periscope

Stockpile Garden

001 The Project

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Stockpile Garden: 001 The Project

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Periscope is a spatial design agency focused on regenerative design and public architecture.

We design and deliver resilient projects that work for people and planet, grounding our interventions within their greater ecological, topographic and social fabric. In valuing meticulous research, technical rigour and plural voices we seek to meet the challenges of our and future generations.

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Stockpile Garden is a whole new breed of garden - a landscape laboratory on one of the biggest construction sites in Europe!

Between 2022 and 2023, Periscope, Kirsty Badenoch, UCL Bartlett School of Architecture and the Department of Biochemical Engineering developed a live research project investigating human and ecological health on meanwhile sites. The project explores the significance of 'temporary' landscapes as a largely unaddressed contributor to urban green infrastructural fabric.

Following Periscope's initial research into soil health across London and the UK a site-based investigation at Barking Riverside was identified. Collaborative partners were sought to bridge research-in-practice with academia, connecting the project to established work on soil health undertaken at UCL Biochemical engineering. The project was awarded UCL Grand Challenges funding in 2022 which became a catalyst for the involvement of more partners and a nucleus of activity for other experimental work which continues beyond the grant.

Stockpile Garden transforms a working construction site on the Thames Estuary into a testing ground for brownfield biodiversity improvement methods. Designed responsively to on-site processes, Stockpile Garden explores locally-sourced, low-cost, and low-maintenance ecological restoration, inviting people, plants, protozoa and other kingdoms to thrive behind the hoarding.

As a living laboratory, the garden will continue to test bioremediation techniques and monitor biodiversity improvements over the coming years, helping to fill current knowledge gaps in the ecological functioning of brownfield sites. As a social space, it will form the stage for an unfolding programme of events.

Book 001: The Project

This book is part of a mini-series documenting the various aspects of Stockpile Garden, intended to be read alongside one another. The book series will be added to as the garden grows. Book 001 provides an overview the Stockpile Garden project from conception to public opening. This includes setting out the wider context and aims, manifestation of the garden, reflections and learnings.

002: Stockpiles
003: The Story Table
004: Earth to Table

www.stockpilegarden.com

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01 Introduction and Context

Stockpile Garden was initiated as an interdisciplinary site-based research into soil health on post-industrial sites. The project stems from conversations between three core professions: regenerative landscape design, bio-chemical engineering and site developers. The project looks to bring together contemporary research, theory and practice by instigating an experimental temporary public space on a construction site. Through a series of experiments, the project initiates a 'landscape laboratory' to live test new approaches to ecological improvement on meanwhile sites.

Between summer 2022 and autumn 2023, the project developed through a series of conversations and activities between the core parties and their supporting teams. The practicalities of bypassing the official site soil remediation strategy for a more environmental approach, as well as opening a construction site to the public were vast and knotty. The project encountered long periods of stalling, and the garden site, size, design and communities changed a number of times. To allow the larger legal conversations time to play out whilst still progressing the project, the team broke the garden down into a number of mini-projects conducted in stages, alongside smaller site visits with invited guests. All physical designs had to remain flexible and adaptable to site and situation changes.

Stockpile Garden officially opened to in autumn 2023, with its first public event. The mini-projects that comprise the physical garden are detailed in the accompanying books 002-004. This book contains the contextual information, background and technical issues that underpin the project to date.

Ecological Context

UK Policy
The UK's 25 year Environmental Plan aspires towards achieving sustainable soils by 2030, yet there is no robust management plan or enforced framework to achieve this. Biodiversity net gain has only recently become a mandatory national requirement for new developments, yet it targets a mere 10% gain, and focuses on an ultimate end state rather than a cumulative durational improvement process.

Construction Best Practice
When it comes to soil remediation and earth works, current best practice is simply not good enough. Strategies are often decades old, and emply highly destructive chemical processes, sterilisation or mass-importing of soils which fundamentally alter the base ecological state.

The wider project scope of Stockpile Garden aligns itself alongside organisations such as ACAN (Architect's Climate Network) who are advocating core policy changes to establish more socially and environmentally sustainable construction practices. The wider project aims to embed theoretical papers into practice and policy.

Meanwhile Ecology
Derelict land, vacant lots and construction sites contain some of the rarest and richest habitats for plants and invertebrates. Yet the ecological health potentials of transitional - or 'meanwhile' - sites is a widely overlooked subject. As large-scale infrastructure and development projects advance across elongated timescales, London is seeing hundreds of hectares of brownfield land left fallow and depleted for decades. Despite the impending threat of urban growth to human and ecological health, no UK biodiversity targets are stipulated for meanwhile sites, which often comprise contaminated soils and are located in areas where communities have little-to-no access to greenspace.

2,700 hectares of land across London remain undeveloped, despite having been granted planning permission for transformation. While progress has been made on some of these sites - such as Barking Riverside where 2500 homes have already been delivered – most are expected to remain derelict for over a decade. These 'slack spaces' have great potential for bringing social value to local areas, and in recent years, so-called 'meanwhile' (i.e. temporary) uses have blossomed across the city. Following this emerging phenomena, in 2021 the GLA compiled a research report with Arup outlining the value of meanwhile use, it provided a framework for improving current and future practice. The report goes into significant detail on social, creative and business potentials, but it stops short of mentioning the ecological.

Despite London having formally acknowledged the biodiversity crisis, non-human needs still sit way down the ladder below human needs. Only this year does 'biodiversity net gain' become a mandatory stipulation within planning regulations - encouraging new developments to achieve an ambitious 'zero' net loss of biodiversity, with the opportunity to buy your way out through off-site improvements if this isn't possible. There are a hundred holes to pick with the biodiversity net gain policy, but we choose one: time.

During decades of planning, design, construction and handover processes, ecological improvements are not considered a worthwhile investment. Care is taken not to disturb existing flora and fauna, but the notion of possible improvements only enters the conversation at the end of everything - at RIBA Stage 7. This may seem logical - why invest in planting and maintaining gardens if they're only going to be there for a few years? But if the climate crisis is urgent, should we not embrace opportunities for immediate improvements, rather than just in twenty years time? Meanwhile use has been acknowledged for its social value potential to vastly improve our neighbourhoods, then why not also its ecological value? If some of the most energetic, creative and opportunist city spaces are meanwhile spaces, why is it only humans who are encouraged to flourish there?

Research Context

Perspectives on Soil

In the construction industry, materials are treated as commodities rather than processes. Material migration and transformation are overlooked in preference to a transactional buy/sell approach. In biology, soil is understood as a system of complex living entities, containing 25% of all biodiversity on the planet.

The UK's soil crisis has been extensively documented across recent news and literature. We are currently losing soil at rates faster than it can naturally form, primarily due to erosion, sealing, contamination and landfill (Environment Agency). Large-scale agricultural and construction industries have long extracted, rinsed, commodified, transported and dumped vast quantities across the country. In England and Wales alone almost four million hectares of soil are at risk of compaction, blocking root growth thus preventing nutrient transfer. Arable soils have lost forty to sixty percent of their organic carbon and the Environment Agency has deemed roughly three-hundred thousand hectares of land as contaminated (Environment Agency). Further still, soil is classified as a non-renewable resource. It takes over 100 years to produce a 1 cm layer of topsoil – a process that cannot be shortcut, and in human terms, is imperceptible (Natural Capital Committee).

Perhaps the most concerning issue is that, despite the Environment Agency being the best advocate soil has in Britain, even they classify it as a "natural capital resource" (Environment Agency 5) - as a material asset. Yet our continued regard of soil as being an inanimate matter or a tradable stock as opposed to a connected body of processes inherently underlines the commodification and manipulation of it. We need to start seeing soil differently.[1]

There is a deep disconnect between soil's vital role in sustaining planetary life and ensuring the healthy functioning of the Earth's ecosystems, and our commonplace reductive, even slightly distasteful perception of it. [1]

(extract from 'Soiled Sights: Compromised Visions Journal 2023)

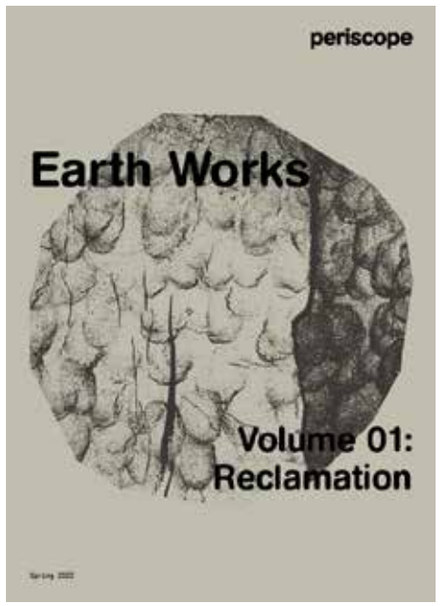
In 2022, Periscope's research project: 'Earth Works[2]' interrogated material as process. The open-source research paper compiled an open-source feasibility study into the processing of usable clay from excavated London soil.

Microbiome-Led Landscape Design

Dr Brenda Parker's current research deals with how we can scale up biotechnologies based on microbes and algae for the remediation of polluted lands and waters. One apsect of this is Microbiome-Inspired Green Infrastructure (MIGI) whereby the biodiversity and functionality of microbes in the built environment are augmented to perform ecosystem services and enhance human health.

In their 2010 article, Microbiome-Inspired Green Infrastructure: A Toolkit for Multidisciplinary Landscape Design[1], Brenda Parker and colleagues set out a framework for managing construction projects so that multidisciplinary teams of researchers and practitioners can explicitly consider environmental microbiota in design and construction contexts, thereby increasing ecosystem functionality and public health. They suggest that an overlay to the existing industry standards for green infrastructure design will be needed in order to create a means for nonscientists to embrace the importance of environmental microbiota for public health and urban ecosystem functionality.

The project develops Dr Brenda Parker's emerging innovations in heavy metal pollution on industrial sites, and bioremediation through the introduction of natural microorganisms. This project builds on her established cross-disciplinary methods of bringing together engineers, scientists and designers.



[1]''Soiled Sights' by Kirsty Badenoch and Teagan Dorsch, Working Titles Journal Issue 2, Bauhaus-Universitat Weimar, December 2023, www.uni-weimar.de/projekte/workingtitles/wp-content/uploads/2023/11/Soiled-sights.pdf

[2] Earth Works Vol 1, Periscope, April 2022, www.periscope.uk/research/papers

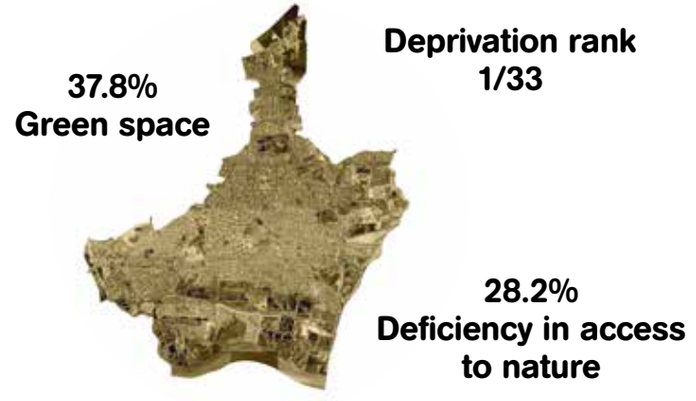
[3]'Microbiome-Inspired Green Infrastructure: A Toolkit for Multidisciplinary Landscape Design', Harry Watkins, Jake M. Robinson,Martin F. Breed, Brenda Parker, Philip Weinste, in Trends in Biotechnology, December 2020, Vol 38, No 12

Site Context: Barking Riverside

Industry and Construction
Barking Riverside is one of Europe's largest brownfield sites and new transport infrastructure is vital to support its development, specifically the 4.5 km extension of the Gospel Oak to Barking London Overground line. At 440-acres, the land was once the former plot of Barking Power Station, based on River Road, it had three coal-fired stations that were opened by King George V in May 1925. The station made Barking one of the largest steam-generating power stations in Europe for approximately 20 years.

Periscope have a long-standing working relationship with Barking Riverside Limited (BRL). In 2017, Periscope were engaged on the landscape and public realm design of Stage 2 North and the linear park, including material testing for a test street. We have undertaken a design advisory role on S2N, and in 2022 developed a Public Realm Design Guide for the masterplan.

Local Green Space and Biodiversity
Barking and Dagenham ranks as the most deprived borough in London, it's population is amongst the most ethnically diverse in the city, and it has one of the lowest percentages of public green space in relation to built area. Lack of access to greenspace and engagement with nature and natural processes have direct tangible implications on health, the impacts of which are particularly marked in young people. Simultaneously, nature education and biodiversity knowledge is crucial in safeguarding the future of our healthy cities - encouraging awareness, advocacy and stewardship. Barking Riverside is designated as 'Healthy New Town', through this programme the development seeks to address health inequality, enable ecological education and provide new green space – these ambitions helped determine Stockpile Garden as aligned with BRL's overall mission.

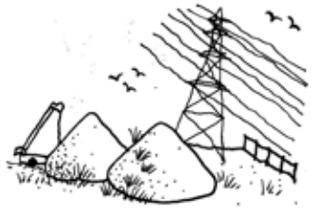


Data on Barking and Dagenham Green Spaces from 'Green for Victory' Periscope 2021 - 2022, available at: https://www.periscope.uk/research/papers

Aims and Objectives

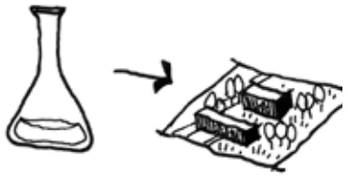
The following aims and objectives were defined at the outset of the project:

1. Evaluate Barking Riverside Soil Health
Compile a portrait of the post-industrial urban soil health conditions at Barking Riverside.

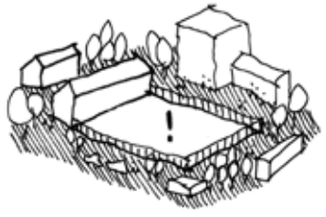


2. Uncover Brownfield Biodiversity Opportunities
Identify currently overlooked biodiversity opportunities in a brownfield landscape.

3. Educate Public on Soil, Ecological and Human Health
Apply and test emerging innovations in microbiology on a live development site, monitoring the subsequent ecological implications.



4. Test Emerging Material Technologies
Develop a program of events and workshops that engages the general public with soils and soil empathy



5. Engage the Public with Meanwhile Sites
Reconnect people with lost urban landscapes, and empower communities with tools to enrich their own health as well as that of their local environment.

6. Create A Scalable Model
Develop the methodology, to construct a scalable model for a community approach to remediating temporary landscapes. The findings will be used to inform a consultation and application process to address meanwhile site remediation at UK policy level.

02 The Project

Stockpile Garden

is a whole new breed of garden - a landscape laboratory on one of the biggest construction sites in Europe!

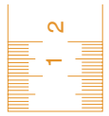
Industrial landscapes contain some of the richest and most important biodiversity, yet we know suprisingly little about how they function ecologically.

Stockpile Garden has been set up at Barking Riverside to test different industrial ecologies and soil-health improvement methods, help better understand how industrial ecosystems develop, and find new ways for construction and ecology to work together.

Who cares about soil?

Soil is highly precious. It is the basis of 25% of the world's biodiversity[1], produces almost all globally consumed food[2] and stores over twice the amount of carbon than the atmosphere[3].

In 2020, the EU estimated that 60-70% of soils are now unhealthy.



It takes about
500
years to make
2cm topsoil[8]

Soil takes so long to form that it is classified as a non-renewable resource, and we are currently losing it at a faster rate than at which it can form. The UK's soil crisis is mainly due to large-scale industrial agricultural processes over the last century.[4]

How can we care better?

London's construction industry shifts thousands of tonnes of soil every year. Much of this soil is post-industrial, and much of it ends up in landfill or is subject to harmful chemical sterilisation. It is not seen as valuable. But it is. With all this soil and all

this space, long-term construction sites have amazing opportunities to do things differently.

Located at Barking Riverside, Stockpile Garden looks to put this to the test!

What does care look like?

Low nutrient soils are key to creating successional habitats. Despite their crumbling and unkempt scrubby aesthetic, 400 nationally scarce species have been recorded on brownfield sites along the Thames Estuary alone[6]. On the Stockpile Garden site, we have already identified some very special plants.

A Lunar Landscape

We are collecting industrial soils from across Barking Riverside to test a number of different plants that remove heavy metal pollutants, increase oxygen and carbon. We are also testing what keystone species could be used to build biodiverse communities, and what micro-organisms could initiate organic complexity. As we collect seeds up and down the foreshore, what life will our little piles of dirt soon be buzzing with?

Soil Stories

Soil has a long memory, registering millions of stories dating back centuries.

Sometimes you might see an old rusty table moving around the garden. This table was buried underground on the construction site, during which it became imprinted with the deep memories of Barking Riverside's past. Memories that we can no longer see ourselves, but that the ground registers. Do these contain clues to a better ecological future?

The table will host talks, picnics and dinners around the garden, a meeting place for exchanging stories and sharing knowledge.

Garden Anthrome

Soil is the building block for natural ecosystems, can it also be our building block for public spaces?

We are pushing natural construction to its limits, using an innovative technology under development at UCL: impact soil printing. Using robotics, this forms and lays compacted 'bricks' using nothing but soil.

Inside our soil planters we are growing plants that help remove toxins. Over time, the planters will become overgrown and fall apart, returning a much healthier soil back to the ground. If done with care, could construction actually help improve biodiversity?

Earth to Table

Using natural methods, we are processing clay from the Barking Riverside soils to make a set of unique site-specific ceramics for our communal food events. Can we better connect the earth beneath our feet to our everyday lives?

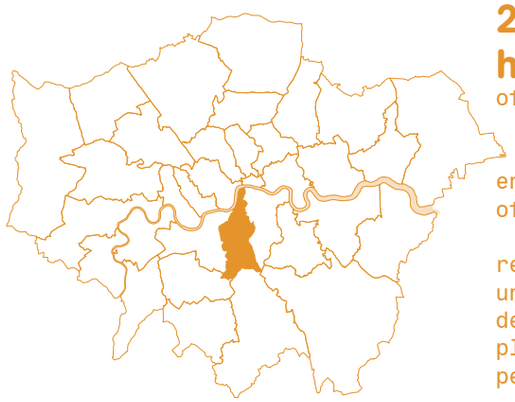
More more more!

Over the next months and years we look forward to sharing and expanding all our ecological experiments! Stockpile Garden will continue to evolve with our research findings.

Build to grow more

Current construction practice aims towards biodiversity improvements at the end of the project. But with increasingly bigger and longer construction projects, this is too far away. We think we can do better. Together, our small-scale experiments seek to find ways for construction to benefit ecology in the short as well as long term.

London's Living Laboratories



2700 hectares of London, equal to the entire borough of Lambeth - remain undeveloped despite having planning permission[7]

Despite being dense and busy, London actually contains a lot of empty space. Space that could provide habitats and contribute to ecological knowledge, helping our future cities become greener and wilder.

Over the last years, London has seen some amazing temporary community projects grow, but few have really centred on ecology. Temporary habitats can be incredibly valuable, allowing us to test new methods on the ground, at small scale.

It may seem small, but Stockpile Garden has great dreams. It is a prototype for an ecologically progressive meanwhile use, testing ideas that could be replicated to transform empty and unused spaces into green oases across the whole of London.

Project team:

In collaboration with:

Supported by:

Care with us!

As it grows, Stockpile Garden will host lots of different events and experiments, evolving to host new communities of plants, animals and people over time. For more information, scan the QR code on the front, email: hello@periscope.uk or visit: www.periscope.uk/atlas/stockpilegarden

1 UN Food and Agriculture Organisation (FAO), 2020
2 United Nations Chronicle,2022
3 European Commission: SOIL, The hidden part of the climate cycle, 2011
4 Responding to the UK's Soil Crisis, AGS, 03/11/2022 3rd Nov 2022
5 FAO Global Symposium on Soil Erosion, Key Findings, 2022
6 The state of brownfields in the Thames Gateway, 2013
7 Centre for London 2018

1. STUDIO:
2021-2023
Policy research and
material analysis

PERISCOPE
STUDIO

UCL BIO-ID
LABORATORY

2. LABORATORY: 2022-2023
Analysis, construction
prototyping, soil
improvement aims

BARKING RIVERSIDE

UCL B-MADE
WORKSHOP

4. SITE: ONGOING
Live experiments and events

3. SITE: 2023
Laboratory base construction
Soil and seed collection
Initial construction

An Interdisciplinary Team

Stockpile Garden brings together a set of disciplines and worlds that work with identical issues and agendas, but very rarely interact in practice. There is a lot of lost knowledge between laboratories and live sites, and between a lack of shared knowledge. The project brings together practice and academia in environmental biotechnology, regenerative landscape design, construction and infrastructure development.

Biotechnology works with soil health through understanding microscopic ecologies and living process systems, whilst the the construction industry manages earth as a manipulatable commodity on local, regional and national scales. This fundamental difference in approach, scale and method highlights a clear gap for knowledge exchange and innovation across disciplines, bringing together polar sides of a shared process.

Regenerative Landscape Design engages with issues of ecological and social health, but is often driven by a top-down finite design agenda. This project looks to engage with community groups and acknowledge non-human actors to develop more inclusive and responsive process-led design methodologies.

Through consulting with partners in neighbouring disciplines and specialists in ecology, botany, geotechnics, community, communications and policy) Stockpile Garden looks to open out to plural voices, employing conversation as a participatory and first-hand research methods.

Periscope

Periscope are a diverse team of specialists in architecture, landscape and urbanism. We work in a collaborative and open fashion, engaging our clients and teams in our process, working together in practical, hands-on workshops and open dialogue.

Daniel Rea
Periscope Founding Director,
Landscape Architect

Daniel is a landscape architect, masterplanner and founding Director of Periscope, he has over twenty years experience in leading complex landscape, urban design and masterplanning projects across the UK, Europe and Asia. He has been working in London for the past fifteen years, and has designed and delivered some of the capital's most challenging projects. Having worked for private developers and local authorities he has amassed a wealth of experience in the design, planning and delivery of complex landscape and public realm with many Stakeholders.

Kirsty Badenoch
Artist / Architect
(Former Head of Research, Periscope)
Design Tutor, UCL Bartlett School of Architecture

Kirsty Badenoch is an artist, researcher and educator. Her work interrogates situations of ecological justice through interdisciplinary, embodied and collaborative site-based projects. She develops participatory methods to foreground more-than-human agency, collaboration and indeterminacy. Her work inhabits the expanded field of drawing, installation, performance, workshops, writing, strategy and events.

Kirsty has over ten years experience working with some of Europe's top architecture, landscape and urbanism practices, including SLA, Bjarke Ingles Group and Periscope, where she founded the research-in-practice platform. She is a design tutor at The Bartlett UCL, guest lecturer at a number of UK universities including Goldsmiths UAL, and curator at Microscope.

UCL Biochemical Engineering

UCL's Biochemical Engineering is a founding laboratory of the discipline boasting a long tradition and reputation of innovation, teaching and research.

Dr Brenda Parker
Associate Professor in Sustainable Bioprocess Design
Director, Bio-Integrated Design Lab UCL Biochemical Engineering
Founding Director, Studio Biocene

Brenda holds an MEng and PhD in Biochemical Engineering from UCL. Dr Brenda Parker's current research deals with how we can scale up biotechnologies based on microbes and algae for the remediation of polluted lands and waters. One aspect of this is Microbiome-Inspired Green Infrastructure (MIGI) whereby the biodiversity and functionality of microbes in the built environment are augmented to perform ecosystem services and enhance human health. She is interested in interdisciplinary approaches that integrate open source technologies and embed methodologies from the social sciences.

Barking Riverside Limited

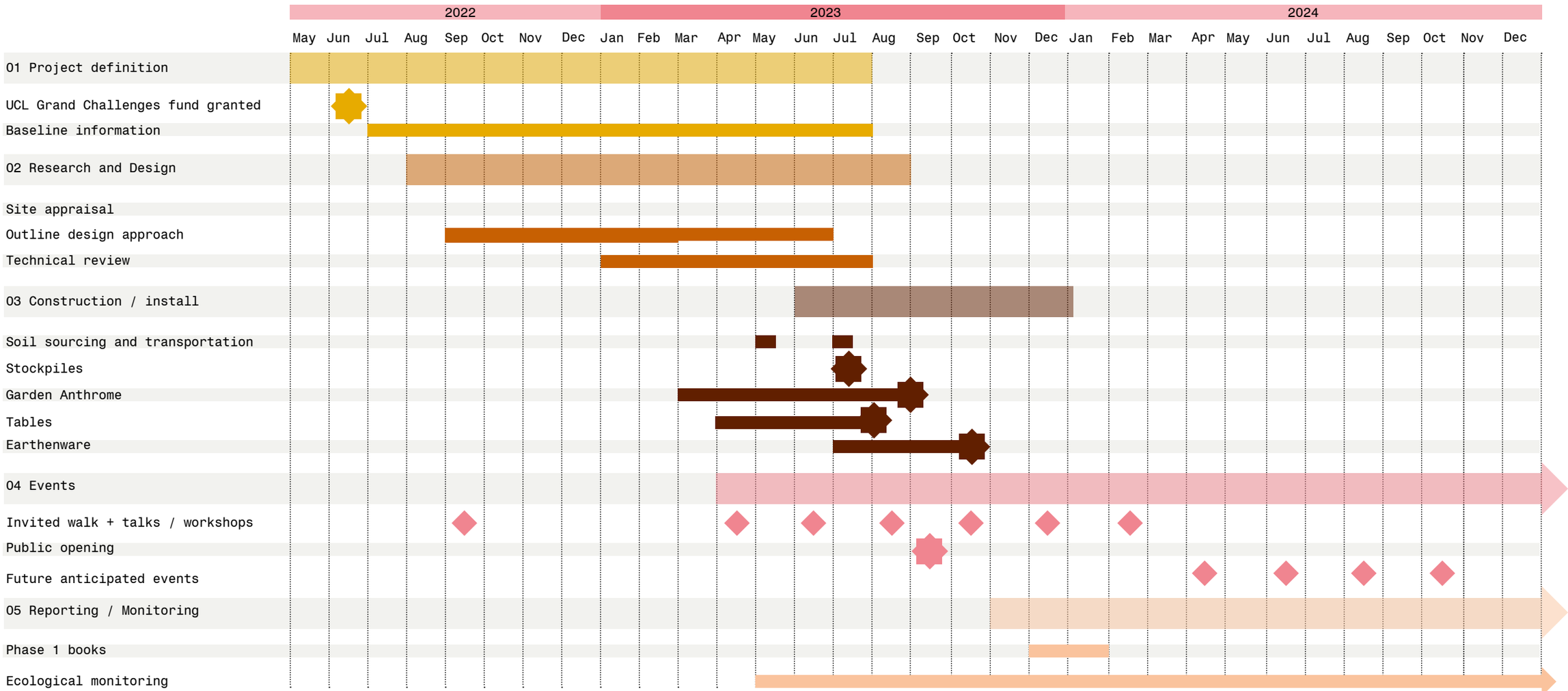
A partnership between L&Q housing association and the Mayor of London, Barking Riverside Limited is transforming a former industrial site in East London into a neighbourhood of over 10,000 homes. Barking Riverside Ltd are responsible for the overall design, planning and placemaking, leading the major infrastructure projects and working with housebuilders.

Matthew Simms
Head of Placemaking

Matt is BRL's placemaking manager, responsible for delivering a new placemaking strategy and public realm activation strategies. Matt specialises in urban sustainability and place activation and has 10 years' experience leading the strategy and delivery of complex placemaking projects including mixed use development, public realm improvements and activation, cultural installations and public amenities for both the private sector and local authorities across the UK, Australia and New Zealand.

Project Timeline

The project programme is fairly unorthodox for a landscape design project, as the site appraisal, outline design and technical review periods were undertaken concurrently. Once site sign-off was approved, the project was constructed, installed and opened in a very short timeframe. It is anticipated for monitoring and events to continue developing over the coming few years.



Garden Components

Stockpile Garden comprises a series of interrelated mini-projects, that each explore biodiversity in brownfield sites through a different optic. These are described in more detail in the books that accompany this one.

Stockpiles
Book 002

The stockpiles of Stockpile Garden provide the ‘laboratories’ for our experiments into industrial ecology. An initial set of piles was constructed in June 2023, these will be added to over time. Like sand dunes, they will continue to shift around the garden and are amalgamated, excavated to construct planters, spread apart and rebuilt.

‘Earth to Table’ Earthenware
Book 004

An application and extension of the clay reclamation techniques developed in Periscope’s ‘Earth Works vol 1’ investigation, 2022, through making a set of site-specific slip cast tableware.

Garden Anthrome
Book 002 [Chapter 4]

A living installation combining emerging robotic innovations from UCL Here East with low-fi construction methods through a process called impact-printing. Constructed from just soil, the structure controls erosion, while encouraging a cover of vegetation to increase microbial activity within the local environment. The planters will degrade and fall back into the earth over time.

Public Engagement
Book 002 [Chapter 5]

The garden was publicly opened as part of the Emerge East festival in September 2023. This was the first of a programme of future public events the garden will host over the coming years. Other activities to date include soil workshops, walk+talks and ecology days.

The Story Table
Book 003

The Story Table explores subterranean material narratives, using erosion processes to construct a moveable banquet table that will host events in and around Stockpile Garden.

03 Process Review

The making of Stockpile Garden involved in-depth reviews of geotechnical, soil remediation and ecological data across the construction site.

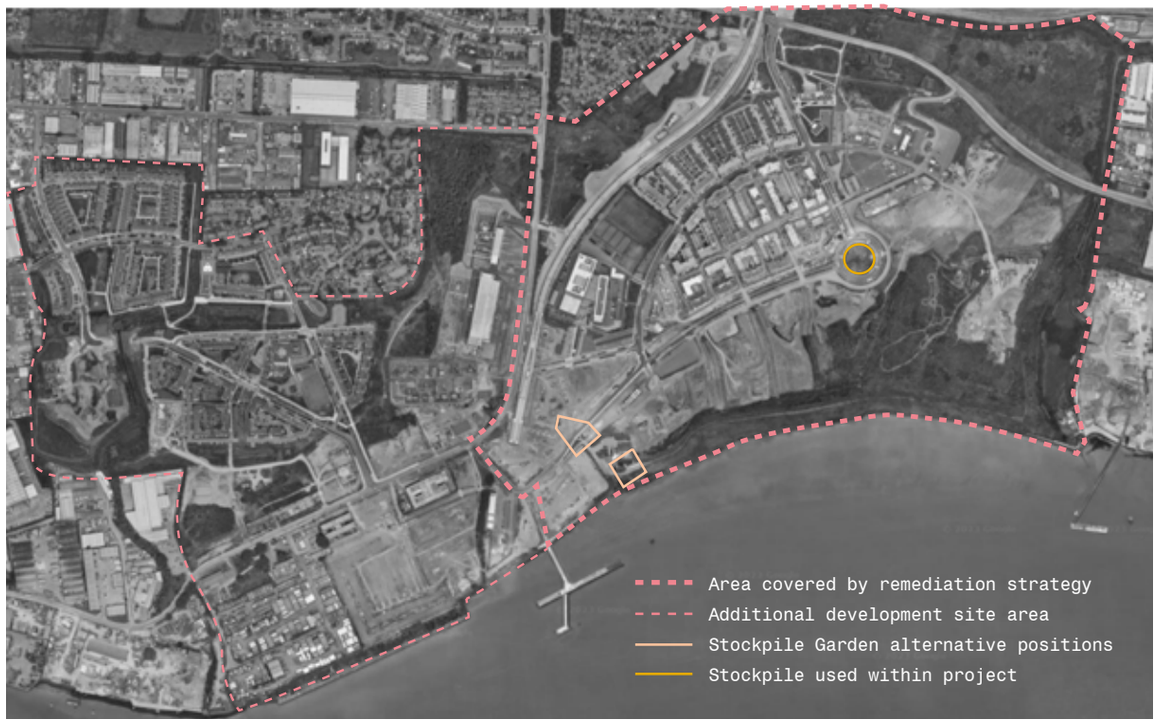
The soils are fairly typical of post-industrial London soils, with high levels of heavy metals and other toxic contaminants. This led to a number of issus when opening the site to the general public.

Barking Riverside's remediation strategy follows prevailing industry approaches - the primary aspect being to 'cap' any existing ground with 'clean' soil approved for human health to a depth of up to 2m, with an additional upper soil capping layer of 300mm for public open spaces. Doing this fundamentally alters the base state of the local ecology, conflicting with projects like Stockpile Garden. It took the team months of negotiations to find a way around these parameters, and simply leave the earth as it is. Through all our digging into technical data, not once is the ecological health or environmental value of soil discussed. While more-than-humans are now being considered, the only documented and regulated interest around health is for humans.

Barking Riverside

The State of Soil

The western side of Barking Riverside site was historically used for the deposition of pulverised fuel ash (PVA), a by-product of the former coal fired power stations located within the wider Barking Riverside development area. The east side of the site operated as a municipal landfill from the 1950s, prior to which it was agricultural land, with evidence of filter beds, an industrial depot, and a railway line.



The stockpile soil was found to be a sandy loam whereas DC5 soil contained a higher clay content at almost 25%. Both were moderately alkaline. Both contained low levels of organic carbon, reflecting that these did not contain a great deal of humic matter (decomposed plant and animal residue), this is likely due to their urban origin. There were low levels of nitrogen, which again may reflect the urban source.

In the soil sampled from DC5, elevated levels of the metals copper, zinc and nickel as well as the presence of lead are indicative of the industrial legacy of Barking Riverside. However, the bioavailable fraction is still to be determined, and soil characteristics such as clay content are likely to influence the uptake of metals into plant tissue.

Hydrocarbons were evident in the soils sampled, reflective of a legacy of combustion on or nearby the site. In particular the stability of PAH (polycyclic aromatic hydrocarbons) was evident due to their presence in soil. Nevertheless, the concentrations in urban environments has been measured previously, and the findings at BRL are comparable to previous studies (Vane et al 2014) who had measured a similar suite of compounds in Thamesmead and Erith, south of the BRL site.

Biodiversity

UCL hosted an ecology walk with our team, led by experienced forensic botanist and writer, Mark Spencer. The collected data was submitted to the Greenspace Information for Greater London (GiGL) database.

One of the primary species of note was identified as the large population of Annual beard-grass, Polypogon monspeliensis, a species that is intimately associated with the Thames marshes.

Achillea millefolium
Agrostis stolonifera
Anisantha sterilis
Apium graveolens
Arctium minus s.s.
Armoracia rusticana
Arrhenatherum elatius
Artemisia absinthium
Artemisia vulgaris
Asparagus officinalis s.s.
Atriplex patula
Atriplex prostrata s.s.
Ballota nigra
Bellis perennis
Beta vulgaris subsp. maritima
Bolboschoenus maritimus
Bromus hordeaceus
Buddleja davidii
Calystegia sepium
Capsella bursa-pastoris
Cardamine hirsuta
Carduus crispus
Catapodium rigidum
Centaurea nigra s.s.
Centaurium erythraea
Cerastium fontanum
Cerastium glomeratum
Chenopodium album s.s.
Cirsium arvense
Cirsium vulgare
Cochlearia anglica
Conium maculatum
Convolvulus arvensis
Crataegus monogyna
Crepis capillaris
Crepis vesicaria
Dactylis glomerata
Daucus carota subsp. carota
Diplotaxis tenuifolia
Echium vulgare
Elymus athericus
Elymus repens
Epilobium montanum
Erigeron sumatrensis
Euphorbia peplus
Festuca rubra
Foeniculum vulgare
Galega officinalis
Galium aparine
Galium verum
Geranium dissectum
Geranium molle
Helminthotheca echioides
Heracleum sphondylium
Hirschfeldia incana
Holcus lanatus
Hypochaeris radicata
Jacobaea vulgaris
Juncus gerardii
Knautia arvensis
Lamium album
Lamium purpureum
Lepidium draba
Lepidium latifolium
Leucanthemum vulgare
Lolium perenne
Lotus corniculatus
Lysimachia maritima
Lythrum salicaria
Malva sylvestris
Matricaria chamomilla
Medicago arabica
Medicago lupulina
Medicago sativa subsp. varia
Melilotus officinalis
Papaver rhoeas
Papaver somniferum
Pastinaca sativa
Phleum bertolonii
Phleum pratense s.s.
Phragmites australis
Picris hieracioides
Plantago lanceolata
Plantago major
Plantago maritima
Poa annua
Poa trivialis
Polygonum aviculare s.s.
Polypogon monspeliensis
Potentilla reptans
Prunella vulgaris
Ranunculus repens
Rosa canina s.s.
Rubus fruticosus agg.
Sagina procumbens
Salix cinerea
Sambucus nigra
Scorzoneroides autumnalis
Senecio inaequidens
Senecio squalidus
Senecio vulgaris
Silene latifolia
Sisymbrium officinale
Solanum dulcamara
Sonchus oleraceus
Spergularia marina
Stellaria media s.s.
Symphytum orientale
Taraxacum officinale agg.
Trifolium arvense
Trifolium dubium
Trifolium pratense
Trifolium repens
Triglochin maritima
Tripleurospermum inodorum
Tripolium pannonicum
Veronica arvensis
Veronica persica
Vicia sativa
Vulpia bromoides
Vulpia myuros

Value & Process

Meanwhile site challenges in the UK are many-fold, but the key tension is between enormous latent land values coupled to strict investment return cycles set against much lower fidelity values in ‘the status quo’.

Business As Usual

Big development organisations have processes, they are designed to remove risk, drive efficiencies and enable a machine to deliver a goal. Meanwhile sites are messy, disorganised and hold little apparent value, at least not ‘as they stand’ and certainly not in the minds of property companies - especially when compared to the juggernaut of ‘driving residential value’; the central aim of most UK development projects.

In our society, in the UK, the economy is geared towards capital and growth, without these you can’t enter into agreements, leverage funding, make deals. Within this context land is an asset to be developed for humans and for profit. Land value growth in the past 30-40 years has meant the stakes are now so high that there must, at all times, in all property development processes, be inexorable progress towards ‘building’. Building must be done in an understood, predictable, measured and risk free fashion; anything else, anything outside the norm might compromise a perceived position ‘in the market’ and therefore be unacceptable. This means leaving sites ‘fallow’, even temporarily, is a challenging departure from convention – a risk.

A Different Way

We have been lucky in Barking; BRL, although large, are unlike most developers, the organisation is a Joint Venture Partnership between a Housing Association (L&Q) and the Greater London Authority (GLA). As such they have been able to be open to Stockpile Garden in ways which more mainstream developers would not be.

The detailed challenge has been that, despite individual and collective support from BRL, meanwhile sites span, variously; legal, infrastructure, community engagement and communications teams - all departments who often don’t need to fully coordinate in their day-to-day work. Communication layers are sometimes disparate and the time consuming process of joining the dots often falls to the external parties, in this case Periscope and UCL.

A meanwhile project takes an eternity to come into being and ‘is not real until its real’ – often hard to take seriously or prioritise for all involved. Despite these challenges BRL has met us with huge enthusiasm, from the Community Engagement team to the Infrastructure Team to the Executive Board; all have been incredibly supportive and wanted to help, this has made all the difference.

Information & Risk

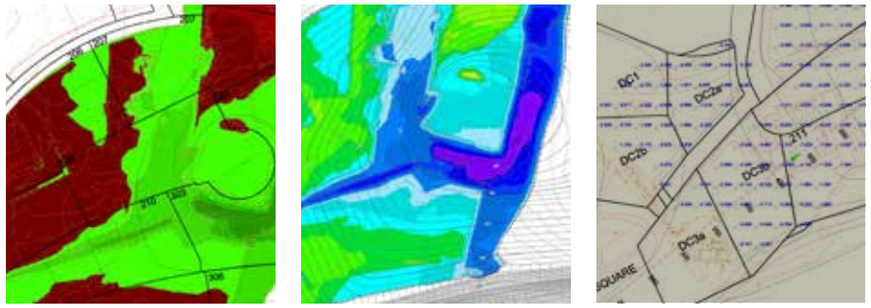
Getting to the source

It took a very long time to find site won soil to use, eventually BRL sourced some – from a roundabout where a Dockland Light Railways Station was proposed in a long since defunct plan for Barking Riverside.

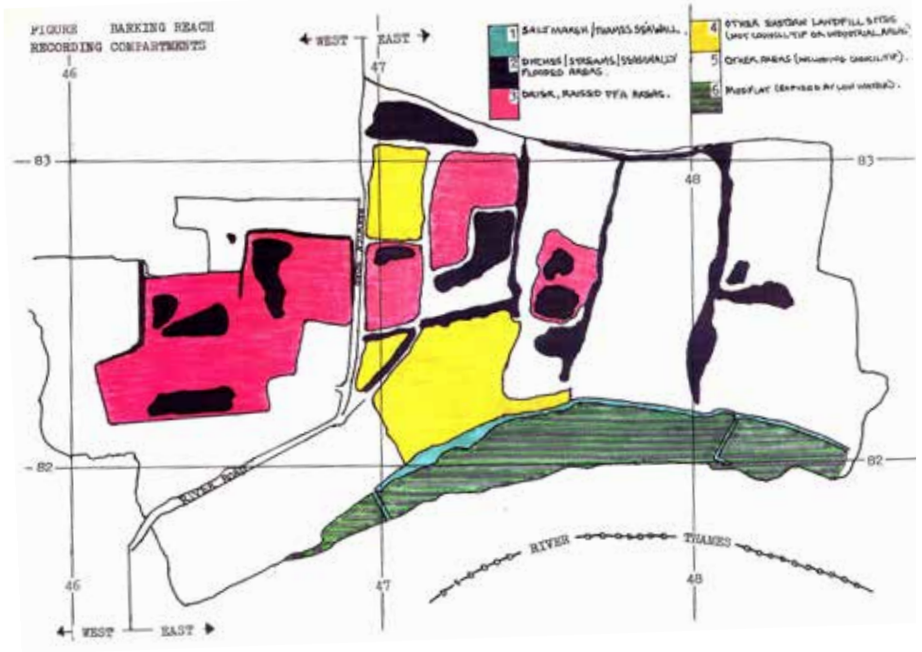
BRL has a wealth of data on soil but the site is so large and the history of its use (including remediation) is so deep that interrogation of a specific place is often difficult. The BRL team know but third parties (like Periscope and UCL) struggle to manage the data because of the sheer volume.

In the end we had to rely on BRL email summaries and clarification meetings to support the provenance of the soil. A series of clarifications and assessments had to be undertaken throughout the process to mitigate risk and verify that any contaminants were at safe or background levels. The Anthropocene is messy, we've tilled the land, built on it, crushed the buildings into the soil then the subsoil, excavated, taken the arisings elsewhere and buried the remainder. Afterwards we forget all of this harm until humans need organic matter, at which point we manufacture British Standard compliant soils tocap the problem rather than address the latent abuse present just below the surface.

This is what we've done to the land and we have to deal with the consequences – the first step is facing up to this reality by understanding what is there, for better or for worse.



Soil Mapping, CGL, 2015-2023



Barking Reach Ecology Recoding Compartments, London Ecology Unit, 1998

Design or Build?

Doing the most with the least

Throughout the Stockpile Garden process we've struggled to find the time for design, in between pushing the project up the hill of approvals and risk assessments lack of time has been a constant concern, it frustrated us all. However, about six months into the process there was a realisation that perhaps the temporary nature of the project could free us from the need to follow rigid architectural processes. Why draw a plan in CAD, print it out, give it to a surveyor with a Total Station and have them painstakingly mark out a garden verbatim?

We realised we could do a hand sketch, go to site with a spray can and instruct a groundworks sub-contractor in real time; we could design experientially in the space while the diggers danced around us in our hi-vis.

Over two days the garden was brought to life not though endless nudging on CAD and submitting/resubmitting to an amorphous altar of approvals but by relinquishing our obsession with control while making the space for expression in a rigid system.

Lack of time at Stockpile had highlighted the real issue; there isn't time or money for designers on every meanwhile site. How could there be? So then, what if one of the outcomes of the Stockpile process was engaging the contracting community and enabling them to learn more about these processes. Perhaps contractors could then offer soil health improvement as part of groundworks services without a designer? 'Earthworks', 'Muck Away', 'Groundworks', 'Foundations' + 'bioremediation and soil health improvement with biodiversity net gain', it might yet be an attractive proposition for any Groundworks contractor.

04 Next Steps

Review of original project aims

All of the orginal aims of the project have been progressed however it is clear that some can only be acheied over a longer term, perhaps longer than Stockpile will remain in place.

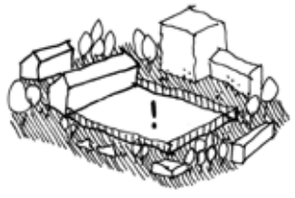
1. Evaluate Barking Riverside Soil Health
Soil has been reviewed in overview and tested in detail, the Anthromes and adjacent stockpiles will allow this to be measured over time
2-3 Year Timeframe

2. Uncover Brownfield Biodiversity Opportunities
The Stockpiles can be enhanced and measured over two to three growing seasons.

2-3 Year Timeframe

3. Educate Public on Soil, Ecological and Human Health
Some interaction with the public has taken place at the Emerge East Festival but Phase 2 offers more opportunity.
1 Year Timeframe

4. Test Emerging Material Technologies
The Anthrome prototype was constructed offsite, it is possible to impact print onsite and therefore test site won soils in Phase 2.
1 Year Timeframe



5. Engage the Public with Meanwhile Sites
The network has been started, Phase 2 can now leverage the built site and connections to better engage communities.
1 Year Timeframe

6. Create A Scalable Model
Influencing policy and national process is a long term goal and may only be possible after Stockpile closes.
3-5 Year Timeframe

Existing Audience

Phase 1 of Stockpile Garden has engaged the Ripple Nature Reserve, Barking Food Forest, Emerge East, Greater London Authority (GLA), University Collage London, University of East London and the Grass Roof Company. These are all organisations that have been part of the outreach programme, part of building the network in the first phase of work.

Future Audience

Within the second phase of Stockpile engagement it is envisaged that nature based solutions, will expand local communities understanding and care for their local green spaces, and equip them with the skills and knowledge to take ownership and demand more from public and private sector organisations.

The audience will include:

Public – Through the workshops, we hope to identify and establish key people to join a longer term citizen science group to continue to steward and record the garden developments over the coming three years, feeding into a long-term data set.

Professionals – Stockpile Garden offers an innovative space to invite professionals to think differently about inherent value in ecology, and to connect practices that are currently disparate or siloed. The long-term ambition seeks a shift in contemporary design and construction practice toward prioritising soil remediation and ecological recovery, through some very simple adjustments.

Policy – The Greater London Authority (GLA) is about to refresh its All London Green Grid. Stockpile Garden's outreach seeks to embed our innovative approaches to the climate crisis into strategic policy. London policy is international recognised as some of the most progressive, the impact Stockpile Garden could have nationally and internationally is far reaching.

Contractors – To date, Stockpile Garden has built strong relationships with the broad contractor network who interface with Barking Riverside. These are the people on the ground who can physically enact ecological change through slight adjustments to their daily practice, yet they are rarely included in environmental conversations. Through our programme, we wish to further engage with and empower this overlooked community. Through doing so, the project seeks to seed new and ecologically informed practices across the country, as the contractor labour workforce moves across the UK.

Ten Lessons for a New Garden

Stockpile will continue on at Barking Riverside but here are ten lessons that we've learnt and would like to offer to those who might consider an endeavour such as this elsewhere.

1 Make contact with the site manager or the custodian of the land as soon as possible, they will be able to give access and offer assistance formally and informally
2 Map internal stakeholders for host sites in equivalent detail to external stakeholders and partners
3 Understand governance, who are the key decision makers, what agency do the players have?
4 Work towards a senior or board level (if relevant) advocate – bottom up is best but very slow, some top-down helps
5 Break silos and meet in person if you can – building relationships can only go so far online
6 Establish site and soil chain of custody early, if in doubt, test, don't wait
7 Undertake pre and post works Grid Contamination Surveys before any works (including design and other surveys) commence
8 Airborne contaminant PPE should be worn by default during construction
9 Limit expectations on how much certainty it will be possible to have over the lifespan of a meanwhile site, it may not exist for as long as you would like, such is the nature of these spaces
10 Host community events as soon as possible, when people see what is possible it does make it real, conversely when they can't it isn't

This is the end of the beginning for Stockpile Garden.

Getting this far has required eighteen months of investment into a partnership between commercial entities and academic institutions, the building of trust and a degree of belief from all parties.

In effect that hard part is done - getting on site and getting something built, even if just the seed of an idea has weight. Stockpile Garden now has Stockpiles, Anthromes, a Story Table, has had a public launch and been visited by academics + students. Its here and it means something.

The network around the garden is embryonic but it exists and is gathering momentum as word spreads. Interest is growing from across London and the UK, watch this space in 2024, spring is coming and with it Stockpile will come to life.

Ecology at work