

03/08/2021 For presentation  
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City of London — Smithfield

# Sustainability in Public Realm

Hawkins\Brown



[hawkinsbrown.com](http://hawkinsbrown.com)



# Introduction

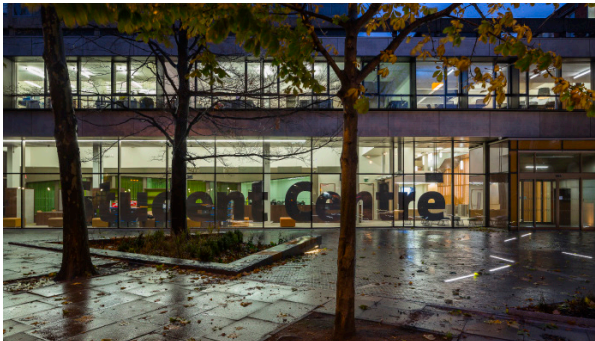
## Hawkins\Brown



WINNER

Best Use of  
Technology  
2020

H\B:ERT embodied  
and whole life carbon  
measurement tool



- Specialist Design
- Urban Design
- Interior Design
- Research



- Higher Education
- Workplace
- Residential
- Healthcare



- Infrastructure
- Cultural & Civic
- Masterplanning





# General Approach



# Reducing Carbon

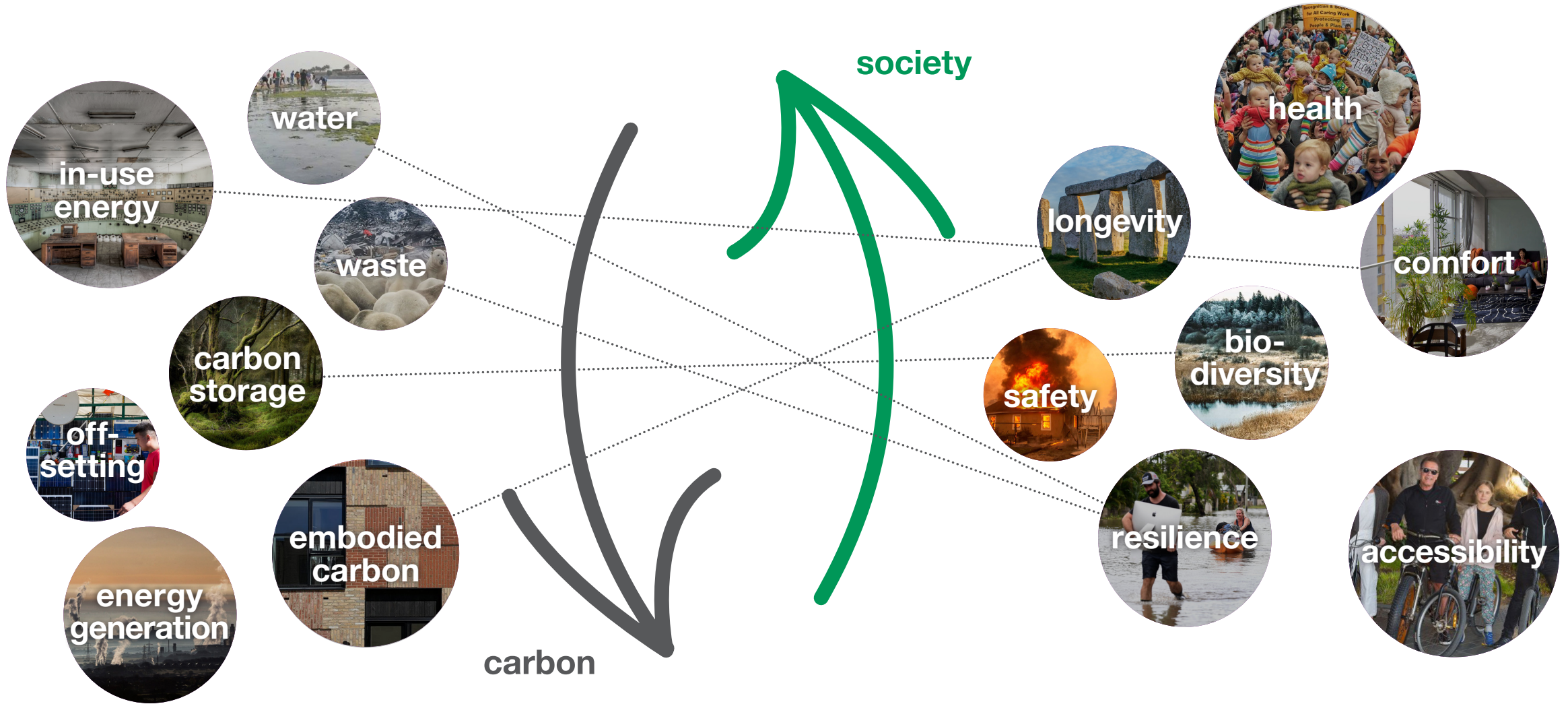
## Increasing Liveability





# Reducing Carbon

## Enhancing Society



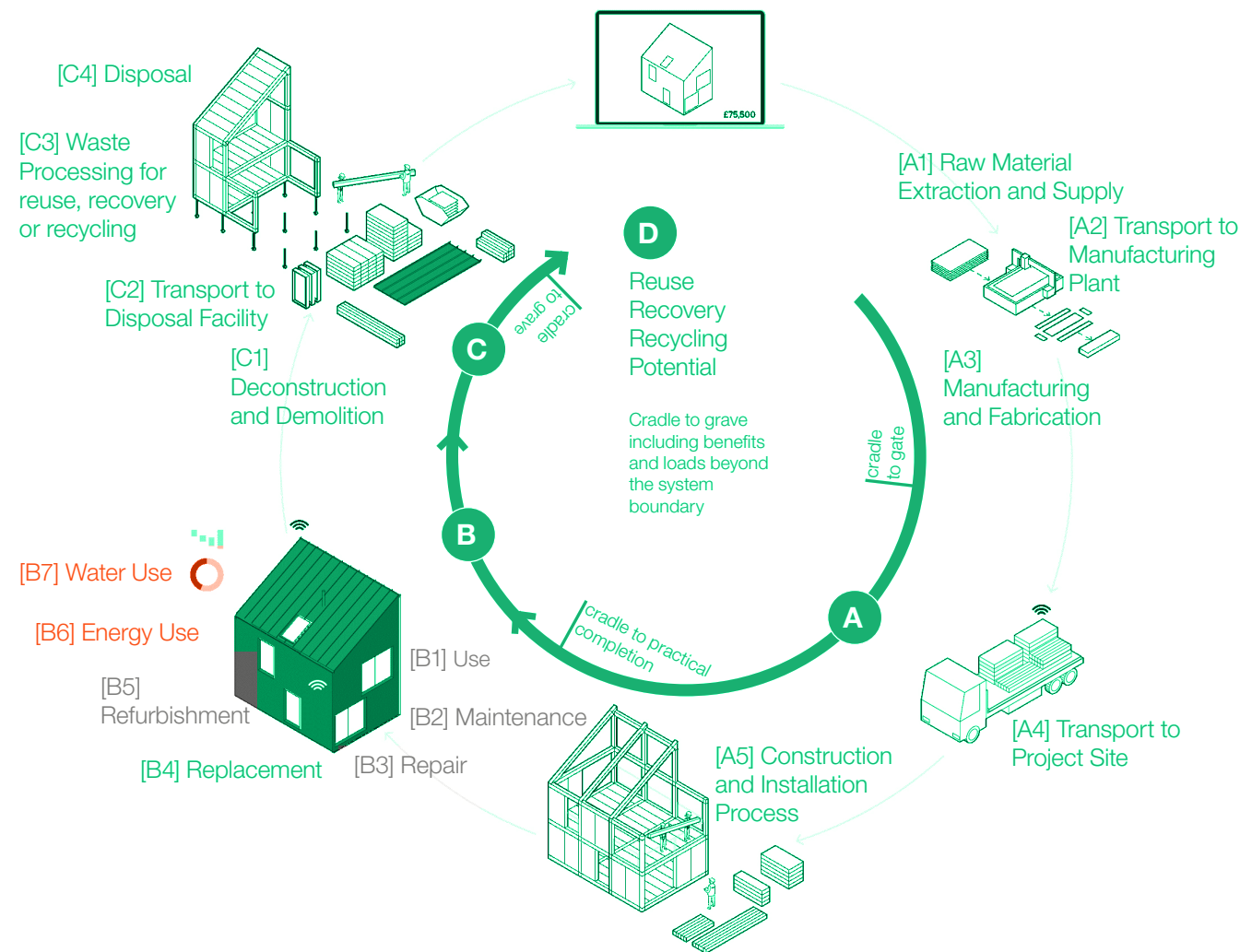


# Whole Life Carbon Approach



# Methodology

## Whole Life Carbon - what is included?

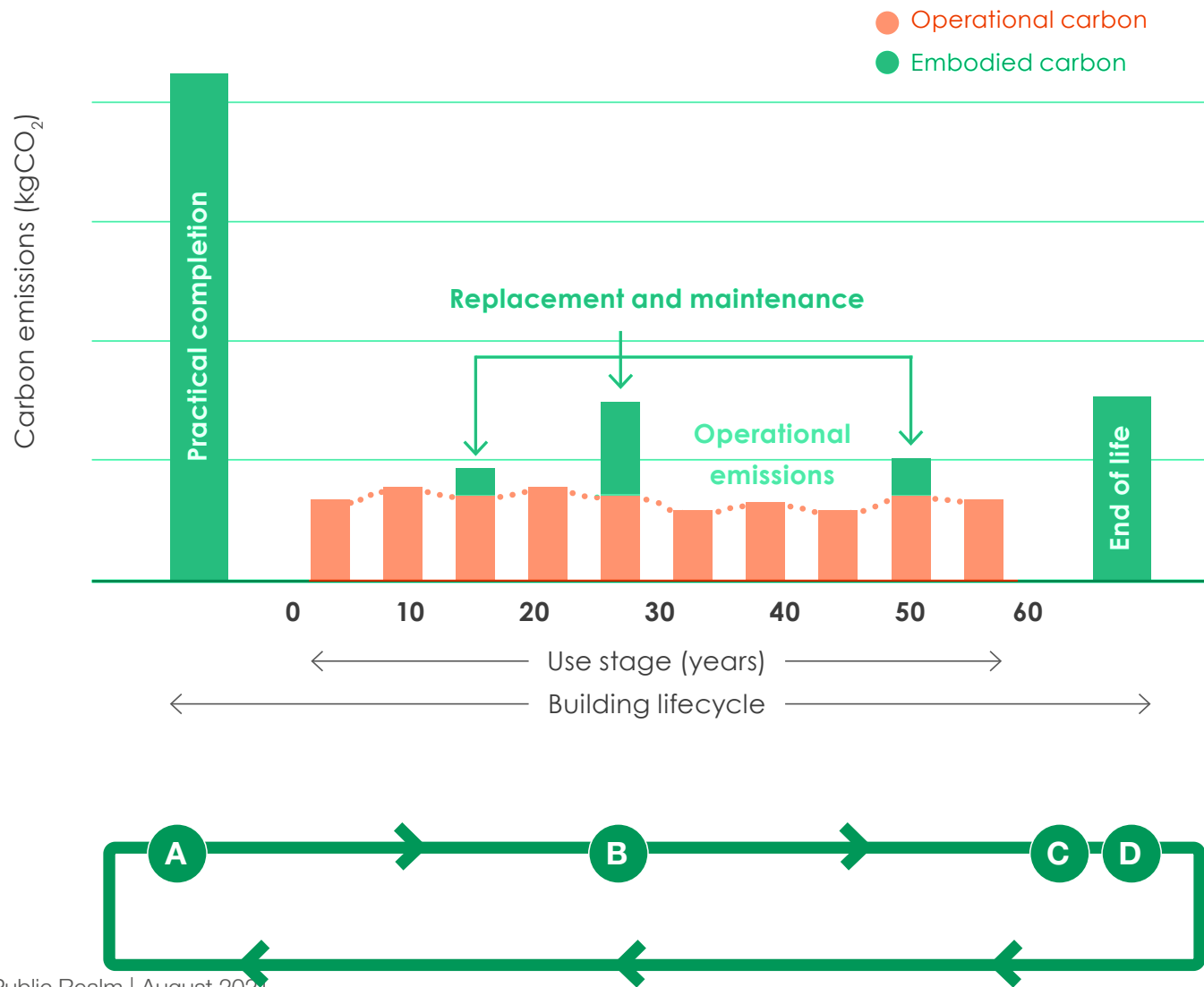


- Embodied Carbon stages
- Operational Carbon stages



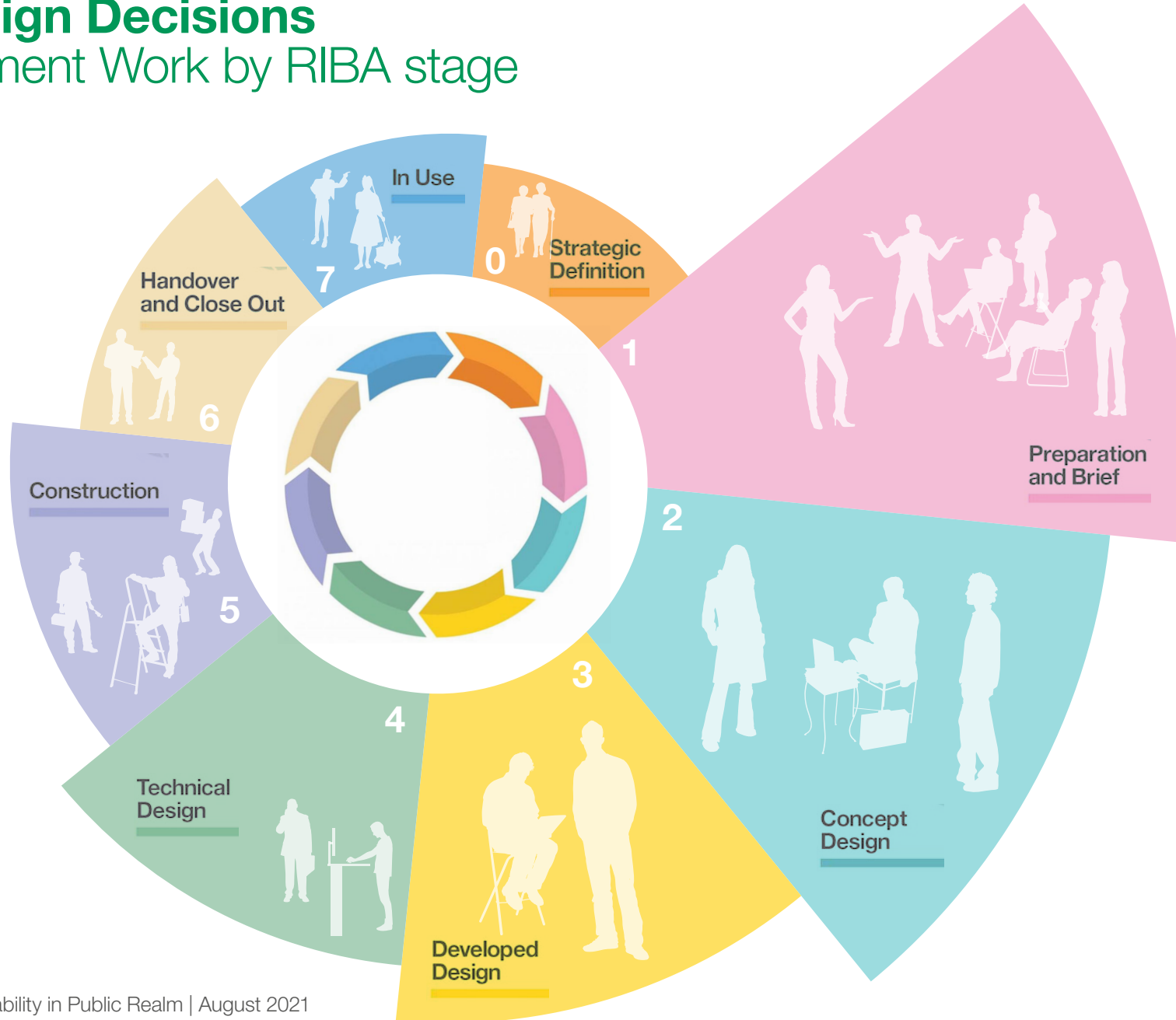
# Methodology

Big wins are in the early design stages



# Impacting Design Decisions

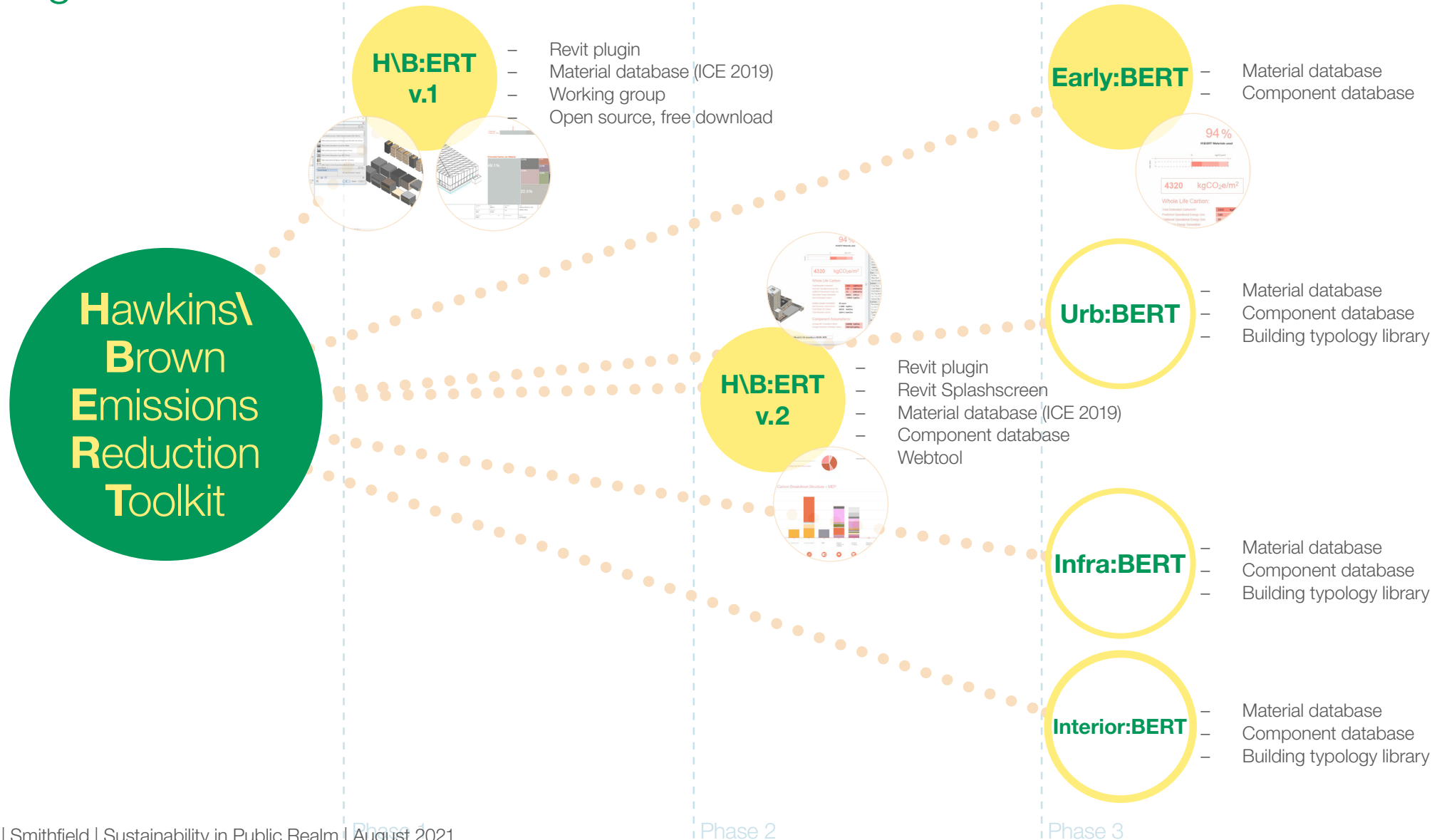
## Carbon Assessment Work by RIBA stage



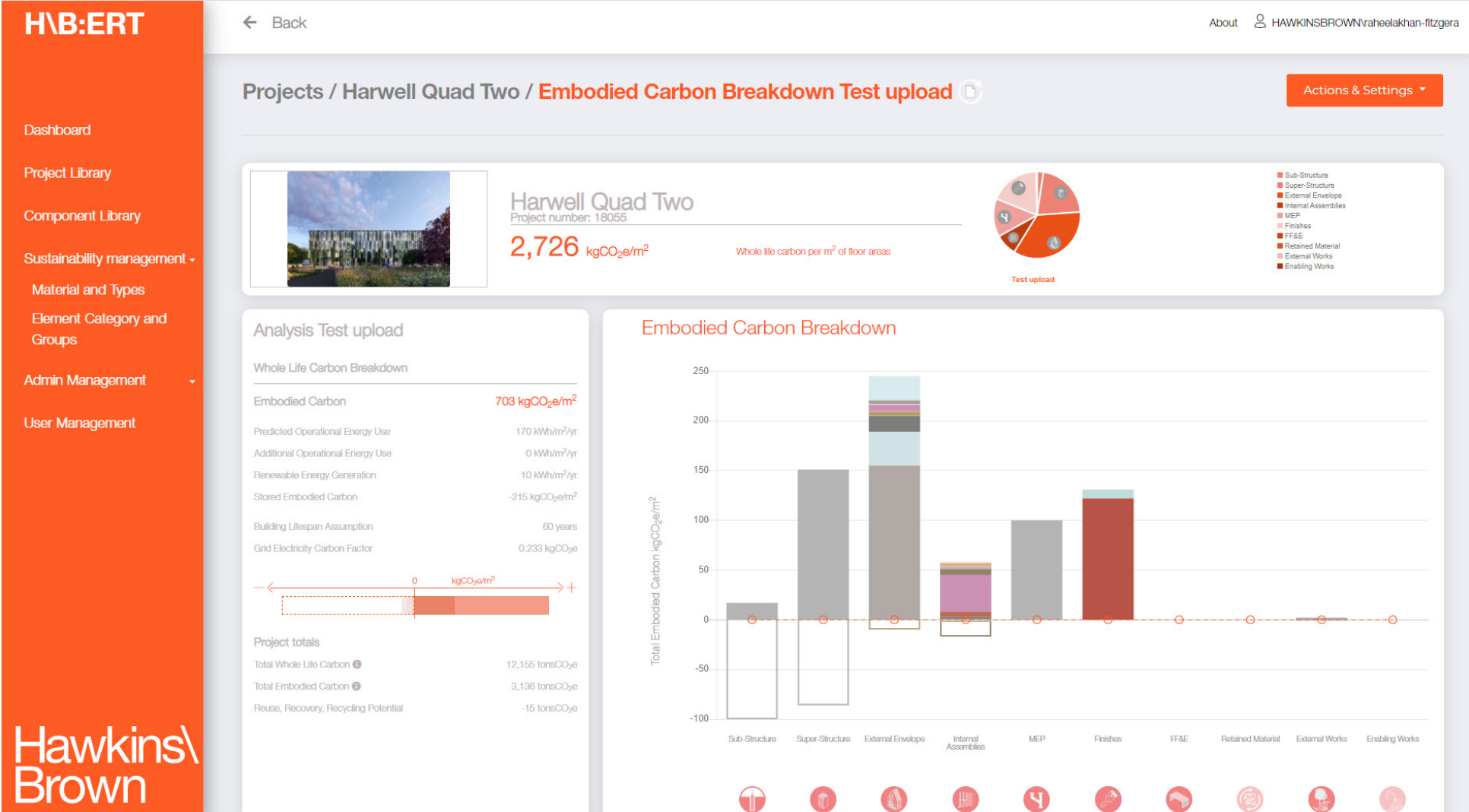


# H\B:ERT - Designing with Carbon

## Developing a Whole Life Carbon Toolkit



# H\B:ERT - Designing with Carbon Emissions Reduction Toolkit V2.0





# Smithfield Public Realm

# Smithfield Public Realm

## Baseline Condition

- Central London location
- Dominated by traffic & service vehicles
- Busy network for pedestrians & cyclists
- Space to pass through rather than a destination
- Limited amenity to support dwelling
- Nightly programme of service vehicles, meat traders, night-life revellers and late-night workers
- Area undergoing transformation





# Smithfield Public Realm

## Vision Statement



**Create** a unified field where Smithfield's **multiple histories** and contemporary **cultures** intermingle.

Smithfield will be a place for all Londoners.

**Create** // A new chapter in Smithfield's continuing legacy through careful excavation, repair and design

**Unified field** // A federated, but not homogenised, field of distinct and complementary characters and functions

**Multiple histories** // A demonstration of Smithfield's sometimes conflicting, brutal and intangible narratives in the public realm

**Contemporary cultures** // A platform for new and progressive mediums of formal and informal culture, built on the agency of local communities



# Smithfield Public Realm

## Vision — Key Views





# Smithfield Public Realm

## Vision — Key Views





# Smithfield Public Realm Sustainable Approach

## City of London - Project Outcomes

9. Applying **circular economy principles** and **minimising whole life environmental impacts**, the public realm is sustainable and integrated seamlessly with the local buildings
10. The public realm incorporates **integrated water management** and **urban greening is maximised**
11. The public realm, including hard and soft landscaping, is **climate resilient**



## Public realm design - climate resilience strategy

### Reducing CO<sub>2</sub> emissions and improving air quality

- Reduced motor vehicular traffic
- Improved pedestrian and cycle infrastructure
- Permeable hard surfaces

### Managing heat risk

- Increased green areas
- Light colour surface material with high albedo
- Increased tree canopy

### Enhancing biodiversity

- New habitats and multi-layered planting

### Reducing flood risk

- SuDs

# Smithfield Public Realm

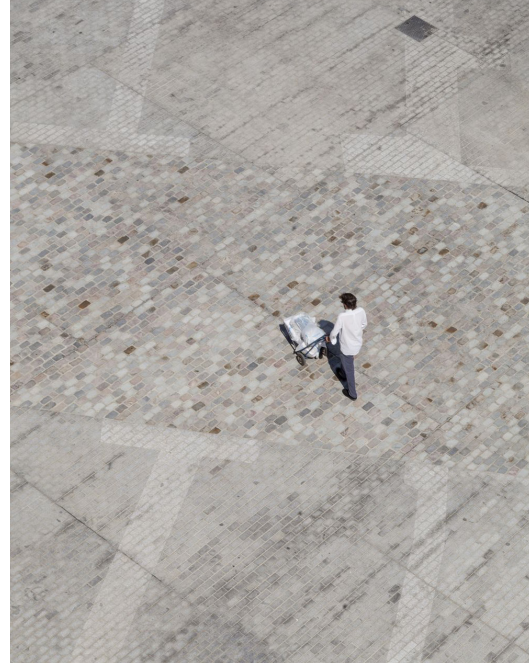
## Materials — Circular Economy approach



### York stone flags

Footways / pedestrian only spaces

- Retained (from works in Smithfield)
- Reclaimed (from external suppliers)
- New material (from CoL supplier)



### Granite setts / cobbles

Footways / carriageway along the Stave

- Retained (from works in Smithfield) with new finish (for accessibility / contrast)
- Reclaimed (from external suppliers)
- New material (from CoL supplier)



### Granite kerbs

- Retained (from works in Smithfield)
- New material (from CoL supplier)



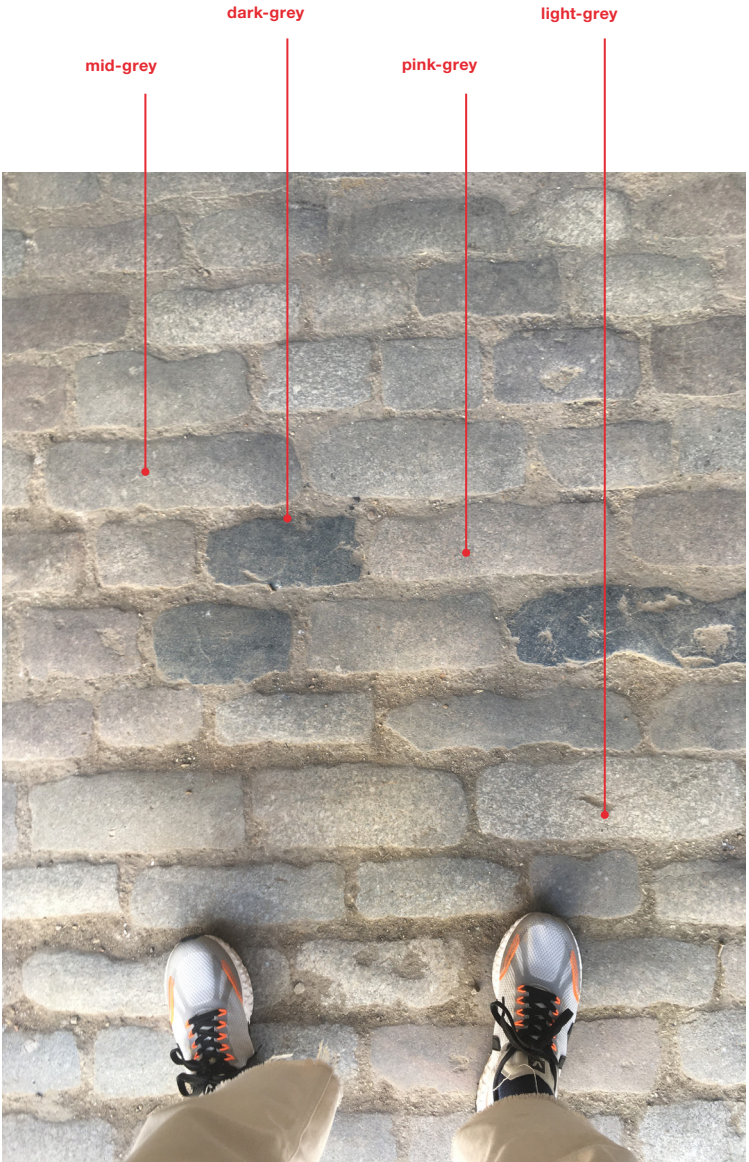
### Granite cobble kerbs

- Retained (from works in Smithfield)
- New material (from CoL supplier)



# Smithfield Public Realm

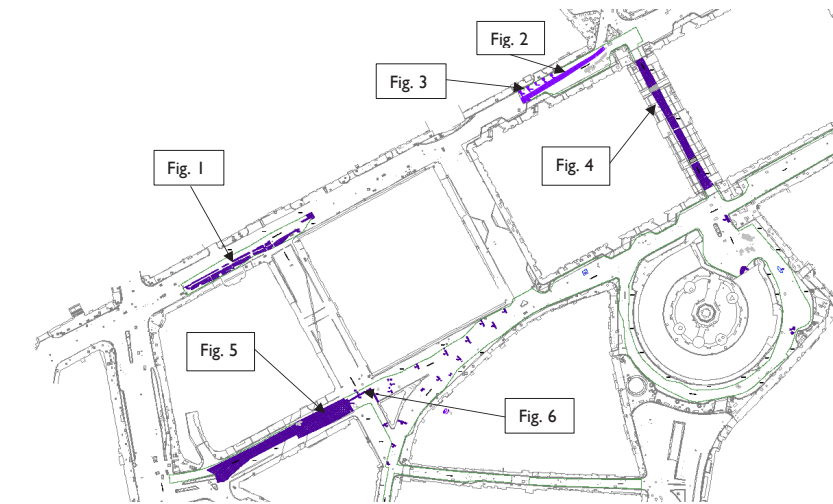
Identifying what is already there



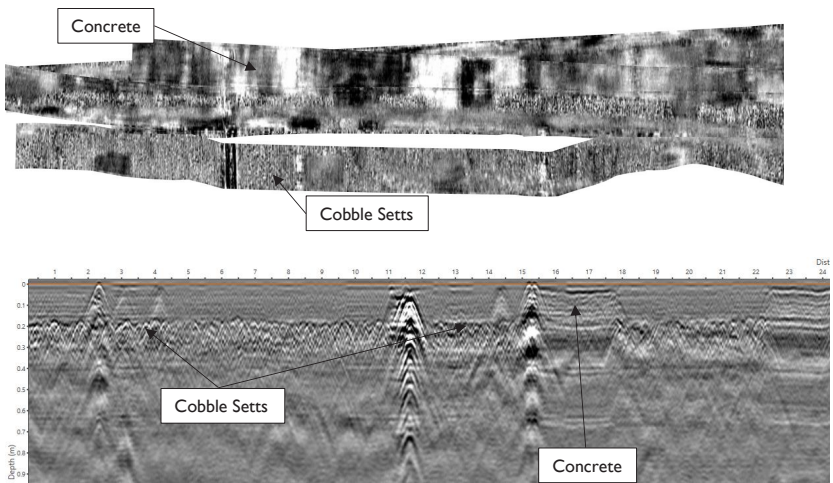


# Smithfield Public Realm

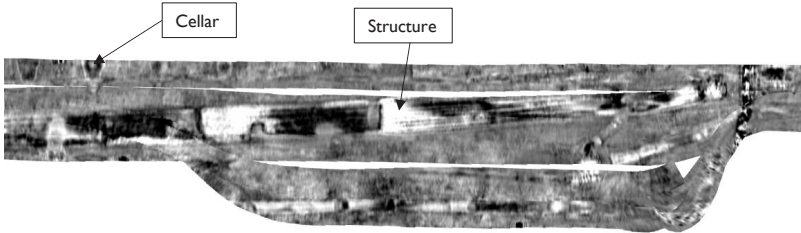
## Identifying what is already there



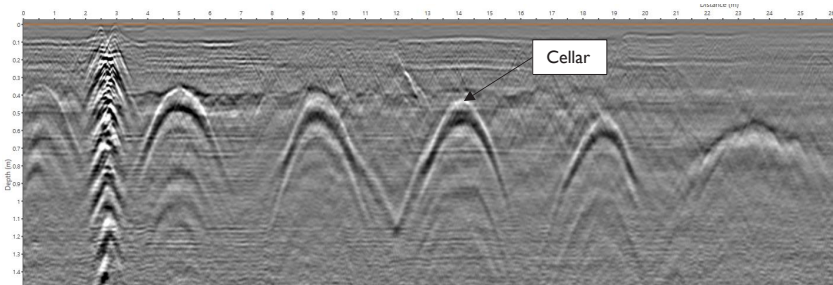
**Figure 1:**  
Possible cobble sett layer detected between 0.07-0.14m deep.



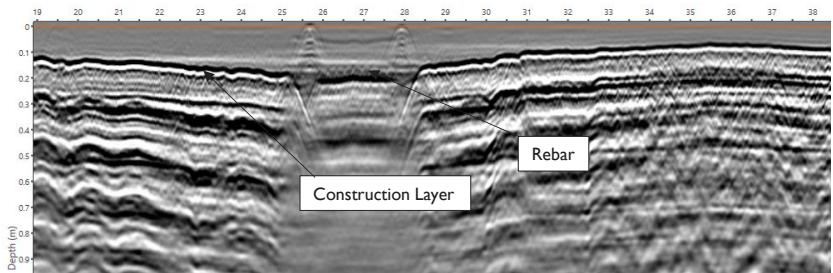
**Figure 2:**  
Structure detected at 0.35m deep.



**Figure 3:**  
Possible Cellars.



**Figure 4:**  
Construction layer at 0.20m deep.

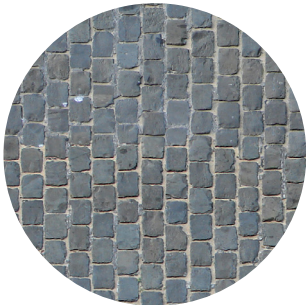
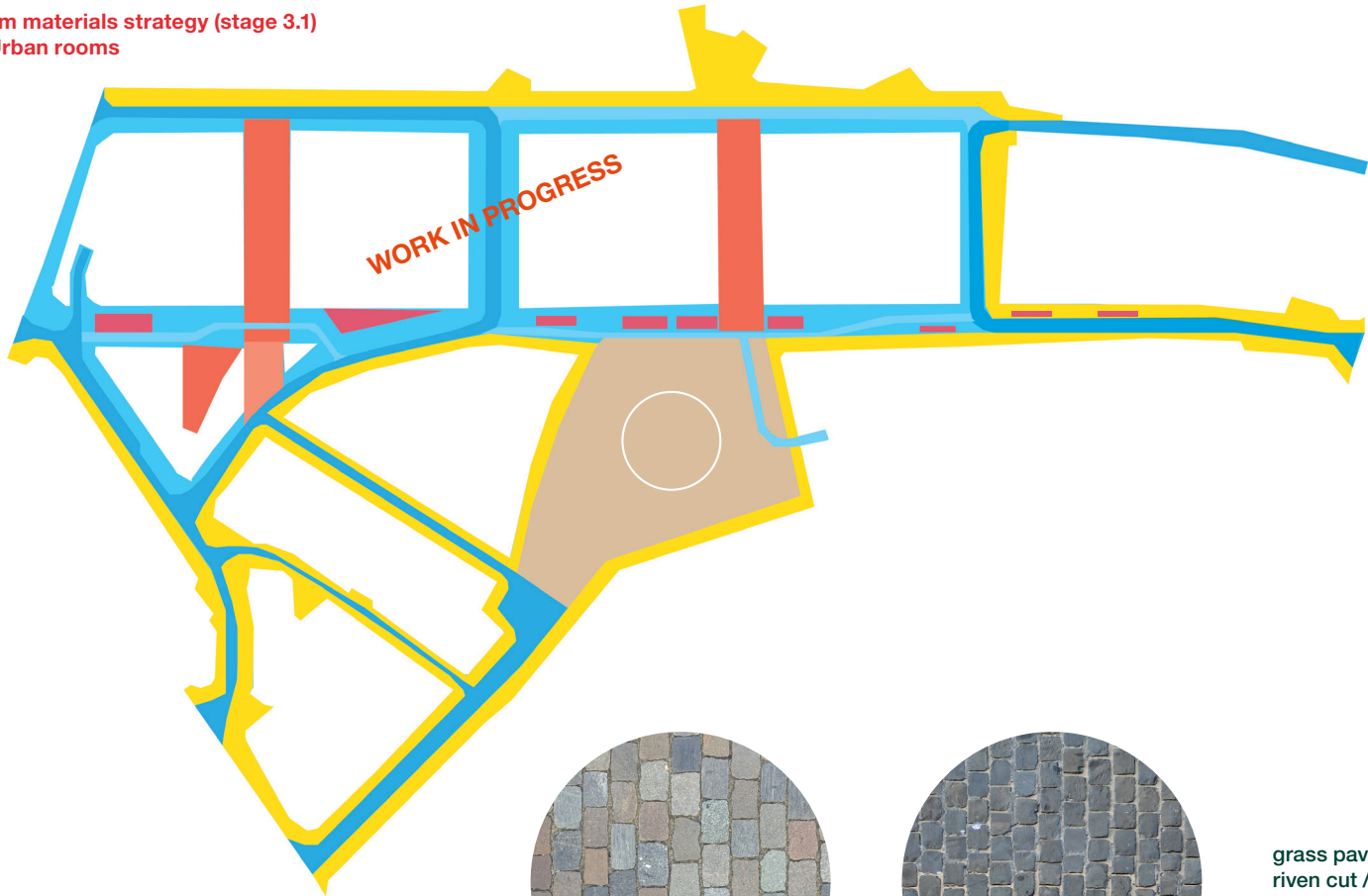




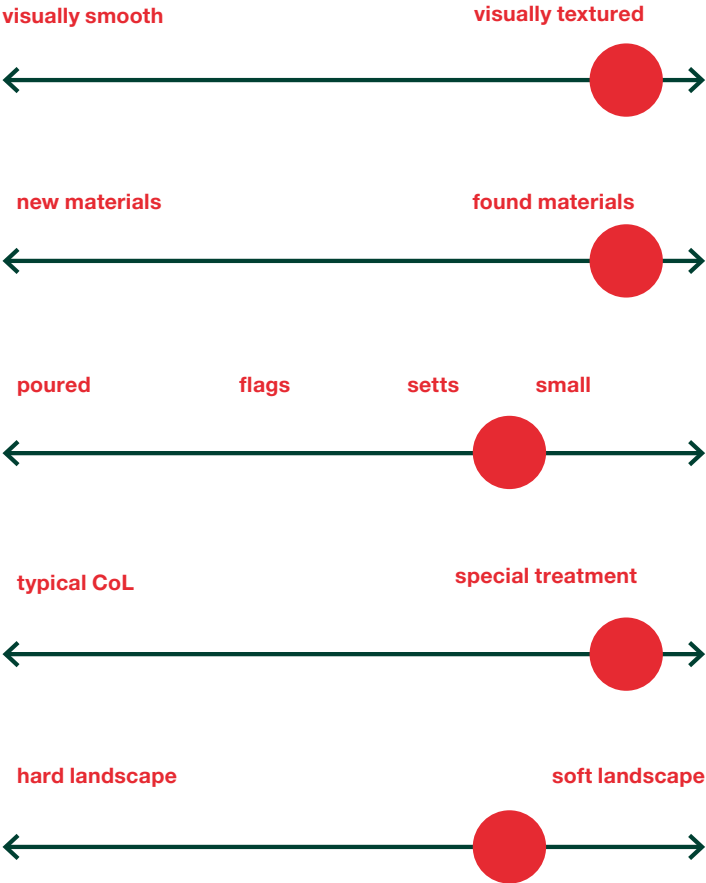
# Smithfield Public Realm

## Materials - Circular Economy approach

Extract from materials strategy (stage 3.1)  
Layer 05\_Urban rooms



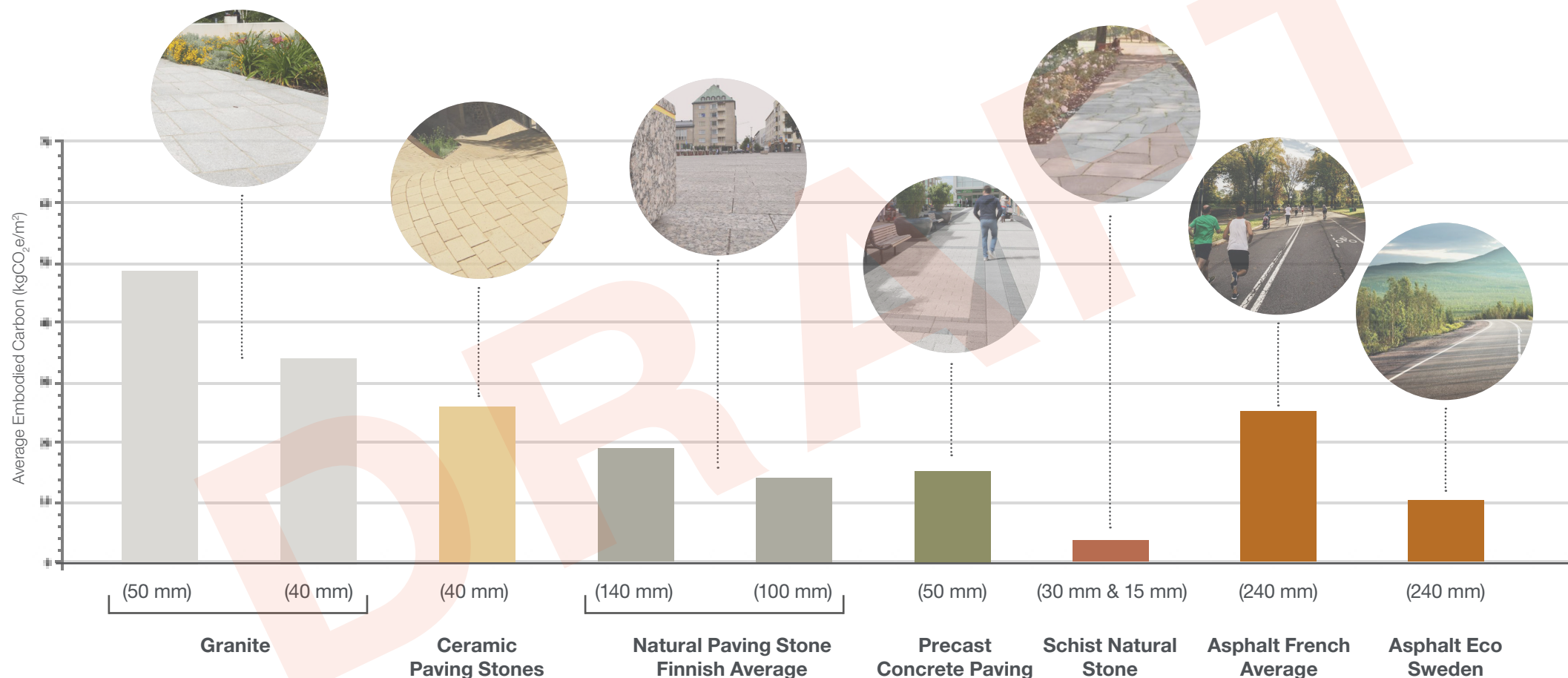
grass pavers?  
riven cut /  
tumbled?



# Carbon Impact

# Carbon Comparison

## New Materials per m<sup>2</sup> of Surface



**Note: Manufacturing and extractions processes vary across countries, e.g. Asphalt production is more reliant on nuclear power in France, i.e. with a lower level of embodied carbon that UK manufactured Asphalt might demonstrate**

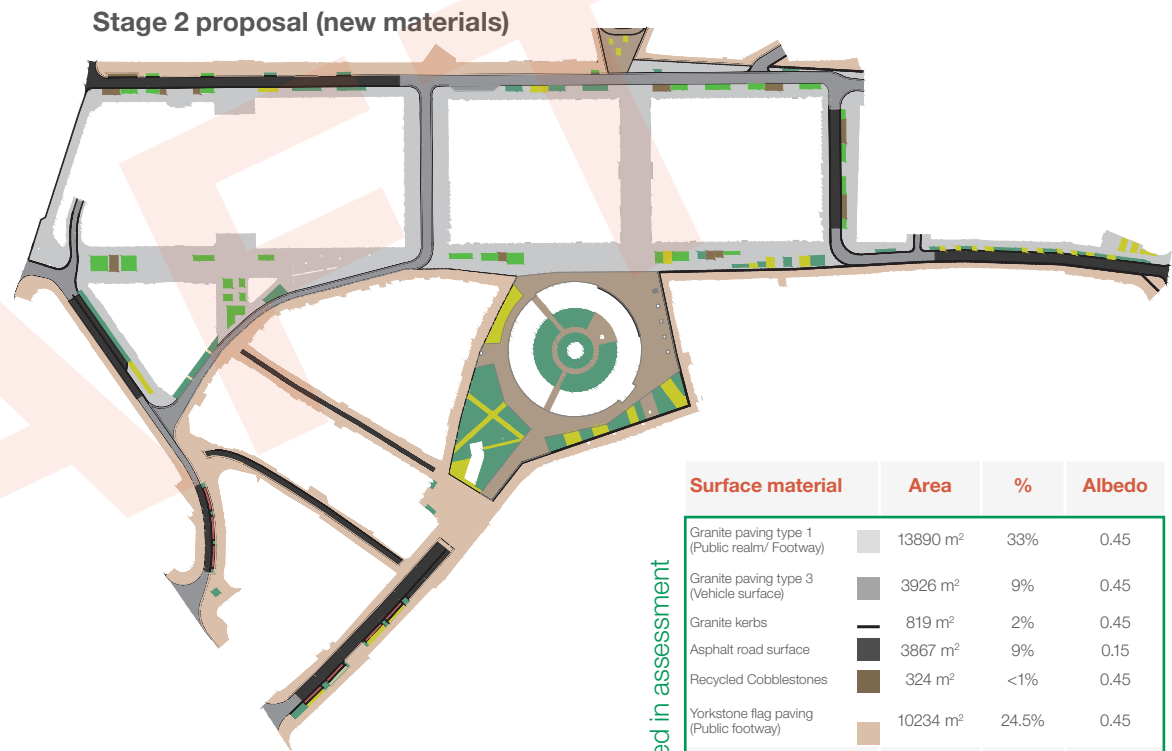
# Smithfield Public Realm

## Surface Materials Baseline vs. Proposed 1



included in assessment

Surface material	Area	%	Albedo
York stone	9 065 s <sup>qm</sup>	22%	0.45
Granite setts	695 s <sup>qm</sup>	2%	0.45
Asphalt (pavement)	6 040 s <sup>qm</sup>	15%	0.05
Asphalt (highways)	23 725 s <sup>qm</sup>	58%	0.15
Gravel	150 s <sup>qm</sup>	<1%	0.45
<b>Total impermeable</b>	<b>39 675 s<sup>qm</sup></b>	<b>98%</b>	
Planting/green	920 s <sup>qm</sup>	2%	0.3
<b>Total permeable</b>	<b>920 s<sup>qm</sup></b>	<b>2%</b>	
<b>Total</b>	<b>40 595 s<sup>qm</sup></b>	<b>100%</b>	



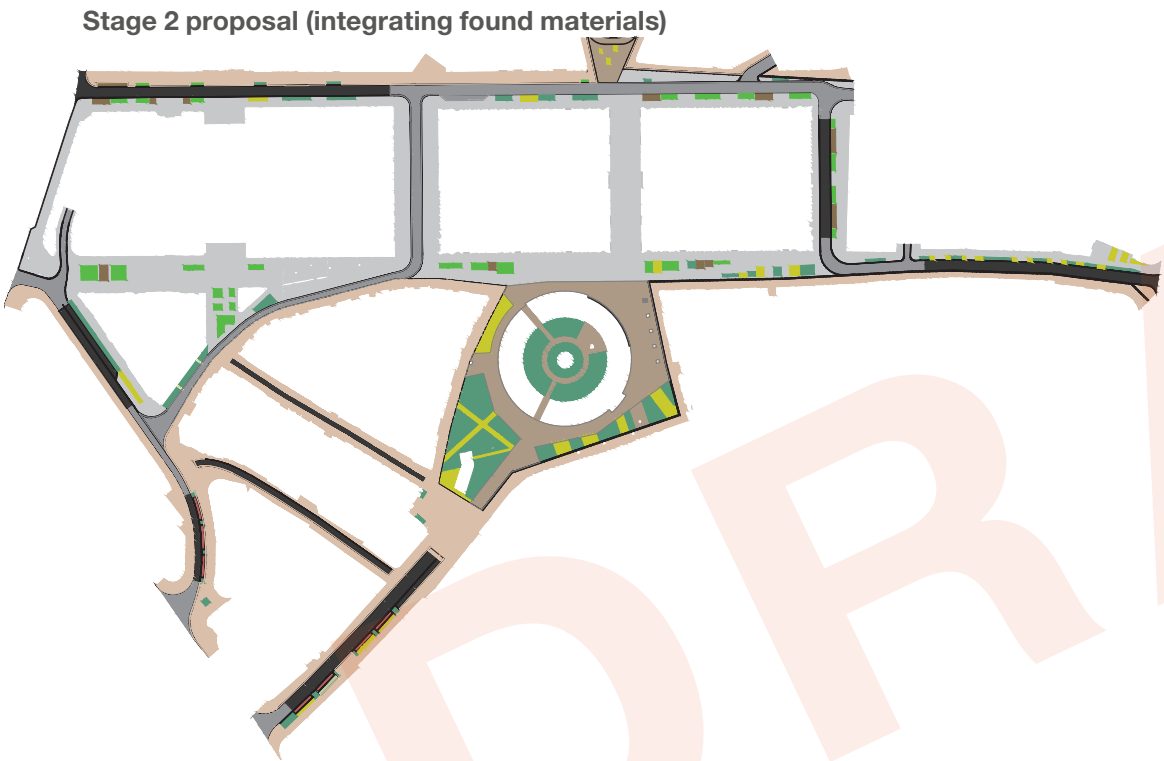
included in assessment

Surface material	Area	%	Albedo
Granite paving type 1 (Public realm/ Footway)	13890 m <sup>2</sup>	33%	0.45
Granite paving type 3 (Vehicle surface)	3926 m <sup>2</sup>	9%	0.45
Granite kerbs	819 m <sup>2</sup>	2%	0.45
Asphalt road surface	3867 m <sup>2</sup>	9%	0.15
Recycled Cobblestones	324 m <sup>2</sup>	<1%	0.45
Yorkstone flag paving (Public footway)	10234 m <sup>2</sup>	24.5%	0.45
<b>Total impermeable</b>	<b>33 060 m<sup>2</sup></b>	<b>78.5%</b>	
Grit-jointed pavers	142 m <sup>2</sup>	<1%	0.45
Grass pavers	1020 m <sup>2</sup>	2.5%	0.40
Breedon gravel	4038 m <sup>2</sup>	9.5%	0.45
Green (planters) Gravel	630 m <sup>2</sup>	1.5%	0.3
<b>Total semi-permeable</b>	<b>5 830 m<sup>2</sup></b>	<b>14%</b>	
Green (full ground)	3195 m <sup>2</sup>	7.5%	0.3
<b>Total permeable</b>	<b>3195 m<sup>2</sup></b>	<b>7.5%</b>	
<b>Total</b>	<b>42 085 m<sup>2</sup></b>	<b>100%</b>	



# Smithfield Public Realm

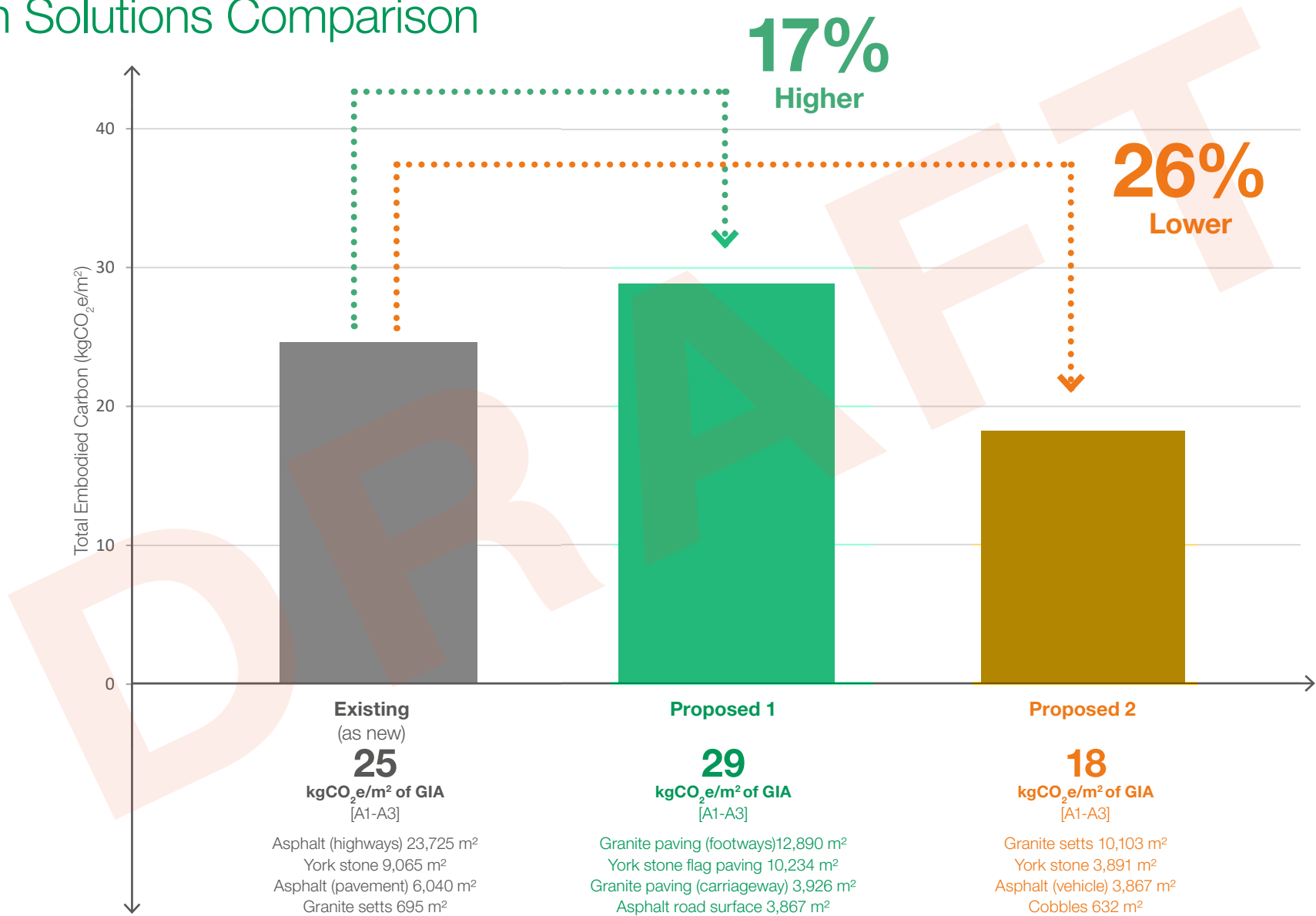
## Surface Materials Baseline vs. Proposed 2



included in assessment	Total surface area	40935 m <sup>2</sup>	
	Paving that will require vehicle loading (asphalt)	25748 m <sup>2</sup>	
	Planting in the ground	2826 m <sup>2</sup>	
	Planting in planters	847 m <sup>2</sup>	
	Granite setts (existing surface material)	2,787m <sup>2</sup>	70% reused + additional salvaged granite from nearby projects
	York stone slabs/pavers (existing surface material)	6,343 m <sup>2</sup>	70% reused
	Existing granite kerbs (not included)	1119 m	80% reused
	Length of kerbs for existing condition (not included)	4663 m	

# Embodied Carbon Breakdown

## Initial Design Solutions Comparison

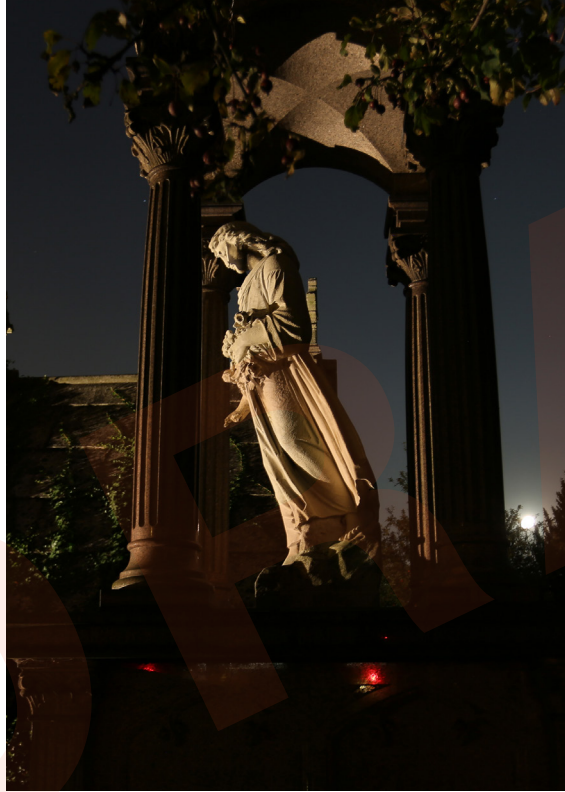


# Smithfield Public Realm

## Other items for further research



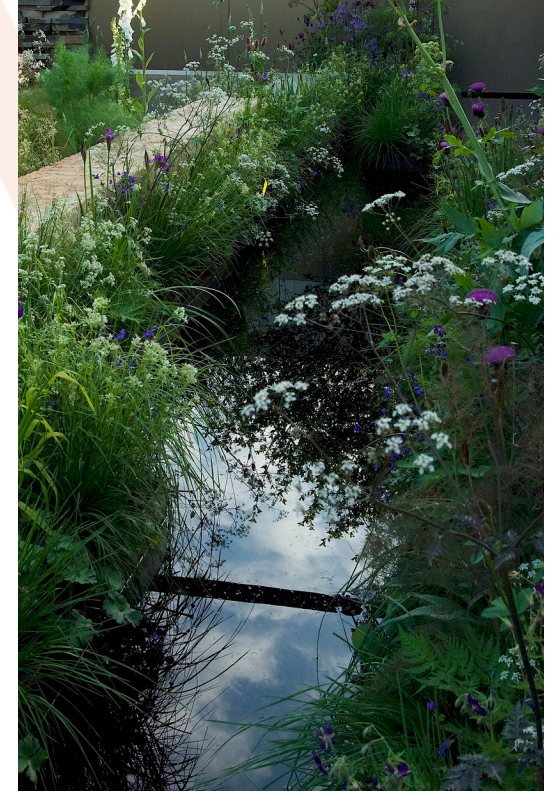
Street furniture



Light fittings and energy use



Planting and tree pits



Water Management and Drainage



# Smithfield Public Realm

## Street Furniture & Outdoor Seating



Concrete Bench



Concrete with Timber Slats



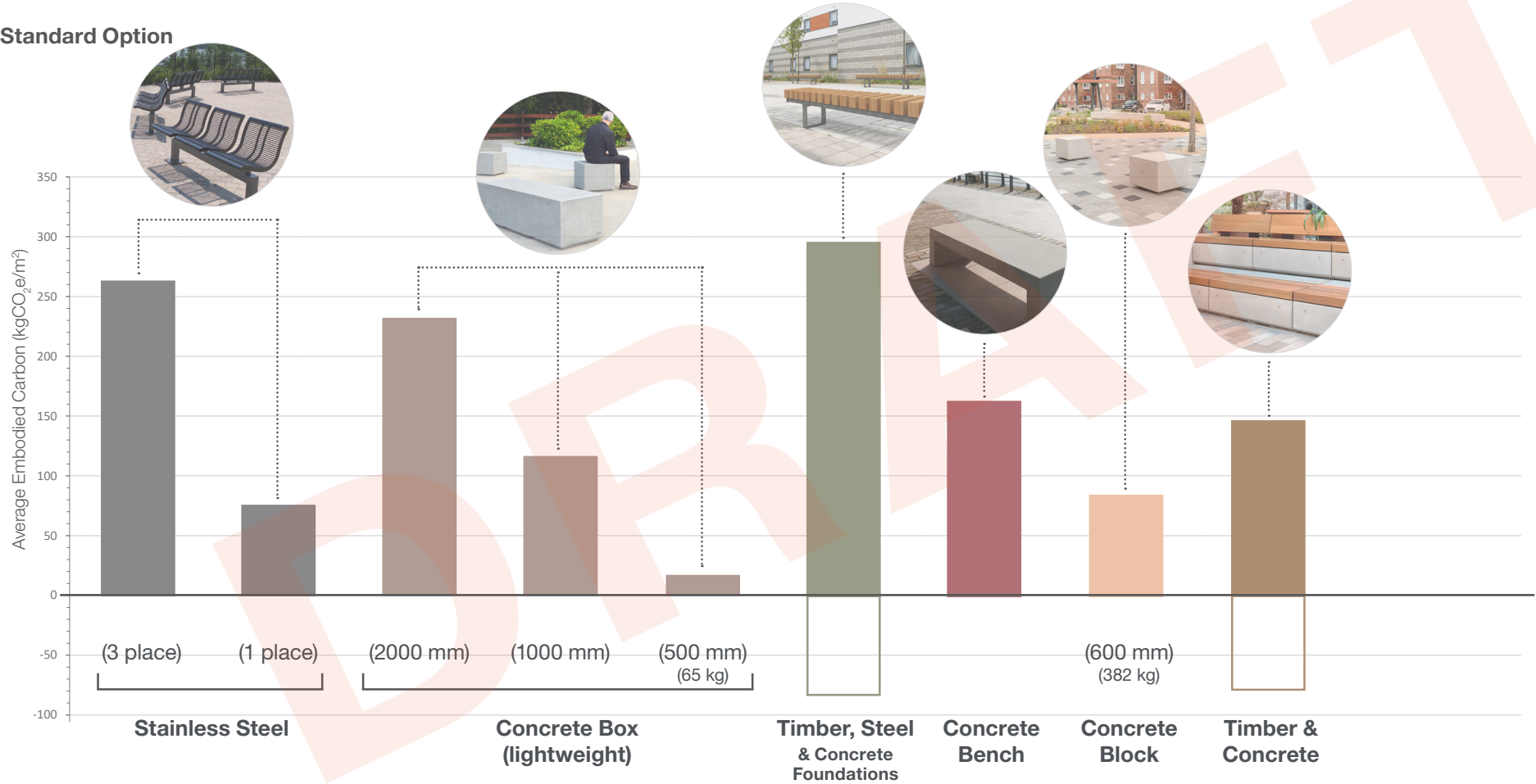
Reinforced Cast Stone



Steel Structure & Timber Slats

# Carbon Comparison

## Street Furniture & Outdoor Seating products



# Public Realm Embodied Carbon

## Balancing priorities

- **Embodied Carbon**
- **Design Life**
- **Robustness/Re-usability**
- **Albedo**
- **Local sourcing / transport**
- **Heritage / sensitivity**
- **Flexibility (use and finish)**
- **CoL palette compliance**
- **Cost**

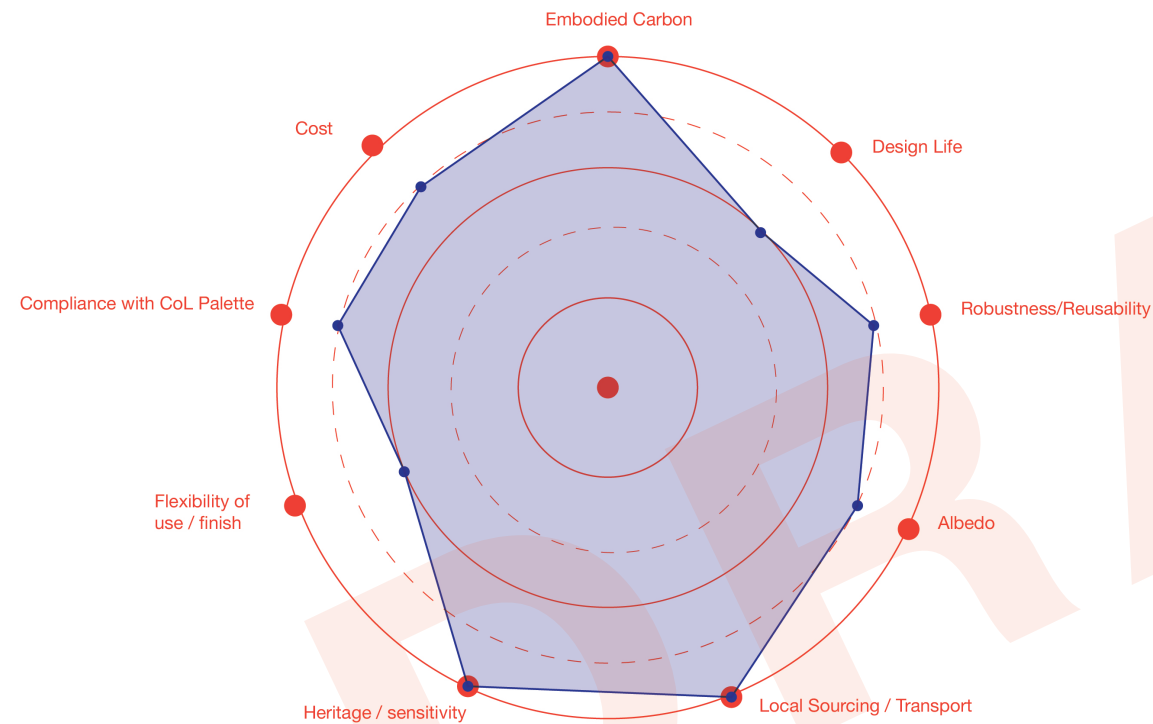
DRAFT



# Public Realm Embodied Carbon

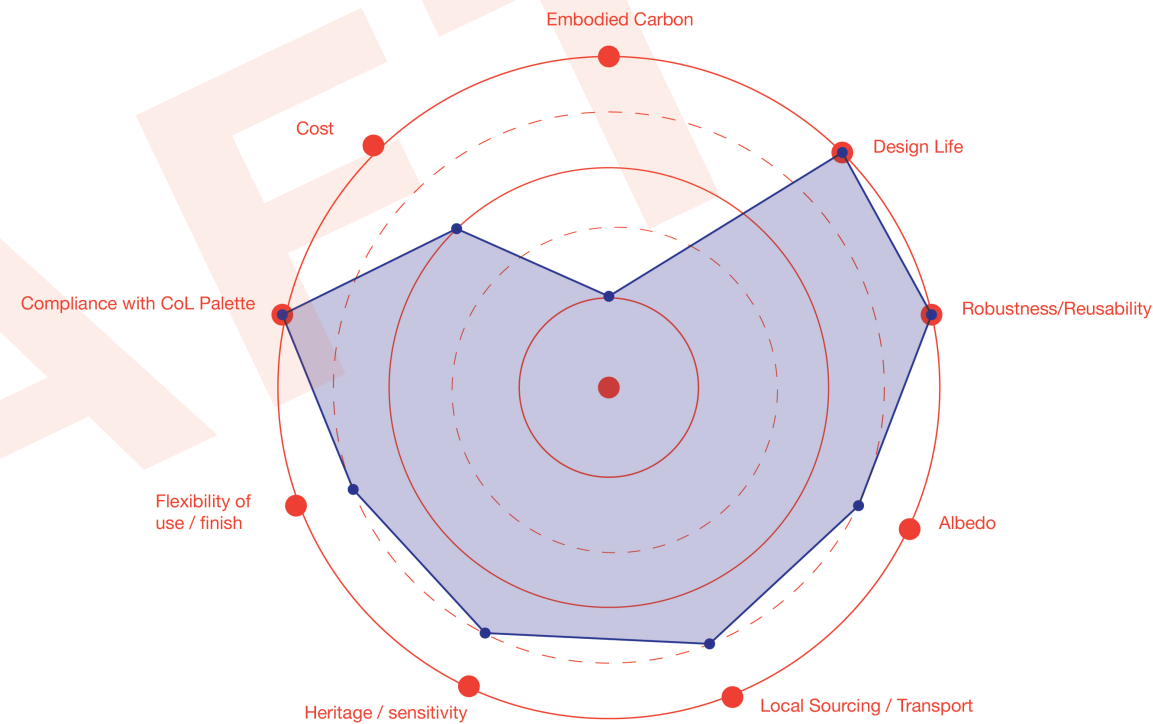
## Balancing priorities

Granite setts (re-used)



**Embodied carbon:** tbc  
**Design Life:** 80+ years (reduced from second use?)  
**Albedo:** (for grey/pink/dark grey sett mix): tbc  
**Local sourcing:** On-site storage leading up to works needs to be considered  
**Heritage sensitivity:** Pink + greyscale of found materials  
**Flexibility of use / finish:** n/a  
**CoL Palette:** n/a  
**Cost:** Storage and treatments costs only

Granite setts (UK/EU Sourced)

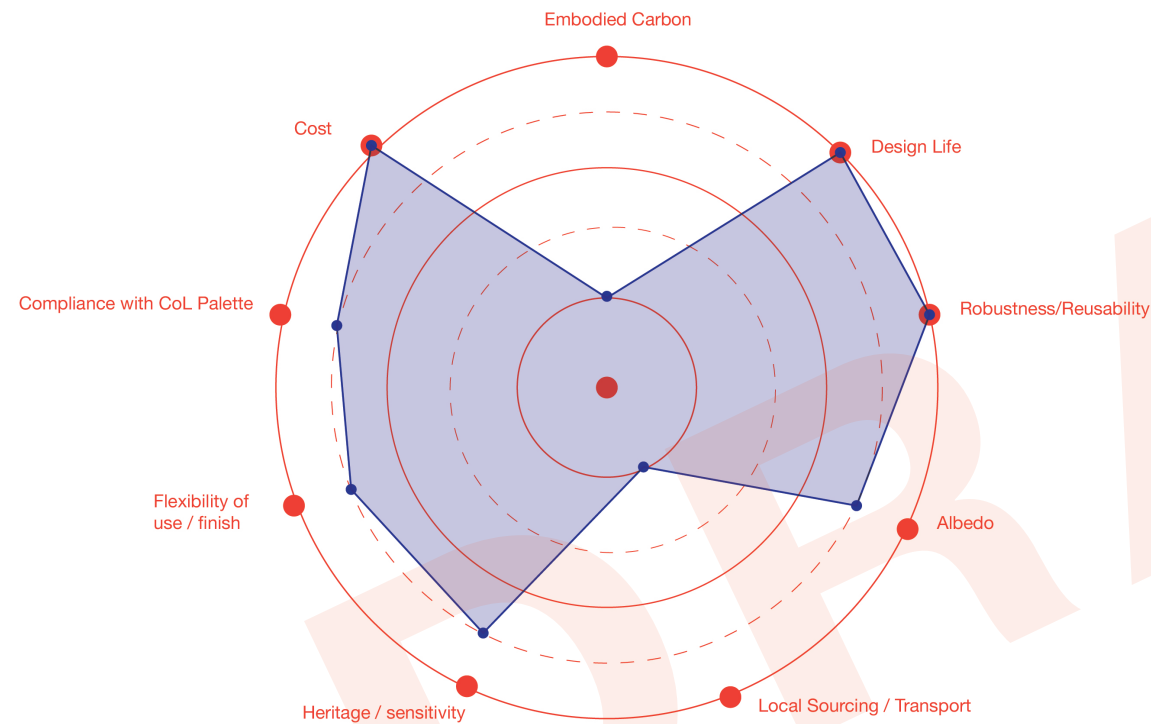


**Embodied carbon:** 49 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C]  
**Design Life:** 80+ years  
**Albedo:** (for grey/pink/dark grey sett mix): tbc  
**Local sourcing:** Potential for Cornish / Scottish sourcing  
**Heritage sensitivity:** Pink + greyscale aligned with found materials  
**Flexibility of use / finish:** Variety of finishes and layouts possible  
**CoL Palette:** Potential to align with CoL palette and guidance  
**Cost:** High capital costs (ethical + local)

# Public Realm Embodied Carbon

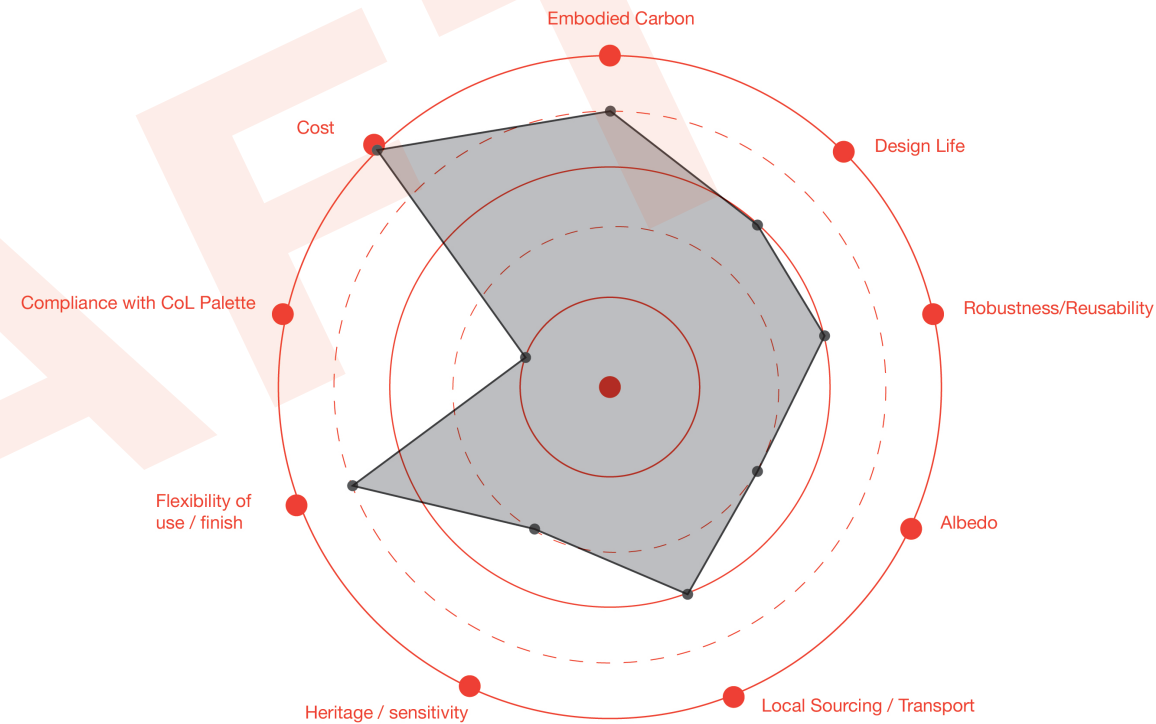
## Balancing priorities

### Granite setts (Asia sourced)



**Embodied carbon:** 49 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C]  
**Design Life:** 80+ years  
**Albedo** (for grey/pink/dark grey sett mix): tbc  
**Local sourcing:** Potential for Cornish / Scottish sourcing  
**Heritage sensitivity:** Pink + greyscale aligned with found materials  
**Flexibility of use / finish:** Variety of finishes and layouts possible  
**CoL Palette:** Potential to align with CoL palette and guidance  
**Cost:** Cheaper than EU/UK sourced, but difficulty monitoring ethics and fair practices

### Pre-cast concrete



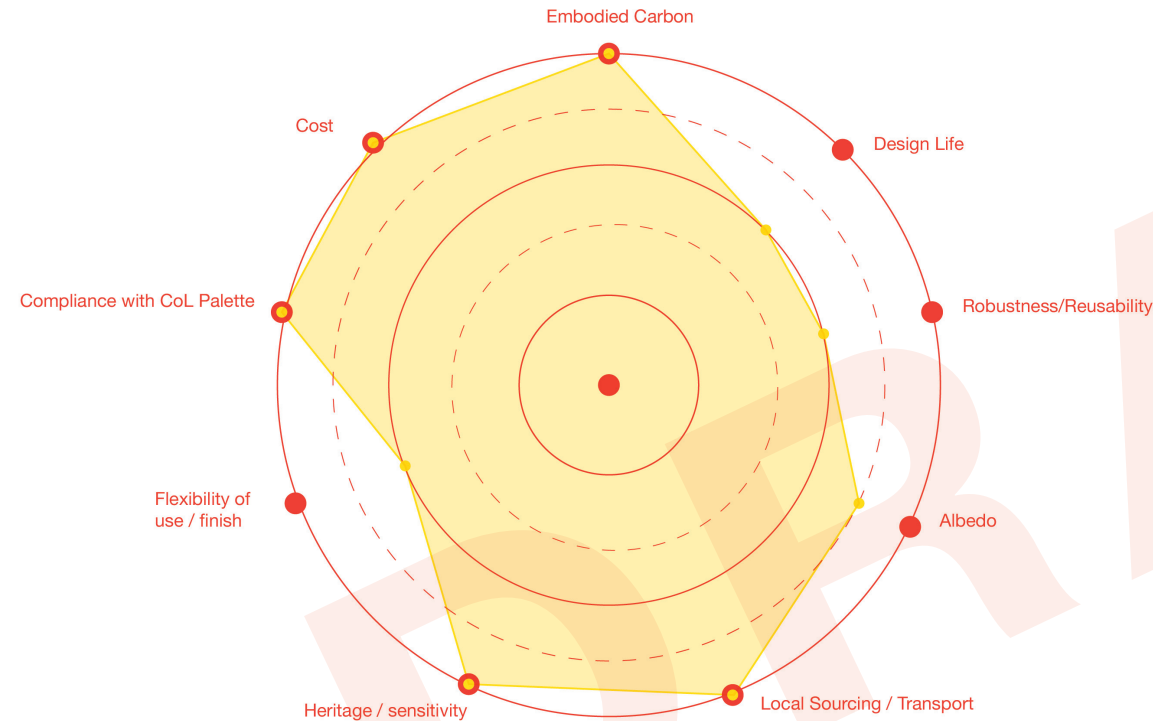
**Embodied carbon:** 15 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C]  
**Design Life:** 25+ years  
**Albedo** (mid-grey): tbc  
**Local sourcing:** Potential for local sourcing and use of found material as aggregate  
**Heritage sensitivity:** Not aligned  
**Flexibility of use / finish:** Variety of finishes and layouts possible  
**CoL Palette:** Not aligned with palette  
**Cost:** Relatively cheap



# Public Realm Embodied Carbon

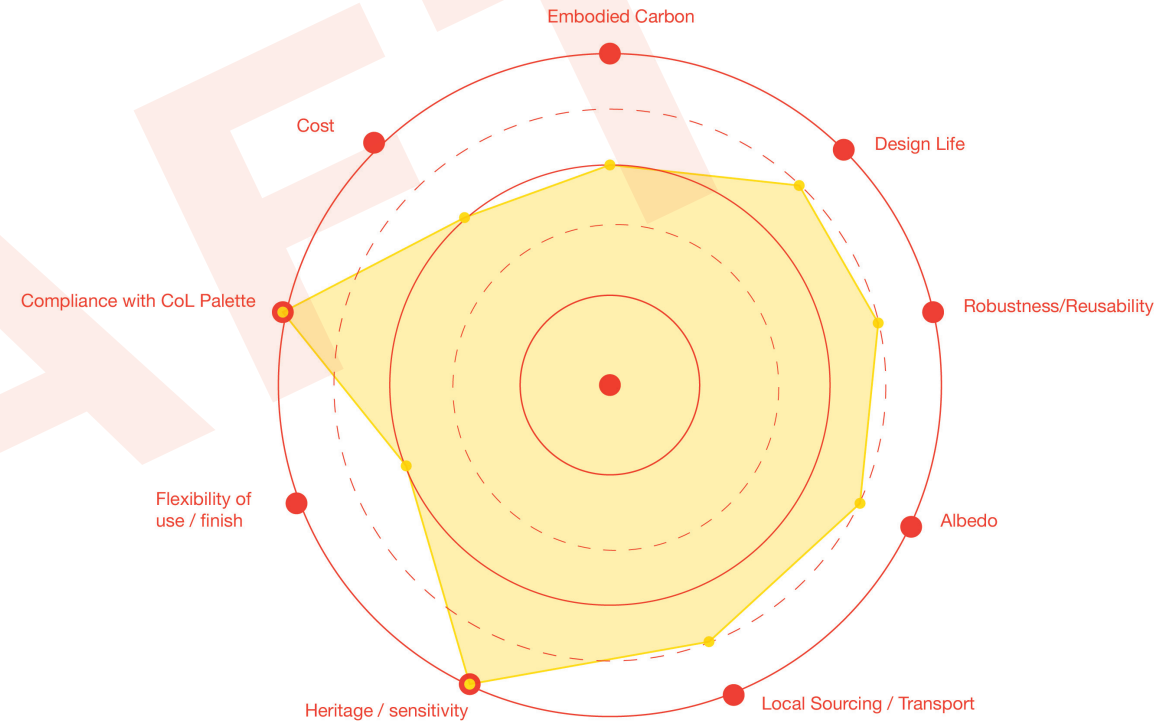
## Balancing priorities

York stone flags (re-used)



**Embodied carbon:** 4 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C] (tbc -taken from Schist)  
**Design Life:** 80+ years (reduced from second use?)  
**Albedo:** tbc  
**Local sourcing:** On-site storage leading up to works needs to be considered  
**Heritage sensitivity:** Fully aligned  
**Flexibility of use / finish:** Limited finished but flexible layout  
**CoL Palette:** Fully aligned  
**Cost:** tbc

York stone flags (UK Sourced)

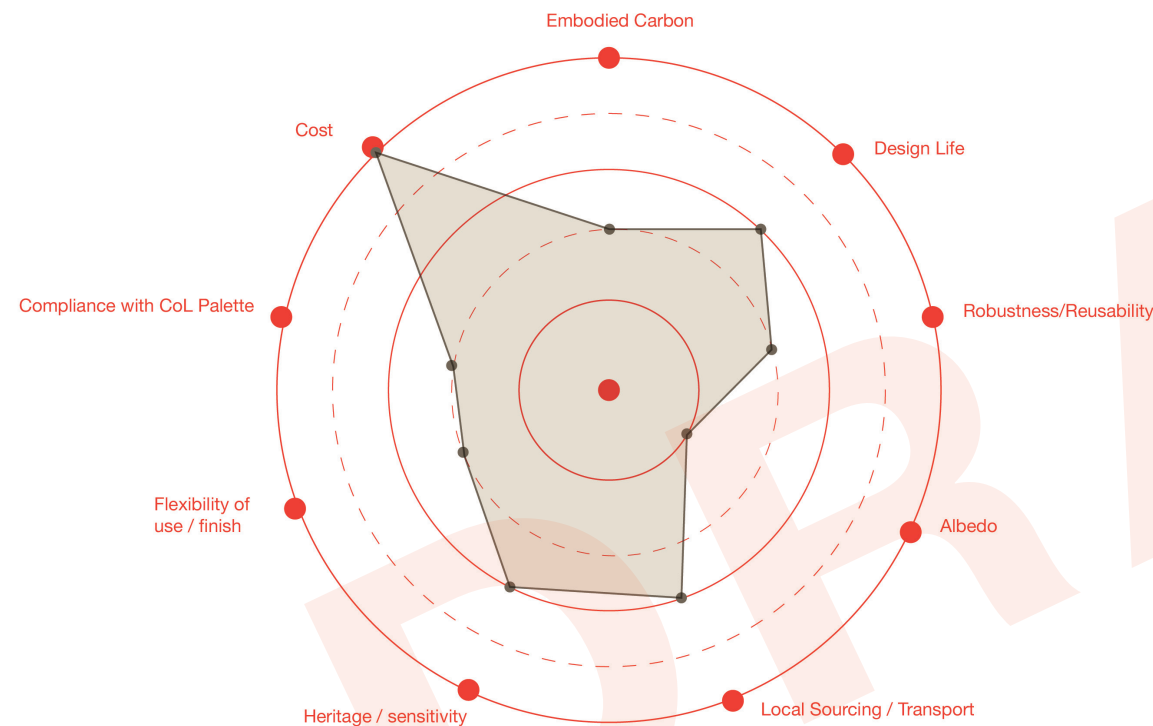


**Embodied carbon:** 4 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C] (tbc -taken from Schist)  
**Design Life:** 80+ years  
**Albedo:** tbc  
**Local sourcing:** Potential for Cornish / Scottish sourcing  
**Heritage sensitivity:** Fully aligned  
**Flexibility of use / finish:** Limited finished but flexible layout  
**CoL Palette:** Fully aligned  
**Cost:** tbc

# Public Realm Embodied Carbon

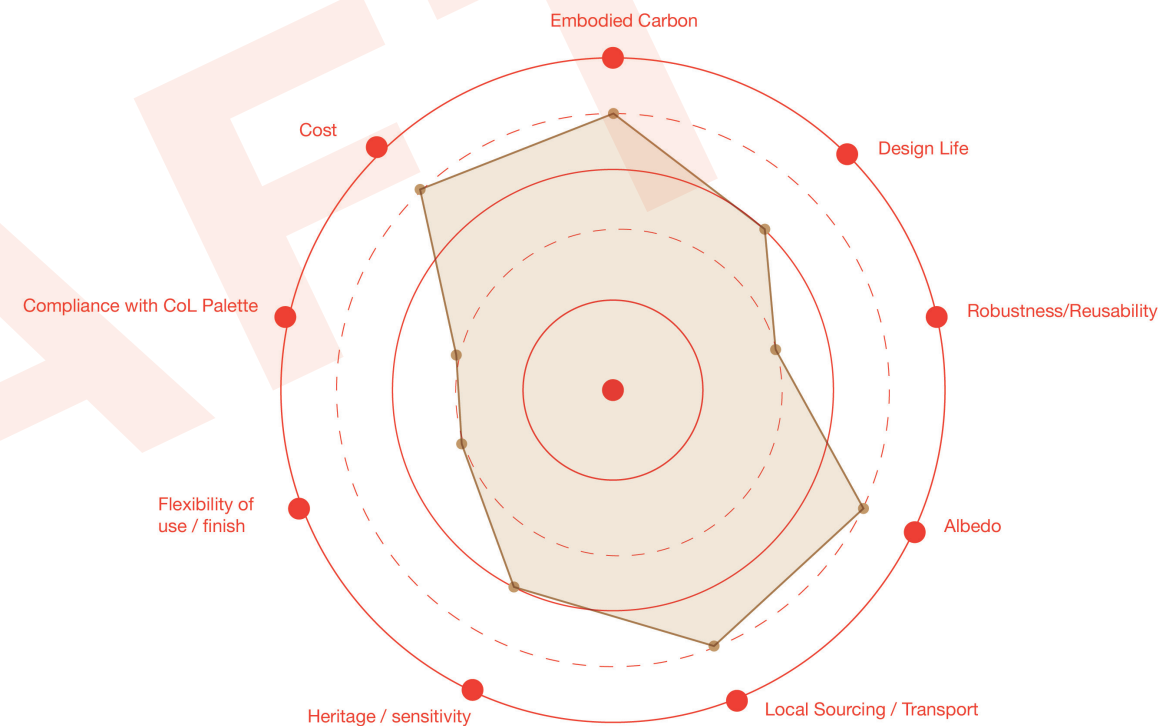
## Balancing priorities

### Asphalt



**Embodied carbon:** 25 kgCO<sub>2</sub>e/m<sup>2</sup> [A-C]  
**Design Life:** 25 years  
**Albedo:** tbc  
**Local sourcing:** n/a  
**Heritage sensitivity:** Not aligned  
**Flexibility of use / finish:** Some variety through use of chips/aggregate  
**CoL Palette:** Not aligned  
**Cost:** Relatively cheap

### Hoggin / Gravel



**Embodied carbon:** tbc  
**Design Life:** 10+ years  
**Albedo:** tbc  
**Local sourcing:** Potential for local sourcing and reuse of aggregate  
**Heritage sensitivity:** n/a  
**Flexibility of use / finish:** n/a  
**CoL Palette:** n/a  
**Cost:** Relatively cheap



# Public Realm Embodied and Whole Life Carbon

## Potential joint research

There is minimal design guidance on the carbon emissions of public realm projects. The GLA has no benchmarking data. We would like to propose a joint research project to develop design and analysis guidance that can feed into a wider City of London approach to holistic low carbon public realm. Such investment could contribute to a more evidence-based design approach including:

- Public realm carbon emission benchmarking
- Greater awareness of upfront carbon and design life / replacement cycles
- An understanding of typical carbon emissions related to the processing of re-used surface finishes
- Live testing on site of more sustainable materials
- Making the case for better UK EPD and product data
- Impact of street furniture including benches, planters, lighting, water features, drainage infrastructure, waste systems
- Quantifying the impact of typical vehicle routes versus pedestrian only
- Gathering more data on the carbon emissions related to various types of soft landscaping including comparing species types, tree pits, planters, irrigation systems and maintenance regimes



# Thank you

# Any questions?

# Contact

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