular Economy Starter Hub

The Starter Hub is the best short- to medium-term option to support skills & training improvement. Physical premises enable practical learning, and institutional partnerships pave the way for formal, accredited learning paths. Because this option addresses some of the barriers to uptake of a circular economy, it actively improves the job market outcomes of the people it trains through these courses.

If the priority is Environmental impact Option 4: Circular Economy Catalyst

The Circular Economy Catalyst would have the highest overarching environmental impact in the borough, as well as the highest impact on jobs. However the size of operations to facilitate a material change to waste consumption is enormous.

A traditional approach to encouraging this sort of scheme would be via an inward investment and attraction approach, in which the Council would seek to attract a lead provider for this space; however, the Circular Economy Hub is a nascent typology for which these types of large-scale providers do not yet exist.

As such, the scale of this Hub would require significant investment – early estimates are upwards of £100m. This would be a long-term proposition and may require a significant risk appetite from the Council.

5 The Way Forward

A Circular Construction Economy in Newham is the ideal way to deliver against Newham's priorities of improving quality of life for residents and increasing sustainable construction practices. The adoption of a circular economy approach is critical to support the transition to net zero. Despite recognition that a circular economy approach is a critical element of managing the climate crisis, it is unlikely that market forces will intervene to establish a circular economy approach without action from the public sector. The private sector's responsibilities towards shareholders do not incentivise the private sector to act as a first mover in this space, and there is little incentive to invest in research and development while barriers to uptake remain in place. The public sector has both the buying power and the regulatory powers to act while the market is failing.

A circular construction economy project will act as an exemplar for public-private sector partnership and for public sector pathfinding for this complex challenge. This is the ideal time to move forward with a circular economy project: national, regional and local policy is behind the approach; interest in the green economy continues to swell; and the scale of future investment from Newham is well positioned to act as a catalyst to the opportunity.

5.1 Recommendations

We propose that in the next stage the Council should develop and appraise the Circular Starter Hub, option 3, as the preferred way forward, aiming to move towards a pilot project for the Hub over the next 12 – 18 months. This option is an ambitious, integrated Hub that proposes to leverage partners and support residents. It will address the Council's strategic development priorities as set out in the Covid-19 recovery Pillars and the Sparks Initiative, deliver meaningful shifts towards a circular construction culture in LB Newham, and create a reference institution that generations high-quality employment opportunities while minimising financial dependency on the Council.

The case for change (Section 2) has demonstrated that there is a mandate at all levels – national, regional, local – to address the climate crisis, and that a circular economy approach is a vital piece of the puzzle. The Circular Starter Hub could push Newham to the forefront of the Green Economy, capture associated employment for local residents and futureproof the construction and logistics skills population.

As a result, the Council should:

Consider opportunities for intervention across the green economy, in order to best position itself and its residents for the net zero transition. These opportunities are currently being evaluated through the Community Renewal Fund Programme's *Project 1: Green Economy Business Case and Delivery Plan.* Any project on the circular economy should be designed to interface with the wider Green Economy aspirations of the Council.

1. Develop a Circular Economy Activation Project which seeks to maximise the benefit of the Council's own Levers. This is work which looks beyond the specific CECH project towards how the Council can use its buying power and its regulatory power to drive changes in behaviour that support the circular economy. This should include:

- Incorporating an explicit position on the Circular Economy into planning policy;
- Incorporating market signalling on Circular Economy initiatives into procurement processes (for example, in specification and evaluation documents);
- Requiring Council-led developments to adopt material reuse and circular economy principles as exemplars for the industry;
- Implementing the *Green Business Fund* which could assist smaller businesses at key scale-up points (for example by assisting with working capital requirements to invest in new reuse materials).

2. Develop a circular economy proposition with the Building Crafts College to capture the quick win: There are 12 Bench Joinery apprenticeship positions available – fully funded through Section 106 funding – at the College. The College has advised that they are unable to fill these apprenticeships and as such the opportunity risks being lost. This would be a very viable pilot project for the training programme element of the CECH; the Council has the opportunity to write an adaptation to the curriculum in order to enable an adjusted apprenticeship course ready for intake in January 2023. While the eligibility criteria is relatively strict, better engagement with the Newham Works teams and other education and outreach providers should assist in finding appropriate students.

3. Move forward with a Circular Economy Construction Hub pilot. This project has the ability to be a world-leading Hub for the Circular Economy, but it is critical that the option that the Council chooses to progress is developed with partners and with market input. This feasibility report has considered the opportunity and barriers, components of a hub, high-level requirements, and identified potential partners for a CECH, however a detailed business case – which is co-created with partners from a CECH taskforce established for the purpose – should be undertaken to progress to the next stage. The business plan should seek to address some of the following:

- Land acquisition / access to space. The project should identify and secure the specific space required for the Hub to move forward. As part of the 'pilot' approach, this could be a meanwhile or temporary space (for example, which is earmarked for development).
- Secure partnership interest and commitments to the project. Extensive stakeholder engagement has been undertaken as part of this commission, identifying over 9 local and regional stakeholders who have expressed an interest in partnership to progress this project.
- Undertake a detailed development of the operational model and the associated revenue and cost flows. This is dependent upon the approach towards partnership, which in turn informs cross-subsidy opportunities. For example: the establishment of a formalised qualification may provide some funding through government grant and student fees; equally the cost of testing may be significantly decreased if partners are able to provide gratis access to their own testing facilities.

Fig. 36 : Propositional view of CECH: builders merchants yard, exterior.

5.2 Next Steps

Action	Description	Timeframe
Confirm priorities	Based upon the impact summary in section 3.1, confirm the key priority for the Council and therefore the preferred way forward. This should also include the timescales of the project: is the priority quick delivery or is it on long-term impact?	August 2022
Secure mandate	Secure mandate (either via Council report or approval from senior leadership) to move forward with Circular Economy Activation (CEA) project and the Circular Economy Construction Hub (CECH). This should include a request for funding to secure the resources required for project management and to undertake the business plan.	October 2022
Mobilise projects	Initiate the CEA and CECH projects, ensuring appropriate project controls are set up, the team is mobilised and the objectives of the individual projects are understood. This is likely to involve cross-departmental working and may need a CEA/CECH working group. If required, procure support to progress the projects: for example, to undertake the detailed development of the business case for the CECH, providing detailed revenue and cost modelling and calculating the wider benefits for the project.	October 2022/ December 2022
Engage wider stakeholders	Undertake engagement with wider stakeholders in relation to their appetite and ability to partner with the CECH.	January 2023/ Ongoing
Source and secure land	Identification of a suitable site (if required) for the CECH and assessment of the requirement for refurbishment, retrofit or construction of a fit for purpose building. In the first instance, the Council may choose to consider a site on a temporary or meanwhile basis for the pilot.	February 2023/ April 2023
Target market testing	More detailed market testing should be undertaken with a number of stakeholders, including: ● For procurement (e.g. with contractors, in support of a Circular Economy Activation project) ● For planning (with developers, in support of the CEA project) ● For training (with students and employers)	February 2023/ June 2023
Detailed review of operating model	Work through additional detail of the operating model, considering elements like: ● which partner is best placed to lead on which elements ● what the start up capital and working capital needs are ● what revenue streams will be available, the value of these revenue streams ● detailed assumptions around costs ● the gap between revenue and costs (either positive or negative) and what will be done with that gap ● the cash flow model (i.e. when expenses and income are likely to arise) ● identification of funding grants that may be applicable.	April 2023/ September 2023
Completion of business plan	Complete the revised business plan with further detail on the level of investment required and support for the project. This is also particularly important if the Council would like to seek grant funding for the project.	November 2023

Fig. 37: Chronology of Actions.

6

Appendix

Appendix A: Socio-economic analysis

Overview

The London Borough of Newham is located approximately 5 miles east of the City of London, home to key landmarks including Olympic Park, the London Stadium and City Airport. It is also undergoing significant regeneration around Stratford, in Custom House, Canning Town and Royal Docks.

The borough takes its name from the old English word 'Hamm' meaning 'a dry area of land between rivers or marshland', with the river Roding and Lea running along its eastern and western flanks respectively, the Thames along its south. It is along these river boundaries that most of the borough's historically industrial lands can be found, within which the Olympic Park now sits. Much of these areas are still actively industrial, with a range of construction related businesses located along the Lea and Thames, including material salvage yards, and material recycling. To the west, where the Roding meets the Thames, Beckton Sewage works, the largest in Europe, processes much of the sewage and rainwater collected north of the Thames. To the South, the iconic Tate and Lyle Factory, which processes a quarter of the UK's sugar demand, is also supporting R&D into construction products developed from its own waste streams.[1] It is this range of industrial uses that makes Newham unique within central London, much of which is now devoid of larger expenses of such land. Surrounded by this arc of industrial land can be found a series of distinguished town centres, and a mix of private and public residential areas which are being developed at pace. Newham has some of the highest proportion of council owned tenanted flats in London and the country,[2] with also some of the highest rates of house building in London.[3]

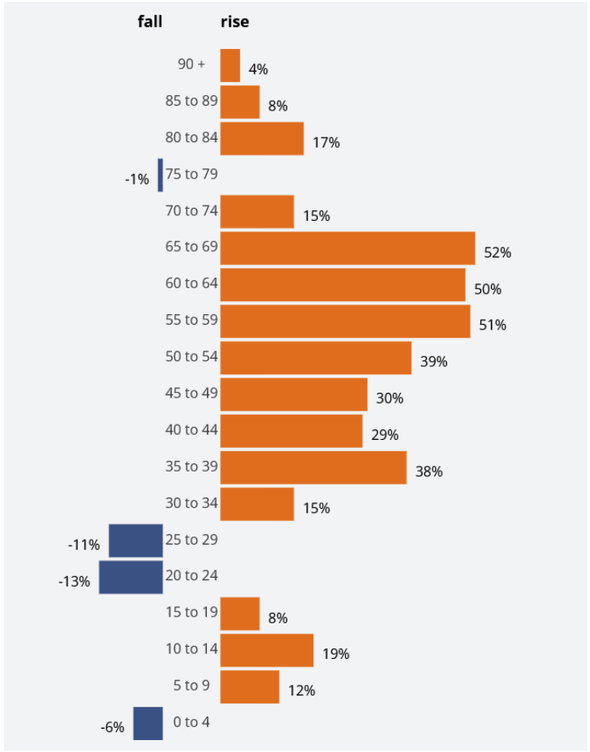
Demographics

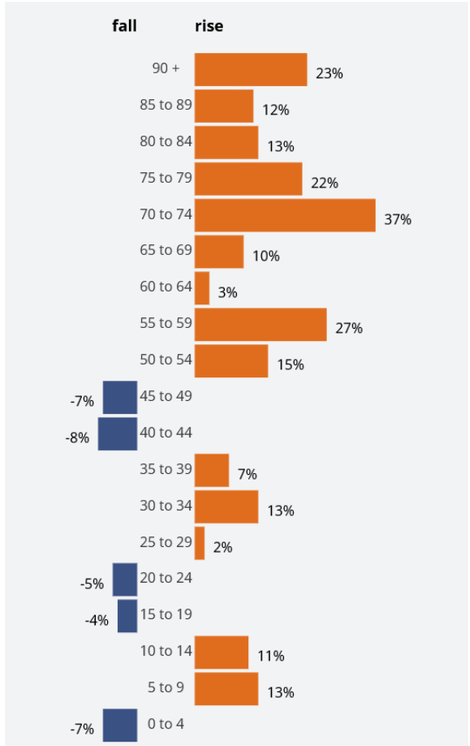
The borough has a young and diverse population of 351,100 which is set to increase to over 370,000 by 2023. Newham has one of the fastest rates of growth, experiencing a growth rate of 14% from 2011 to 2021,[4] almost doubling that experienced by London as a whole (7.7%) during the same period (Figure 3 and Figure 4). The profile of Newham's population increase varies to that of the UK, with greater percentage increases being seen in the working age and early years (children under 5) population. While Newham's has seen an increase of 21.9% in people aged 65 years and over, the profile of this population is largely at the younger range (i.e. largely concentrated at 65-69) when compared to the UK-wide demographic changes.

It is a transient borough, with over 15% of the population either moving in or out of the Borough in 2017 alone, and the majority of homes being privately rented.[5] Young people in Newham are high achievers with 65.8% of pupils achieving a level 4 or above in both English and Maths GCSEs in 2017-18 (compared with 64.2% for England). In terms of qualifications, Newham has just over half of residents with NVQ (National Vocational Qualification) 4 and above (57.6%) which is slightly less when compared with London (58.9%) however higher than Great Britain as a whole (43.5%). Compared to neighbouring boroughs, including Barking and Dagenham, Tower Hamlets and Redbridge, Newham has a higher proportion of people qualified at NQ4 or above, with only 6.1% of residents having no qualification (Figure 5).

Despite this, within the Beckton area, adult skills attainment is amongst the 30% most deprived nationally.[6] Despite these achievements, Newham is one of the most deprived boroughs in the country, ranking 12th of 317 local authority districts (within the 10% most deprived in the country). Taking into account rent and housing costs, almost half (49%) of all households in the borough are living in poverty.[7] These factors mean that more

1 Royal Docks, Tate & Lyle, https://www.royaldocks.london/articles/a-tour-of-tate-lyles-raw-sugar-mountain, 2019
2 Newham currently has 17,015 council owned rental homes - comparative data coming https://www.newham.gov.uk/housing-homes-homelessness/plans-building-council-homes-newham/3
3 Trust for London, Net housing completions in London by planning authority, https://www.trustforlondon.org.uk/data/new-housing-completions/, 2019
4 ONS, How the population changed in Newham: Census 2021, https://www.ons.gov.uk/visualisations/censuspopulationchange/E09000025/, 2022
5 London Borough of Newham, Community Wealth Building, 2020
6 Indices of Multiple Deprivation, 2019
7 London Borough of Newham, Community Wealth Building, 2020





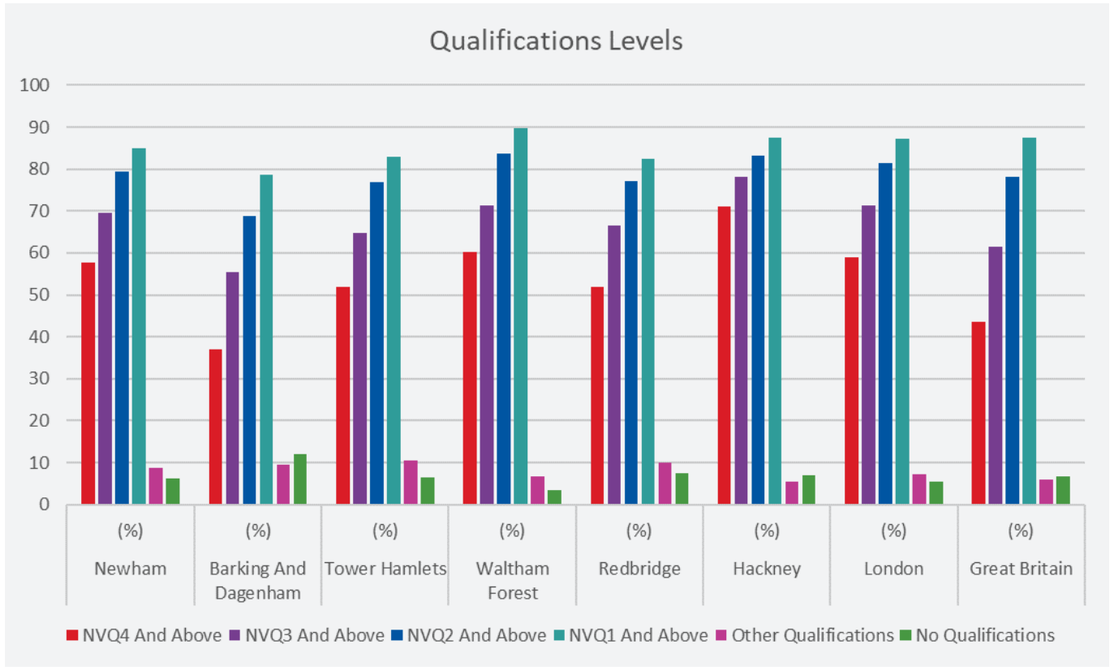


Fig. 37: Population Change in Newham since 2011.
Fig. 38: Population change in England since 2011.
Fig. 39: Notional Vocational Qualification (NVQ).[1]

1 ONS, 2021

people in Newham rely on public services than in many parts of London or the UK, placing pressure on services and funding available to deliver them.[8]

Economy

Over 80% of students progressed to education or employment in Newham (81%) in line with England's figures (81%), with over 3,410 students in 2021. Based on destinations after 16 to 18, 64% of all students stayed in education, which is significantly higher than England's 47%,[9] however, a smaller proportion of students entered employment (14% in Newham, 25% in England) – this highlights that the younger population has higher education levels than England as a whole, however there may be some gaps in pathways to employment. The vast majority of students are classified as disadvantaged in Newham (64%) which is higher than England (49%), showing significant disadvantage across the borough.[10]

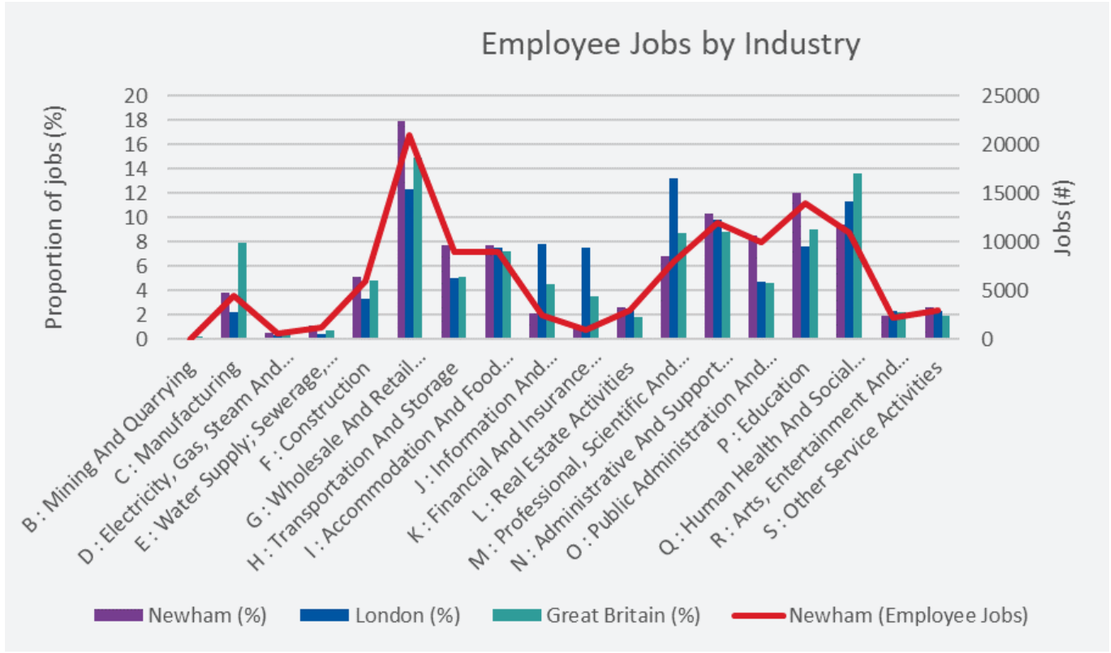
Based on Newham's Household Panel survey, findings suggested that approximately 27% of employees in the borough are paid less than the national Statutory Minimum Wage, suggesting that worker's rights abuses are high, with average gross annual pay in the borough amounting to £27,942 compared to the London average of £33,776.

Based on 2020 figures, the most dominant industry by employee jobs is Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (17.9%), Education (12.0%) and Administrative and Support Service Activities (10.3%)[11] (Figure 3). Compared to London and Greater Britain, Newham has a higher proportion of employee jobs in each of these industries than London and Great Britain, however in terms of specialisation, 'Water supply; sewage, waste management and remediation activities' is almost 3 times more concentrated in Newham than London – likely due to the presence of the Beckton sewage treatment works in the borough, one of the largest in Europe. 'Electricity, gas, steam and air conditioning supply', as well as 'professional, scientific and technical activities' and 'administrative and support service activities' are all almost twice as concentrated in Newham than London (LQ of 1.7)[12] (Appendix A). In terms of business size, the overwhelming majority of businesses are micro-sized (0 to 9) accounting for 94.3% of all enterprises in Newham, and 89% of all local units. This represents a higher proportion of businesses than London, with 90.9% and 87.5% of micro-sized enterprises and local units respectively.[13]

A key challenge for Newham is the net daily outflow of residents seeking employment opportunities across London, with approximately 30,000 workers travelling predominately westward to Central London for employment (demonstrated from Beckton in Figure 4). This is further demonstrated by Newham's existing job density (2020)(0.55) which is significantly lower than London (0.99) and Great Britain (0.84).[14] This means that for every 1 person of employment age (16 to 64), there are 0.55 jobs available in the borough. This suggests that there is a real opportunity to localise employment, with forecasts also suggesting that over the next five years, Newham will contain 20% of London's job growth and 78% of business growth, with over 60,000 new jobs by 2030.[15]

Within the construction industry, the majority of employees work in the development of building projects, followed by construction of commercial and domestic buildings (Figure 5).

8 London Borough of Newham, Statement of Accounts 2020/21, 2021
9 UK Government, Schools by Type – 2021 Newham, Available at: https://www.compare-school-performance.service.gov.uk/schools-by-type/2021?step=default&table=schools&region=316&geographic=la&for=16to18&datasetfilter=final, 2021
10 Disadvantaged students are defined as those who were eligible for the pupil premium when in year 11 – according to the school census and local authority records.
11 NOMIS, Labour Market Profile – Newham
12 Location Quotient Analysis, using NOMIS, Labour Market Profile – Newham data from 2011
13 NOMIS, Labour Market Profile – Newham
14 The density figures represent the ratio of total jobs to the population aged 16-64
15 London Borough of Newham, Community Wealth Building, 2020



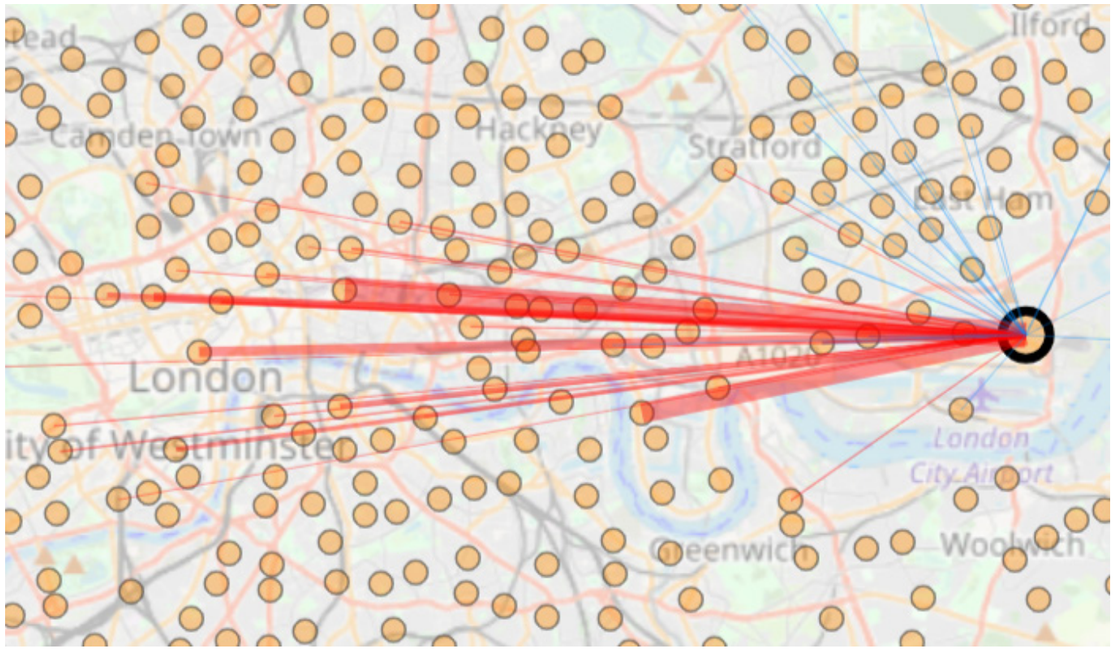


Fig. 40: Employee Jobs by Industry (2020).[1]
Fig. 41: Travel for employment from Beckton.[2]
Figure 12: Employees in Construction[3]

1 NOMIS, Labour Market Profile – Newham
2 Datashine, using 2011 Census Data
3 Business Register and Employment Survey, Count of Employees in Construction, 2022

A summary of the key socio-economic insights, and their considerations for the CECH include:

- Newham has a transient population with over 15% of population either moving in or out of the Borough in 2017 alone – providing job opportunities for locals could help to retain them in Newham, and increase their participation in the community.

- Almost half (49%) of all households in the borough are living in poverty16 – a hub could help to retrain or skill locals in circular economy practices, improving their level of qualification and helping to support employment pathways.

- Based on Newham's Household Panel survey, findings suggest that approximately 27% of employees in the borough are paid less than the national Statutory Minimum Wage, with average gross annual pay in the borough amounting to £27,942 compared to the London average of £33,776 – reskilling opportunities could lead to higher-paid job opportunities.

- Newham has low job-self containment, with the majority of residents travelling to central London for work – local job generation and partnering with local schools and education providers could help to increase spend in Newham. This would also support Newham's ambitions around a 15-minute neighbourhood, by creating employment opportunities that would enable residents to remain local.

- Newham has a young population, providing access to a large pool of students that could be retained and skilled in circular economy practices.

- Large proportions of Newham residents are qualified to a NVQ1 level (over 85%), however there's a skills gap at higher qualification levels and attainment within the adult population is low – the hub could address this gap, and focus on NVQ3 and above – supporting higher education and potentially pathways to higher-paid jobs.

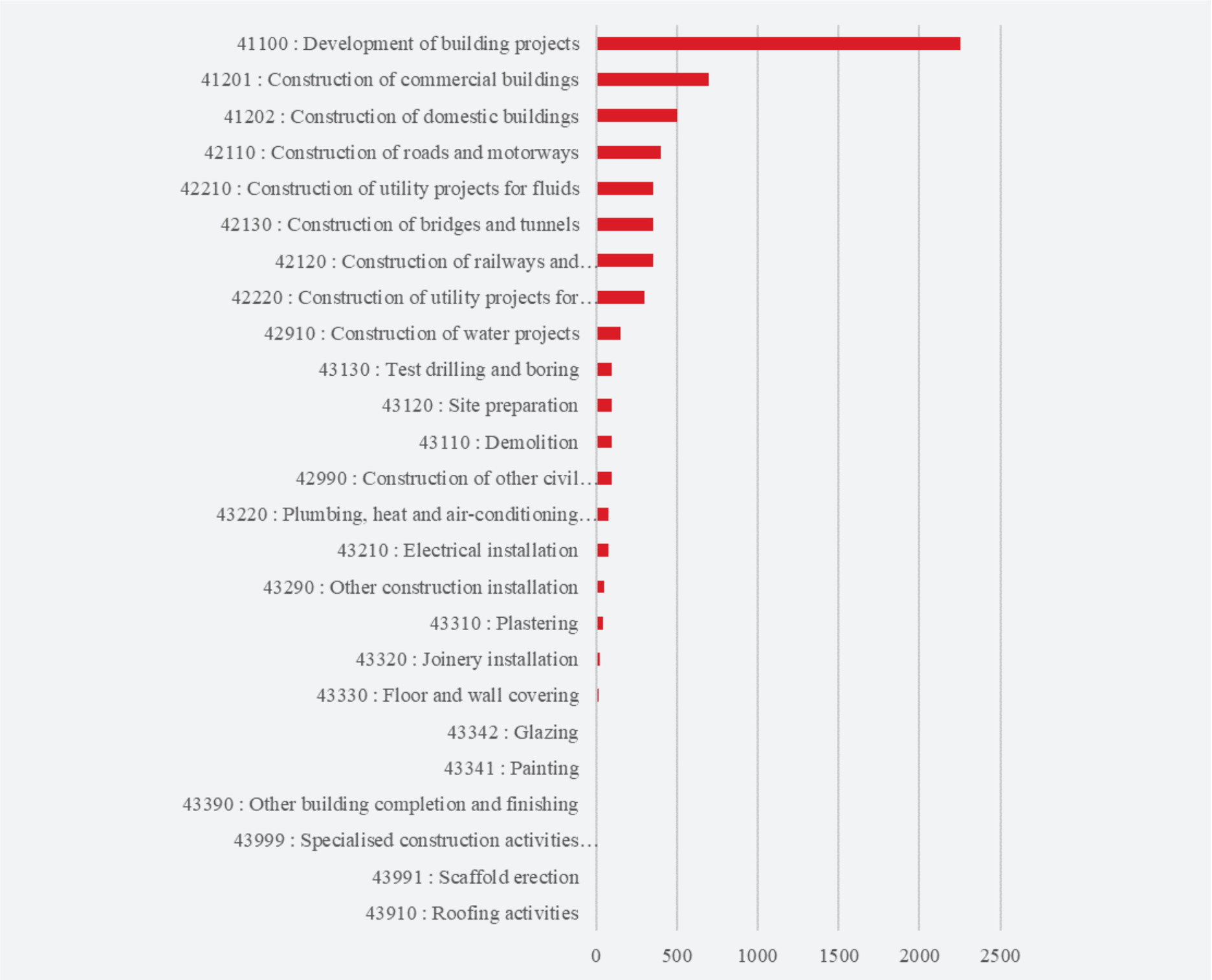


Fig. 42: Employees in Construction.[1]

16 London Borough of Newham, Towards a Better Newham – COVID-19 Recovery Strategy, 2020

1 Business Register and Employment Survey, Count of Employees in Construction, 2022

Appendix B: Evaluation Methodology

Overarching Methodology: In order to develop the feasibility study detailed in the main report, the team undertook the following process.

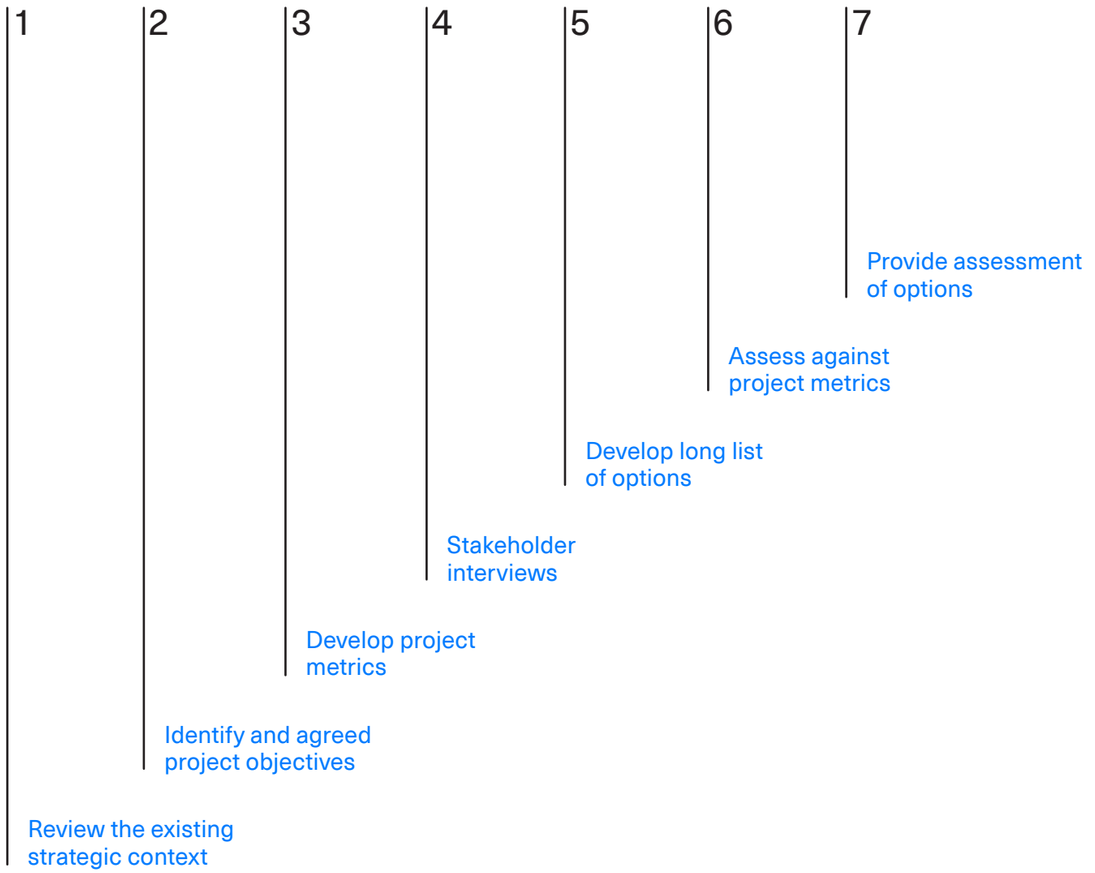


Fig. 43: Framework used to build up options

1 Review the existing strategic context: The project team undertook a review of the policy context around the circular economy and construction, identify the existing policy instruments and gaps in the 'golden thread' of policy from national and international policy requirements through to local Newham level. This allowed the team to understand the existing context, identify key stakeholders to interview, and develop the objectives for the CECH. Summaries of these policies and papers can be found in Appendix C.

2 Identify and agree project objectives: Using the strategic policy framework from the policy review, the team developed the project objectives. These objectives explicitly link back to the *Towards a Better Newham* document which outlines 6 key pillars for action within Newham. The pillars are designed to support a just transition and a more equal economy, using a Community Wealth Building approach to the local economy.

To ensure alignment between this core Council approach and the project, potential project objectives were created and then mapped against the pillars. This ensures that the strategic fit of the project is fully aligned to the overarching ambitions of the Council.

3 Develop project metrics: The CECH project is at an early stage within a relatively nascent industry. Many of the programmes explored within this report do not have detailed precedents that enable a verified evaluation of the size of the opportunity. As a result, the project team developed a list of potential metrics that would be possible to collect and also give the ability to act as a comparison between options. This evaluation matrix went through a number of iterations. The final matrix is outlined below: These metrics, in conjunction with a qualitative assessment of how likely an option was to fulfil the council's objectives, formed the basis of the evaluation for this project.

4 Stakeholder interviews:

At the beginning of the project, through the policy review process, a series of stakeholders were identified in conjunction with the client team. These stakeholders were prioritised in accordance with their relevance to the CECH and over 20 interviews were conducted with training providers, testing centres, material reuse businesses, material manufacturers, Council officers, and developers.

The lines of enquiry undertaken for each interview were developed based upon the specific interests of the stakeholder. These broadly covered the below topics:

- Education
- Material Suppliers
- Developers
- Waste to Materials
- Contractors

Category	Draft Questions	Outcomes sought
Education	What is the interest in new courses?	Demand for new education offering
	Do you have capacity to accommodate new courses?	Education provider interest in circular economy practices
	How many students are enrolled in construction courses today? and what are projected numbers?	Skills pipeline
	What skills are taught on construction courses today? Demand from businesses for new skills? Which skills?	Industry demand for construction skills, identification of skills gaps that may exist currently
	Does circular construction feature in any curricula?	Skills pipeline
Material Suppliers	What are the processes involved in recycling or reuseing the materials you make?	Spatial planning, training centre and workshop requirements, Infrastructure requirements.
	Does it make financial sense for you to reuse materials or are the processes too costly?	Constraints: funding/commercial
	In what condition do these materials need to be given back to you for re-use to be viable?	Constraints: reuse practices
	What processes need to take place for these materials to be prepared for you to re-use them?	Constraints: reuse practices, infrastructure requirements
	In what volumes does the re-use/ recycling process take place?	Spatial planning, infrastructure requirements
	How many people are employed directly in the manufacture/ re-use of these materials?	Jobs: existing and potential for additional job creation
	Profitability of reuse	Commercial
Developers	What are your sustainability targets for the future?	Social and environmental benefits
	How high up your agenda is reuse?	Social and environmental benefits
	How do you perceive your client's interest in reuse?	Future demand/opportunities for the hub
	How much money/proportion of revenue (%) are you investing in reuse in your practices?	Capacity/demand for reuse practices
	What do you see as the main benefits to reuse?	Social, economic and environmental benefits
	Have you identified any barriers to greater reuse within your developments?	Opportunities for a hub model: operational, funding, governance etc
	Has anything driven greater use of reused materials in your practices?	Opportunity for a hub model

Fig. 44:

Category	Draft Questions	Outcomes sought
Waste to Materials	What materials do you recycle?	Material flows, delivery partners
	What does recycling mean at this plant, is it sorting, processing, remanufacturing?	Logistical knowledge
	What is the potential quantum of carbon that is reduced as a result of reuse?	Environmental benefits (carbon reduction)
	What quantities of materials do you recycle?	Spatial planning, infrastructure requirements
	What are you motivations for recycling materials? (targets/financial/ consumer pressure)	Social and environmental benefits
	Who uses your construction waste services (domestic/commercial), and what sort of quantities/proportions (%) of each?	Market understanding
	What is the value per tonne of the materials you recycle?	Economic benefits
	Where do waste materials go/who/what sort of companies are you selling on to?	Supply chain understanding and local value
	Do you have partnerships with large companise such as British Gypsum or Rockwool to take construction waste for their own recycling?	Supply chain understanding and local value
	What are the timeframes for recycling materials? what is their storage life?	Operational considerations – timeframes
Contractors	Are you using reused materials on your projects?	Opportunities for a hub model – demand
	If you are using reused materials, what is driving this?	Existing context
	What are the main barriers to using reused materials on site?	Opportunities for a hub model – operational, funding, governance etc
	Is there anything that could be done to help you use more reused materials?	Opportunities for a hub model – operational, funding, governance etc

Fig. 45:

5 Develop long list of options: The project team developed a long-list of options to determine what form and function a CECH could take. Based on the UK Government's Green Book Guidance, the potential *scope, service solution, service delivery, service implementation method* and *funding* were explored as shown in the diagram below. Collectively, these elements form the options described in the report.

There were a number of findings from qualitative research interviews that have influenced the optioneering process:

- Newham Council does not have a specific commitment to the reuse of a particular material, i.e. concrete or steel. This therefore should not be the defining factor in determining options.
- Aspects of the delivery options are defined by the choice of material, i.e. spatial requirements differ per material: for example, processing steel requires more space than door handles, and different levels of upfront investment.
- Newham Council do not have a specific site in mind for a spatial solution.

5.1 Scope

Through the research undertaken, it became evident that decisions about service solution, delivery, implementation and funding are partially dependent upon the specific material streams the CECH would like to target: for example, the material flow for sanitary ware is very different to that for steel.

It also became clear that the material chosen was not a driving decision-making factor for the Council. As such, service solutions were worked up in a 'material agnostic' way in order to develop a range of options for this feasibility study.

Materials considered within the long list were: fittings; sanitary-ware; brick; timber; tile; insulation; steel; and stone.

These materials were chosen for their ability to demonstrate a scaling up in terms of ambition of commitment for the Council. For example, sanitary-ware and fittings are recognised as high-value, low-risk materials that are most likely to contribute to a viable ongoing business' in terms of revenue. Materials such as brick, timber and tile all have known reuse pathways which are more labour intensive. At the far end of the spectrum, insulation currently has limited reuse pathways: investment in Research & Development could offer significant environmental benefits if a reuse pathway for such a material is created. As a result, materials were aligned with the scale of the options generated to develop the options.

5.2 Service Solution

In order to develop the service solution options, the team broke these down into the component parts (or 'programmes') required to support a circular economy hub.

As outlined in government guidance, strategic fit is a 'critical success factor', 'an attribute that any successful proposal must have if it is to achieve successful delivery of its objectives'. A qualitative assessment of each element of the *service solution* (websites, research and development function, training, testing, retail) was undertaken to determine which services are more likely to deliver on the objectives set out for this project in Table 1. This then informed the final options.

In an initial review of the potential solution options, the importance of business to business networks was identified. As a standalone programme, a business-to-business network is unlikely to achieve the objectives of the Council. However it is a critical element of all of the options, and thus has been integrated into each of the four options as an assumed requirement.

<?> UK Government, Green Book Appraisal and Evaluation in Central Government – The Green Book, 2020

	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Website	2	3	4	3	4
R&D	3	4	3	3	3
Training	5	4	3	4	4
Testing	4	4	3	3	4
Retail	4	4	4	4	4

Objective 1: Improve the quality of life for residents of Newham, improving access to opportunities including job and education

Objective 2: Increase sustainable construction practices to become London's greenest local borough and economy

Objective 3: Reduce greenhouse gas emissions and the use of raw materials

Objective 4: Deliver a financially viable solution that attracts local investment in Newham

Objective 5: Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices

- 1. Fails to meet the critical success factor
- 2. Unlikely to meet the critical success factor
- 3. An equal balance of advantages and disadvantages in relation to the identified critical success factor
- 4. Likely to meet the critical success factor
- 5. Hoghly likely to meet the critical success factor

Fig. 46:

5.3 Service Delivery

Options identified for the service delivery element included: private sector led; public sector led; and public-private partnership.

This service delivery pathway is highly dependent upon the decision around service scope: for example, Option 2 (a Circular Economy Prototype) has been identified as a relatively low Council involvement option that would be largely private-sector led: the Council's role is as instigator and enabler, rather than deliverer. By comparison, Option 3 is more likely to be public-private sector partnership, given the aspiration for formalised training that will require both public and private sector involvement in order to run.

5.4 Service Implementation

Options explored for service implementation were:

- Pilot
- Phased roll out
- 'Big bang' roll out (i.e. seeking to implement everything at once.)

Given that the Circular Economy remains an emerging industry, it was deemed inappropriate to advocate for a 'big bang' roll out, and instead a more practical approach of piloting and / or phased roll out was incorporated into the options.

5.5 Funding

Funding as an option is heavily dependent upon the service delivery options and the service solution. For example, Option 2 (Circular Economy Prototype) is largely private-sector led, and so the funding call for establishing this option is limited.

Options 3 and 4, by contrast, are larger-scale with additional partnership working opportunities. This makes it far more difficult to provide an indication of either the funding requirements or pathways, given the level of information available at this time. In order to better demonstrate the funding options, more detailed discussions of partnership potential, existing partners' operating models and funding requirements, and setup costs or contribution needs to be understood.

For example, Option 4 combined the salvage, retail & reuse with testing, training, and R&D. Taking only the training element of this option: Apprenticeship trailblazers are the pathway to develop new apprenticeships. They require a minimum of 10 partners from the private sector to develop. This is normally done pro bono on the part of the representatives. However once completed, an apprenticeship is a paid training course that is funded through the apprenticeship levy and by employers. This means that it is likely to provide no additional cost to the Council once up and running – however if any surplus raised as a result of this project was intended to be reinvested into the programme, this would require a detailed negotiation with the training & development partner.

5.6 Long List

The long list that was created incorporated different options, focussing particularly on the scope and service solution options. These long-list options are:

	Option 1: Circular Economy Academy	Option 2: Circular Economy Prototype	Option 3: Circular Economy Starter Hub	Option 4: Circular Economy Catalyst
Materials Targeted	N/A	Ironmongery lighting doors sanitary ware (e.g. sinks).	Ironmongery lighting doors sanitary ware brick timber tiles.	Ironmongery lighting doors sanitary ware brick timber tiles insulation steel.
Spatial configuration	N/A	Small: Multistory department store	Medium: Material yard, outdoor and indoor space	Large: Networked to existing partners
Retail activity	N/A	Specialised boutique store	Shopfront and department store	Department store
Online configuration	Online training platform	Basic web presence (e.g. modern yellow pages)	Basic web presence, virtual shop window (to enable online purchase)	Basic web presence, virtual shop window material trading infrastructure
Training	See Above	Informal, site-based training for staff (no external training provided).	Formalised site-based partnership with existing educational providers and opportunity for 'placements' on site.	Full apprenticeship accreditations, links to higher-level providers, continued partnership with existing educational providers
Research & Development	N/A	N/A	Partnership with existing educational providers for best practice	In-house, independent R&D (and potential consultancy arm)
Testing / Certification	N/A	Grading: in house Testing / certification: N/A	Grading: in house Testing / certification: third party, off-site	Grading: in house Testing / certification: in-house

Fig. 47: Qualitative Assessment of 'Service Solution' options.

6 Assess against metrics:

Following the completion of the long list, the long list was assessed in two ways:

- A qualitative assessment against the objectives of the project to define how likely an option is to achieve the Council's objectives.
- A quantitative assessment of metrics for each option.

6.1 Qualitative Assessment

Results of the qualitative assessment, and details of the reasoning for the assessment, are below:

	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Option 1	4	3	2	4	3
Option 2	3	3	3	5	3
Option 3	4	4	4	4	5
Option 4	5	5	5	4	5

Objective 1: Improve the quality of life for residents of Newham, improving access to opportunities including job and education

Objective 2: Increase sustainable construction practices to become London's greenest local borough and economy

Objective 3: Reduce greenhouse gas emissions and the use of raw materials

Objective 4: Deliver a financially viable solution that attracts local investment in Newham

Objective 5: Ensure investment provides value for money for Newham, leveraging existing provision of circular economy practices

- 1. Fails to meet the critical success factor
- 2. Unlikely to meet the critical success factor
- 3. An equal balance of advantages and disadvantages in relation to the identified critical success factor
- 4. Likely to meet the critical success factor
- 5. Hoghly likely to meet the critical success factor

Fig. 48:

6.2 Quantitative Assessment/Impact Methodology

The detailed methodology used for the quantitative assessments is detailed below.

Economic impact/Employment: Number of FTEs employees supported on site

An employment density provides a guideline of the number of total number of Full Time Equivalent (FTE) employees based upon the amount of space used and the type of activity (for example, office use). Employment densities used (estimated number of square feet per type of job) are based on the UK Government's Homes & Communities Agency, Employment Density Guide – 3rd edition (November 2015). Net Internal Area (NIA) used for calculations was determined by stakeholder engagement who informed spatial requirements for each option.

Economic Impact/Gross GVA Calculation

This calculation estimates the Gross GVA for the option based upon the jobs supported in each of the proposed options.

The team applied the GVA level for Construction-focussed businesses identified by their Standard Industrial Classification System (SIC) codes. This was then filtered to businesses within Newham (based on ONS data), updated to 2022, and the corresponding number of FTEs for each of the identified Construction SIC codes (based on latest data from the Business Register and Employment Survey) to calculate a GVA/job – applying this to FTEs for each option.

		Option		
		2. Small	3. Medium	4. Large
Activities	Boutique	125m2*1		
	Grading	125m2*1	150m2*2	
	Training	125m2*1	150m2*2	3000m2*3
	Interior Storage	125m2*1	500m2*2	1000m2*4
	Exterior Storage (Yard)		500m2*2	11,500m2*5
	Department Store		1000m2*2	2500m2*4
	Certification /Testing			5000m2*6
	R&D			2000m2*7
Materials	Ironmongery			
	Lighting			
	Doors			
	Sanitaryware			
	Bricks			
	Timber			
	Tiles			
	Insulation			
	Steels			
TOTAL		500m2	1500m2	25,000m2

*1 Old Slate Yard, Newham & Peckham Reclamation & Salvage
*2 B&Q West Norwood (small branch)
*3 Barking + Dagenham College
*4 B&Q Peckham (large branch)
*5 London Reclaimed Brick Merchants, Uxbridge
*6 BBA
*7 Assumption

The information in the table above was then tested in schematic floor plans as shown below. This relied on reasonable assumptions adding service and circulation spaces.

Fig. 49: Estimated m² of the spatial options (Options 2 - 4) for each of the use types.

6.2.1 Local market size: Estimation of the value of the direct market with which the Hub could interact.

Drawing upon Companies House data, SIC codes of businesses that could interface with each Hub option were identified, as shown in the table below, and were then matched against the corresponding total business counts in Newham for each of the SIC codes (to verify existence/absence of a local market for the sub-industry). Once the existence of businesses in specific SIC industries interacting with the Hub's options was verified, GVA for each of those SICs in Newham was used to obtain the total potential market size for each of the options.

Note that the market assessment of education providers was undertaken using a separate method and so a SIC table is not included for Option 1.

Table 4:
SIC Codes assigned to potential market size assessment

Code	Code bis	Description	Op 2	Op 3	Op 4
2200	02200	Logging	0	1	1
2400	02400	Support services to forestry	0	1	1
10810	10810	Manufacture of sugar	1	0	0
16100	16100	Sawmilling and planing of wood	0	1	1
16210	16210	Manufacture of veneer sheets and wood-based panels	0	1	1
16220	16220	Manufacture of assembled parquet floors	0	0	1
16230	16230	Manufacture of other builders' carpentry and joinery	1	1	1
16240	16240	Manufacture of wooden containers	0	1	1
16290	16290	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	1	1	1
20600	20600	Manufacture of man-made fibres	1	0	0
22190	22190	Manufacture of other rubber products	1	0	1
22230	22230	Manufacture of builders ware of plastic	0	0	1
23120	23120	Shaping and processing of flat glass	1	0	0
23190	23190	Manufacture and processing of other glass, including technical glassware	1	0	0
23310	23310	Manufacture of ceramic tiles and flags	0	1	1
23320	23320	Manufacture of bricks, tiles and construction products, in baked clay	0	1	1
23410	23410	Manufacture of ceramic household and ornamental articles	1	0	0
23420	23420	Manufacture of ceramic sanitary fixtures	1	0	0
23430	23430	Manufacture of ceramic insulators and insulating fittings	1	0	0
23440	23440	Manufacture of other technical ceramic products	1	0	0
23490	23490	Manufacture of other ceramic products n.e.c.	1	0	0
23510	23510	Manufacture of cement	0	0	1

Code	Code bis	Description	Op 2	Op 3	Op 4
23520	23520	Manufacture of lime and plaster	0	0	1
23610	23610	Manufacture of concrete products for construction purposes	0	0	1
23620	23620	Manufacture of plaster products for construction purposes	0	0	1
23630	23630	Manufacture of ready-mixed concrete	0	0	1
23640	23640	Manufacture of mortars	0	0	1
23650	23650	Manufacture of fibre cement	0	0	1
23690	23690	Manufacture of other articles of concrete, plaster and cement	0	0	1
23700	23700	Cutting, shaping and finishing of stone	0	0	1
24100	24100	Manufacture of basic iron and steel and of ferro-alloys	0	0	1
24200	24200	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	0	0	1
24420	24420	Aluminium production	0	0	1
24430	24430	Lead, zinc and tin production	0	0	1
24440	24440	Copper production	0	0	1
24450	24450	Other non-ferrous metal production	0	0	1
24510	24510	Casting of iron	0	0	1
24520	24520	Casting of steel	0	0	1
24530	24530	Casting of light metals	1	0	1
24540	24540	Casting of other non-ferrous metals	0	0	1
25110	25110	Manufacture of metal structures and parts of structures	0	0	1
25120	25120	Manufacture of doors and windows of metal	1	0	0
25210	25210	Manufacture of central heating radiators and boilers	0	0	1
25290	25290	Manufacture of other tanks, reservoirs and containers of metal	0	0	1
25610	25610	Treatment and coating of metals	0	0	1
33110	33110	Repair of fabricated metal products	0	0	1
33120	33120	Repair of machinery	0	0	1
33130	33130	Repair of electronic and optical equipment	0	0	1

Code	Code bis	Description	Op 2	Op 3	Op 4
33140	33140	Repair of electrical equipment	0	0	1
36000	36000	Water collection, treatment and supply	0	0	0
37000	37000	Sewerage	0	0	0
38320	38320	Recovery of sorted materials	1	1	1
41100	41100	Development of building projects	0	1	1
41201	41201	Construction of commercial buildings	0	1	1
41202	41202	Construction of domestic buildings	0	0	1
42110	42110	Construction of roads and motorways	0	0	1
42120	42120	Construction of railways and underground railways	0	0	1
42130	42130	Construction of bridges and tunnels	0	0	1
42220	42220	Construction of utility projects for electricity and telecommunications	0	0	1
42910	42910	Construction of water projects	0	0	1
42990	42990	Construction of other civil engineering projects n.e.c.	0	0	1
43110	43110	Demolition	1	1	1
43120	43120	Site preparation	0	0	0
43290	43290	Other construction installation	0	0	0
43310	43310	Plastering	0	0	0
43320	43320	Joinery installation	1	0	0
43330	43330	Floor and wall covering	1	0	0
43342	43342	Glazing	1	0	0
43390	43390	Other building completion and finishing	1	1	1
43910	43910	Roofing activities	0	1	1
43999	43999	Other specialised construction activities n.e.c.	1	1	1
46130	46130	Agents involved in the sale of timber and building materials	0	1	1
46150	46150	Agents involved in the sale of furniture, household goods, hardware and ironmongery	1	0	0
46470	46470	Wholesale of furniture, carpets and lighting equipment	1	0	0

Code	Code bis	Description	Op 2	Op 3	Op 4
46730	46730	Wholesale of wood, construction materials and sanitary equipment	0	1	1
46770	46770	Wholesale of waste and scrap	0	0	0
49200	49200	Freight rail transport	0	0	0
49410	49410	Freight transport by road	0	0	0
50200	50200	Sea and coastal freight water transport	0	0	0
50400	50400	Inland freight water transport	0	0	0
51210	51210	Freight air transport	0	0	0
52101	52101	Operation of warehousing and storage facilities for water transport activities	0	0	0
52102	52102	Operation of warehousing and storage facilities for air transport activities	0	0	0
52103	52103	Operation of warehousing and storage facilities for land transport activities	0	0	0
52211	52211	Operation of rail freight terminals	0	0	0
52241	52241	Cargo handling for water transport activities	0	0	0
52242	52242	Cargo handling for air transport activities	0	0	0
52243	52243	Cargo handling for land transport activities	0	0	0
63120	63120	Web portals	0	0	0
71111	71111	Architectural activities	0	0	0
71112	71112	Urban planning and landscape architectural activities	1	1	1
71200	71200	Technical testing and analysis	0	1	1
72110	72110	Research and experimental development on biotechnology	1	1	1
72190	72190	Other research and experimental development on natural sciences and engineering	1	1	1
74100	74100	specialised design activities	1	1	1
74901	74901	Environmental consulting activities	0	0	0
74902	74902	Quantity surveying activities	0	0	0
85310	85310	General secondary education	0	0	0

Code	Code bis	Description	Op 2	Op 3	Op 4
85320	85320	Technical and vocational secondary education	1	1	1
85410	85410	Post-secondary non-tertiary education	1	1	1
85421	85421	First-degree level higher education	0	1	1
85422	85422	Post-graduate level higher education	0	1	1
85600	85600	Educational support services	0	0	0
95210	95210	Repair of consumer electronics	0	0	0
95220	95220	Repair of household appliances and home and garden equipment	0	0	0
95240	95240	Repair of furniture and home furnishings	0	0	0

6.2.2 Potential Embodied Carbon

The following is an outline of the methodology used to calculate the potential embodied carbon savings by facilitating material reuse. It discusses the assumptions and simplifications built into the methodology and the implications they have on the potential embodied carbon savings presented in Table 2 and Table 3. These calculations use data from a single Environmental Product Declaration (EPD) for each product investigated and should only be used as a high-level assessment to compare the material pallets to be featured in each of the Circular Economy Hub options.

An EPD is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impact of products, including carbon dioxide equivalent emissions (kgCO2e), also known as global warming potential (GWP). Assessing a single EPD per product requires assumptions to be made about the typical products being processed by the CECH, so where possible EPDs for generic materials or products have been used. Similarly, where possible UK specific EPDs have been used, where this was not possible EPDs from western or northern Europe have been used.

These interviews provided a broad qualitative overview of the barriers to adopting a circular economy approach in construction and some of the ways in which these barriers can be overcome.

A qualitative (and quantitative where possible) assessment of each product should also be carried out to ensure that challenges associated with the reuse of these products are understood in relation to embodied carbon, economics, and best practice use. Examples of these challenges include:

BRICKS: Disassembly of bricks can be time consuming and costly compared to demolition which can potentially increase the embodied carbon impact. It may only be economically viable where the bricks have heritage value and/or a characterful appearance that cannot be replicated with modern brickmaking techniques.

STEEL: Inefficient use of scrap steel resources in a project reduces scrap availability in the industry. This can lead to an increase in global primary steel production, so care is needed to avoid any unintended adverse impact on global carbon emissions. Removal of coatings from previous uses (e.g. intumescent paint or corrosion protection) can have embodied carbon implications.

The calculations assume the two areas of potential embodied carbon savings associated with reusing a product are:

- Removing the requirement to produce a virgin product. This saving is equal to the sum of the embodied carbon associated with the “product stage” (A1-A3).
- Removing the requirement for waste processing and disposal of the product being reused. This saving is equal to the sum of the embodied carbon associated with the “waste processing” and “disposal” (C3-C4) modules in the “end of life” stage.

Table 5:
Assumptions for modules

Stage	Module	Assumption
Product	A1 – Raw Material Supply	The embodied carbon associated with these modules is considered a saving because the requirement for the production of a virgin product is removed when a product is reused.
	A2 – Transport	
	A3 – Manufacturing	
Construction	A4 – Transport	Transport distance between the Circular Economy Hub and site is assumed to be equal to the transport distance between the factory and site. Therefore, potential embodied carbon savings associated with this module are ignored.
	A5 – Construction / Installation Process	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
Use	B1 – Use	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
	B2 – Maintenance	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
	B3 – Repair	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
	B4 – Replacement	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
	B5 – Refurbishment	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored.
End of Life	C1 – De-construction / Demolition	It is assumed that the impact of this module is equal for both a virgin and a reused product. Therefore, potential embodied carbon savings associated with this module are ignored. Note: This assumption may not be realistic for products that require time consuming and careful deconstruction when compared to demolition. For example, de-construction of a masonry wall.
	C2 – Transport	Transport distance between the site and the Circular Economy Hub is assumed to be equal to the transport distance between the site and the waste processing site. Therefore, potential embodied carbon savings associated with this module are ignored.
	C3 – Waste Processing	The embodied carbon associated with these modules is considered a saving because the requirement for waste processing and disposal is not required when a product is reused.
	C4 – Disposal	
Benefits and Loads Beyond the System Boundary	D – Reuse / Recovery / Recycling Potential	For any given product there is a beneficial component associated with end of life if some amount of a product is recycled or recovered (D). For a reused product, the embodied carbon associated with this module equal to – (A1-A3). Therefore, the embodied carbon savings associated with this module when a product is reused is equal to – (A1-A3) + D

Fig. 50: outlines additional assumptions associated with each of the modules.

Based on the assumptions presented in Table 5 the potential embodied carbon saving is calculated using Equation 1.

Equation 1

ECsaving = -A1-A2-A3-C3-C4+D

Table 6 and Table 7 present the potential embodied carbon savings based on Equation 1 as well as the EPDs from which the data used in the calculations for each product has been sourced from.

Table 6:
Potential embodied carbon savings

Product	Potential GWP Saving (kgCO2e/tonne)	EPD / Source
Brick	201	UK Clay Brick. The Brick Development Association. BRE. 2019. EPD Number 000002.
Tiles (clay roof tiles)	404	Ceramic roof tiles. Belgian Brick Association. Federal Public Service of Health. 2022. B-EPD n° 22_012_003.
Timber (Glulam, 100% FSC/PEFC)	1628	How to calculate embodied carbon. The Institution of Structural Engineers. 2020.
Steel (UK open sections: British Steel EPD)	850	Steel Rails and Sections (including semi-finished long products). Tata Steel UK Limited. 2020. EPD-TS-2020-003.
Insulation	831	ROCKWOOL Stone Wool Thermal Insulation for buildings. ROCKWOOL Group. 2021
Door handles	2824	Door handles Dormakaba. Dormakaba International Holding AG. 2018. EPD-DOR-20200137-IBA1-EN.
Light fittings	6025	LED waterproof luminaire FORCELED 6000 HF L840. Thorn Lighting Limited. 2020. ECO-ZGR-96242061-Manufactur-EU-2020-02-20

Table 7:
Potential embodied carbon savings for windows

Product	Potential GWP Saving (kgCO2e/m2)	EPD
Windows	89.3	PVC-U plastic windows with dimensions 1.23 x 1.48m and isolated double-glazing. EPPA – European PVC Window Profiles and Related Building Products Association. 2018. EPD-QKE-20150313-IBG1-EN.

The table below outlines the potential carbon savings if the percentages of waste diverted for each material were achieved. The methodology for the carbon savings above is a high-level, illustrative view of potential savings however it does not apply the potential savings for the material to an existing, known quantity of materials.

The table below begins to apply some targets to material waste to illustrate the scale of processing and potential carbon savings opportunities afforded by a CECH. Further development of this targets should be undertaken in the next phase of the project, to sense check the absolute level of waste diversion required to make a material impact.

Table 8:
Embodied carbon savings per material flow in London

	Option 01		Option 02		Option 03		Option 04	
	Scenario		0%		3%		5%	
	kgCO2e/tonne	Waste (tonnes)	Waste (tonnes)	CO2 (tonnes)	Waste (tonnes)	CO2 (tonnes)	Waste (tonnes)	CO2 (tonnes)
Ironmongery	2824	N/A						
Lighting	6024	N/A						
Doors	31.9	N/A						
Sanitary ware	2018	N/A						
Brick	201	87710,1	0	0	2631,303	528,891903	4385,505	881,486505
Timber	1628	142691,4	0	0	4280,742	6969,047976	7134,57	11615,07996
Tile	404	1222,2	0	0	36,666	14,813064	61,11	24,68844
Insulation	831	925,7	0	0	0	0	46,285	38,462835
Steel	851	167488.9	0	0	0	0	8374,445	7126,652695
TOTALS			0	0	6948,711	7512,752943	20001,915	19686,37044

No embodied carbon calculation has been undertaken for Option 1: Circular Academy. As a skills & education based provision without any direct material reuse expected, there is not expected to be any direct embodied carbon savings for this option. There is currently no material-specific figures on the waste levels of ironmongery, lighting, doors or sanitaryware. As such, the carbon savings for Option 2 is returned as N/A. Option 2 is likely to impact on Brick, Timber and Tiles only; while Option 4 includes insulation and steel.

Even with relatively low percentages of London's material waste streams, the absolute tonnage of waste is significant for Option 3 and Option 4. The reality is that diverting material percentages of London's waste to reuse will require industrial-level operations that are likely to be much larger than the interventions considered within this report. However this does not negate the strategic importance of this project as a catalyser to shift the approach to waste in the borough and leverage the green economy, creating clusters for the circular economy in London.

7. Provide assessment against options

The assessment and recommendations against options are outlined in the main report.

If the priority is
Minimising cost to the public sector
Option 2:
Circular Economy Prototype

The Circular Economy Prototype is the most likely option to be entirely delivered by the private sector. It could be instigated by the Council's allocation of seed funding and access to space for an entrepreneurial startup chosen through a public competition requesting expressions of interest.

The low-risk, high-value approach to materials mean that the complications and barriers related to risk would be lower, and the research undertaken for this project indicates that it is likely to be a viable going concern if space is provided on a peppercorn basis.

If the priority is
Deliverability:
Option 3:
Circular Economy Starter Hub

The Circular Economy Starter Hub offers the best all-around fit with the Council's strategic objectives: it is a more active intervention in the medium term that also starts to address some of the barriers to the circular economy, particularly barriers to supply and demand.

The Starter Hub option will have a multi-year implementation phase and will require investment from the Council in terms of seed funding, access to space, and resources. There will be both capital and revenue costs but the opportunity to leverage partners behind a vision is significant: a Hub that is both physical and networked, that leverages partners and creates a circular ecosystem within the borough, and which directly links to both training and job outcomes.

If the priority is
Skills and training
Option 3:
Circular Economy Starter Hub

The Starter Hub is the best short- to medium-term option to support skills & training improvement. Physical premises enable practical learning, and institutional partnerships pave the way for formal, accredited learning paths. Because this option addresses some of the barriers to uptake of a circular economy, it actively improves the job market outcomes of the people it trains through these courses.

If the priority is
Environmental impact
Option 4:
Circular Economy Catalyst

The Circular Economy Catalyst would have the highest overarching environmental impact in the borough, as well as the highest impact on jobs. However the size of operations to facilitate a material change to waste consumption is enormous.

A traditional approach to encouraging this sort of scheme would be via an inward investment and attraction approach, in which the Council would seek to attract a lead provider for this space; however, the Circular Economy Hub is a nascent typology for which these types of large-scale providers do not yet exist.

As such, the scale of this Hub would require significant investment – early estimates are upwards of £100m. This would be a long-term proposition and may require a significant risk appetite from the Council.

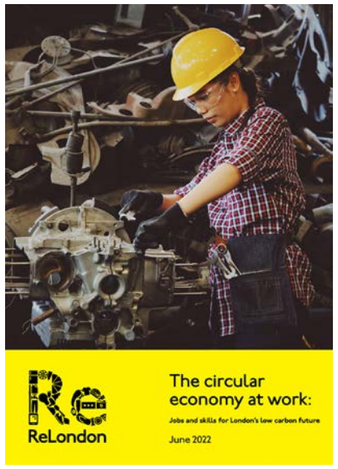
Appendix C: Policy Review

A strategic policy review has been undertaken to understand broader national, regional and local strategic objectives, and the wider context for a Circular Economy Construction Hub within Newham.

Waste Prevention Programme for England:
Towards a resource efficient economy
Department for Environment Food and Rural Affairs, 2021

The Resources and Waste Strategy is framed by natural capital thinking and guided by the two overarching objectives of maximising the value of resource use and minimising waste and its impact on the environment. It sets out the measures the government intends to take to implement this revised Waste Prevention Plan for England by outlining guiding strategic principles for delivery and setting objectives, examples of which include reducing pressure on the natural environment, safeguarding the country's resource security, and creating jobs at all skill levels. The programme contributes to wider environmental and industrial goals by contributing towards eliminating avoidable waste by 2050 as part of the 25 Year Environment Plan and increasing municipal recycling rates to 65% by 2035 as part of the resources and waste strategy.

The document notes that aligning the regulatory framework with a circular economy approach will help embed the principles of the Programme. The aim of the circular economy approach is to retain products and good in circulation for as long as possible and at their highest value. An economy-wide increase in circular economy activities, such as remanufacturing has the potential to increase jobs locally. There are clear parallels in this programme's objective of reducing waste by shifting to a circular economy with Newham's strategy to implement a circular economy in terms of protecting natural resources, reducing waste and providing economic benefit through job creation.



The Circular Economy at work:
Jobs and Skills for London's low carbon future
Relondon, 2022

Relondon have published a document that recognises that the circular economy has previously been looked at through the wrong lens, with the wrong definitions. Previous analysis has relied on a definition of circular jobs being associated with waste management or recycling, or closely associated specialisms such as refurbishment or repair, with a definition of circular economy as a stand-alone sector. This document outlines that a circular economy is not a sector, but rather a system, with an impact on materials, food, products and services permeating the entire economy. It recognises that in addition to the substantial environmental gains that a circular economy can deliver, it also has the double dividend of contributing significantly to job creation and economic growth. It forecasts that London's circular economy currently contributes approximately £11billion (2.5%) of London's economy, which could grow to a total of £24.2billion by 2030.

Green Jobs Taskforce
Department for Business, Energy and Industrial Strategy, 2021

This independent report from the Green Jobs Taskforce (convened by BEIS and the Department of Education) brings together evidence on the skills needed to transition to net zero. It sets out how the government, industry and education sector alongside other stakeholders can work together to grasp the opportunities offered by the green industrial revolution and meet the challenges of supporting high carbon sectors, their workers and the communities they support through the transition to net zero. The report outlines that the growth of circular economy sectors such as repair, remanufacture, refill, and servitisation, could create between 54,000 to 102,000 net jobs across all regions in the UK by 2030. It outlines that shifting towards more circular economy activities has the potential to decrease demand for imported goods and increase jobs locally, especially through repairs. It outlines that workers will require skills in repair and manufacturing at levels 3-6, and circular economy business planning at master's level, including engineers, material scientists and managers.

Global Britain in a competitive age
HM Government, 2021

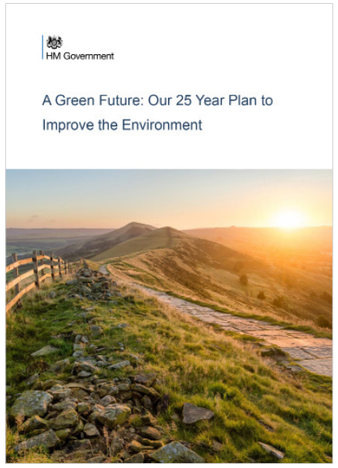
The Integrated Review of Security, Defence, Development and Foreign Policy is an updated review which takes into account Britain's departure from the European Union (EU) and explores domestic and foreign policy. At the heart of the Integrated Review is an increased commitment to security and resilience, through defence of people, territory, critical national infrastructure (CNI), democratic institutions and way of life.

The document outlines the Prime Minister's vision for the UK in 2030 and establishes a Strategic Framework with the Government's overarching national security and international policy objectives and priority actions to 2025. In particular, it identifies the accelerating need to transition to a zero-carbon global economy, with actions including to "promote green trade as part of the solution to climate change and biodiversity loss" through exploration of opportunities to mitigate carbon emissions and make progress towards a circular economy. To achieve an open, resilient global economy, the strategy identifies the need to diversify the UK's supply in critical goods, exploring opportunities around processing of critical minerals, as well as their recovery, recycling and reuse to establish a viable circular economy, which is directly relevant to the objectives of the CECH in Newham.

Circular Economy Package Policy Statement
DEFRA/DAERA, 2020

This policy statement outlines the UK's commitment towards a more circular economy which will keep resources in use as long as possible, extracting maximum value for them. The Circular Economy Package (CEP) introduces a revised legislative framework, identifying steps for the reduction of waste and establishing an ambitious and credible long-term path for waste management and recycling.

The Resources and Waste Strategy (RWS) for England forms part of the UK government's commitment in the 25 Year Environment Plan for England which outlines the need to leave the environment in a better state than we inherited it. There are three substantive changes to laws, regulations and administrative provisions – including a directive on Waste (2018), Packaging and Packaging Waste (2018) and Landfill of Waste (2018).



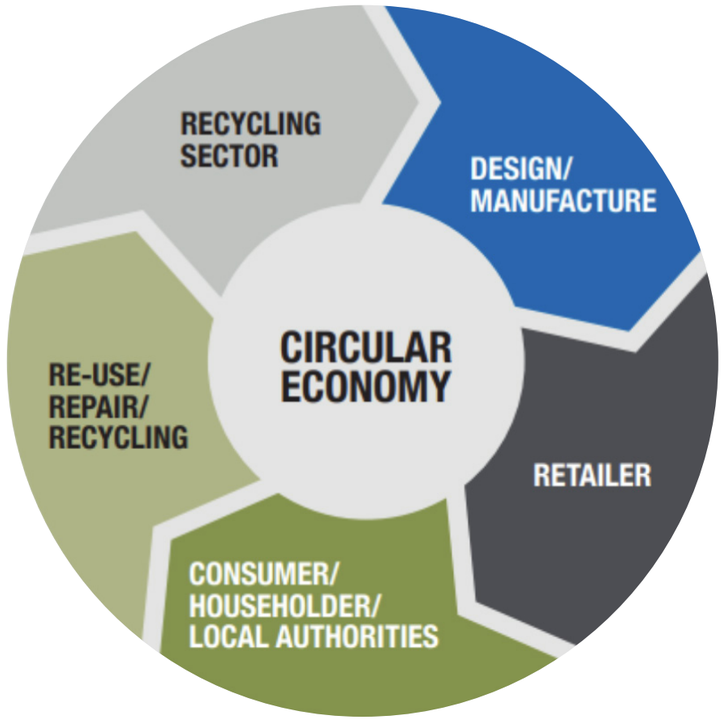
A Green Future:
Our 25 Year Plan to Improve the Environment
HM Government, 2018

This 25-year Environment plan sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first. This ambitious plan sets out national goals with the aim of improving the environment. It highlights 10 key aims, such as using resources from nature more sustainably and efficiently (5) and minimising waste (7) and 6 main policies to help meet these aims. The document also highlights how the government intends to work with devolved administrations (as the UK leaves the EU) to deliver this plan.

The report refers to promoting a 'regenerative' circular economy as part of an effort to maximise resource efficiency and minimise environmental impacts at the end of life. It states how energy and materials are essential contributions to the production of goods and services, and a healthy economy depends on a health environment. The circular economy is shown as being a crucial component of the industrial strategy as well as feeding into the Bioeconomy strategy. This demonstration of the multi-faceted benefits of a circular economy mirrors a similar notion expressed in Newham's desire to implement a viable circular construction economy and the potential benefits associated with it.

Litter Strategy for England
HM Government, 2017

The Litter Strategy for England outlines a strategy for addressing cleaning as well as focusing on influencing behaviour. It outlines the goal over the next 25 years, to become one of the most resource efficient countries in the world; reducing waste, tackling litter and maximising the value from natural and material resource assets, to protect the environment and strengthen the economy in the long-term. It outlines the target to achieve even greater levels of recycling, to incentivise activities such as reuse, repair and remanufacturing – to increase the efficiency and productivity of resource use in the economy to move towards a circular economy as shown in the image below. For Newham, the key components of the circular economy include the reuse/repair and remanufacturing as well as design/manufacture.



The Clean Growth Strategy: Leading the way to a low carbon future
HM Government, 2018

Clean growth means growing national income whilst cutting greenhouse gas emissions. Achieving clean growth, while ensuring an affordable energy supply for businesses and consumers, is at the heart of the UK's Industrial Strategy. The strategy outlines that it will increase the UK's productivity, create good jobs, boost earning power for people right across the country, and help protect the climate and environment upon which future generations depend on. This strategy outlines the opportunities and challenges of achieving clean air – including that a UK low carbon economy could grow by an estimated 11 per cent per year between 2015 and 2030, four times faster than the rest of the economy, with the potential to deliver between £60 billion and £170 billion of export sales of goods and services by 2030. This shows that clean growth can play a central part in our Industrial Strategy – building on the strengths to drive economic growth and boost earning power across the country. This could also lead to the delivery of wider benefits – for example the co-benefit of cutting transport emissions is cleaner air, which has important effects on public health, the economy and the environment.

In the Newham context, achieving clean growth has the potential to increase productivity, create good jobs and boost earning power for local residents.