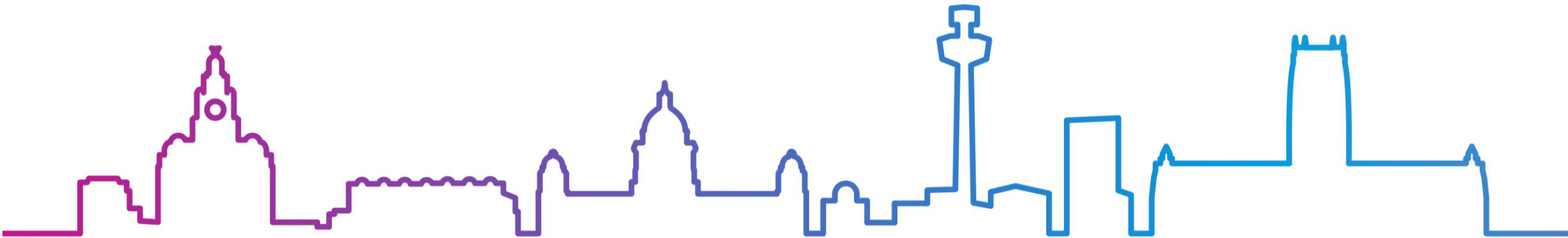




# Live Labs II – Liverpool

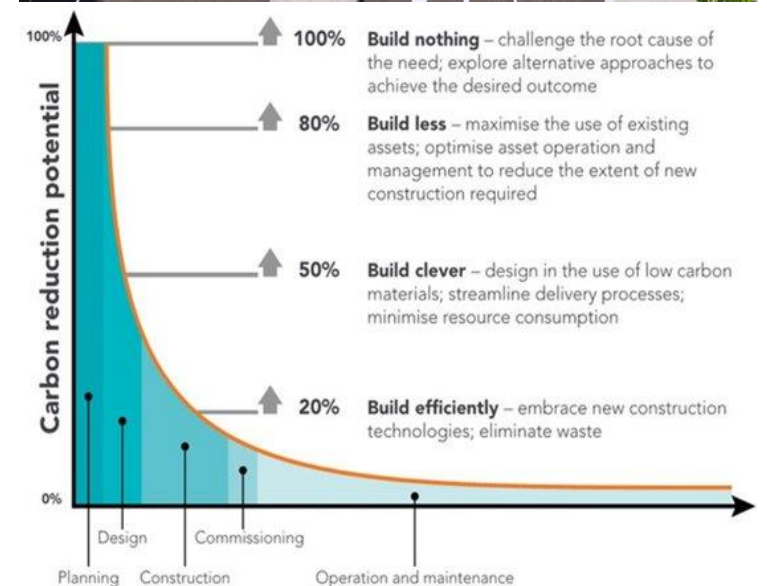
## Carbon Plenary

12<sup>th</sup> March 2024

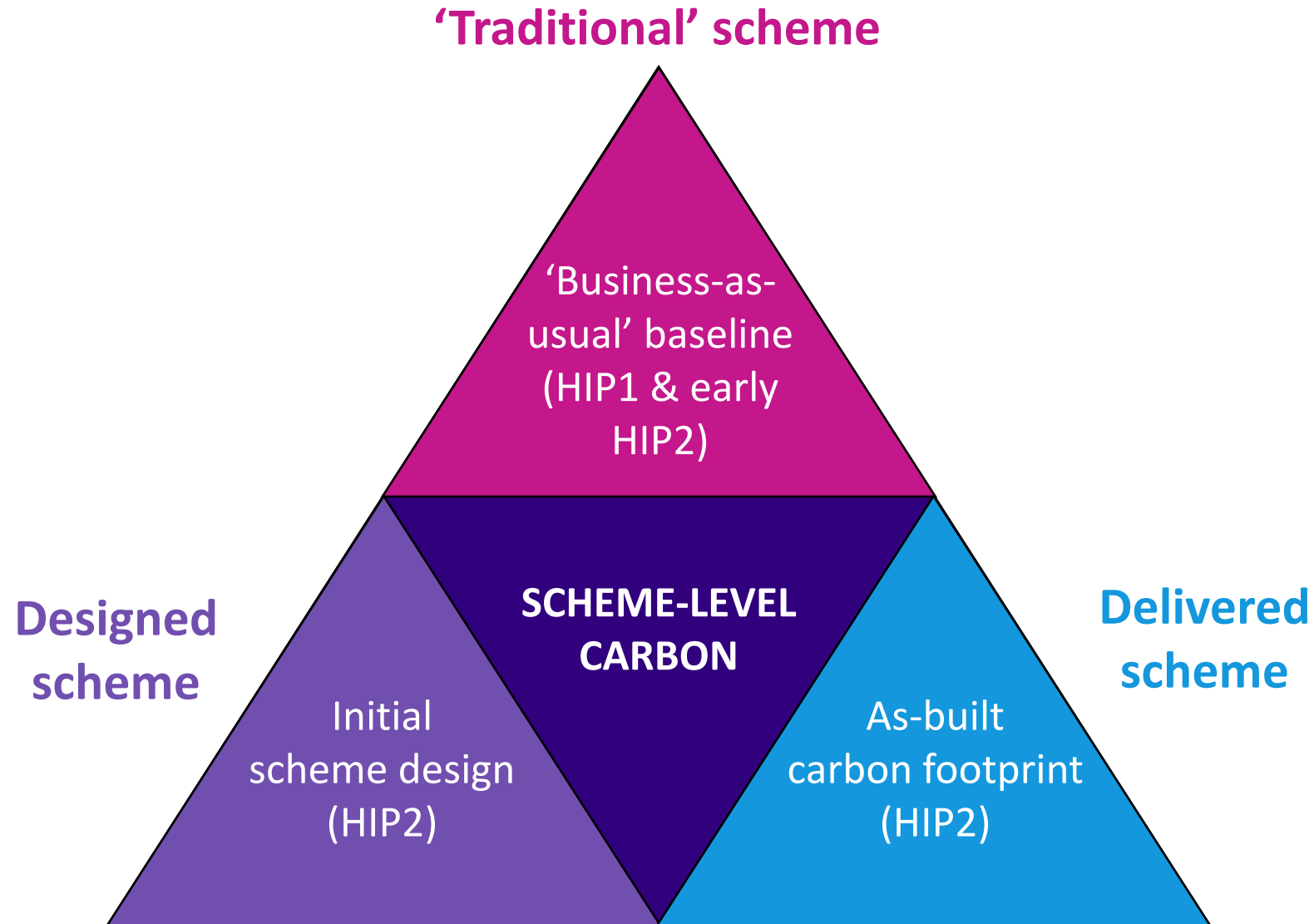


# LIVERPOOL LIVE LAB – PROJECT CONTEXT

- **Theme: Corridor & Place-Based Decarbonisation**
- **Scheme-level focus** centred around LCC’s Highways Improvement Programme (HIP).
- **Carbon hierarchy lens** – minimising carbon at the earliest opportunity.
- **Circular economy** – circular supply chain & recycling facilities.
- **Sustainable roads** for people, place, and planet.



# DELTA OF SCHEME-LEVEL CARBON



# BASELINE HIP SCHEMES



**Scarisbrick Crescent**



- Carriageway & footway resurfacing; upgraded kerbs, tactiles, road markings, & drainage
- 11,000m<sup>2</sup> area
- 100mm depth (+ extra in certain areas)

**Chatterton Road**



- Carriageway resurfacing
- 87m<sup>2</sup> area
- 100mm depth

**East Mains**



- Carriageway resurfacing; renewal of footways, kerbing, drainage, & road markings
- Approx. 2,000m<sup>2</sup> (TBC)
- 90mm depth, plus speed cushions



# CARBON BASELINING METHODOLOGY

Workshop held with contractors to establish baseline methodology

Data collection template sent to & completed by each contractor

## Scheme details



- Location
- Activity type
- Asset type
- Area/ volume

## Premises & Sites



- On-site fuel & electricity consumption

## Staff & Contractors



- Commuting days
- Home working days
- Commuting mode
- Vehicle fuel & size
- Daily commuting miles
- Business miles

## Vehicles & Plant



- Vehicle / plant type
- Fuel type
- Function
- Miles travelled OR litres of fuel consumed
- Weight / Engine size

## Products & Services



- Materials
- Transport as a service
- Waste management
- Other purchased services

Carbon factors obtained for new materials



CO<sub>2</sub>e emissions calculated for each scheme









Emissions normalised to scale of scheme



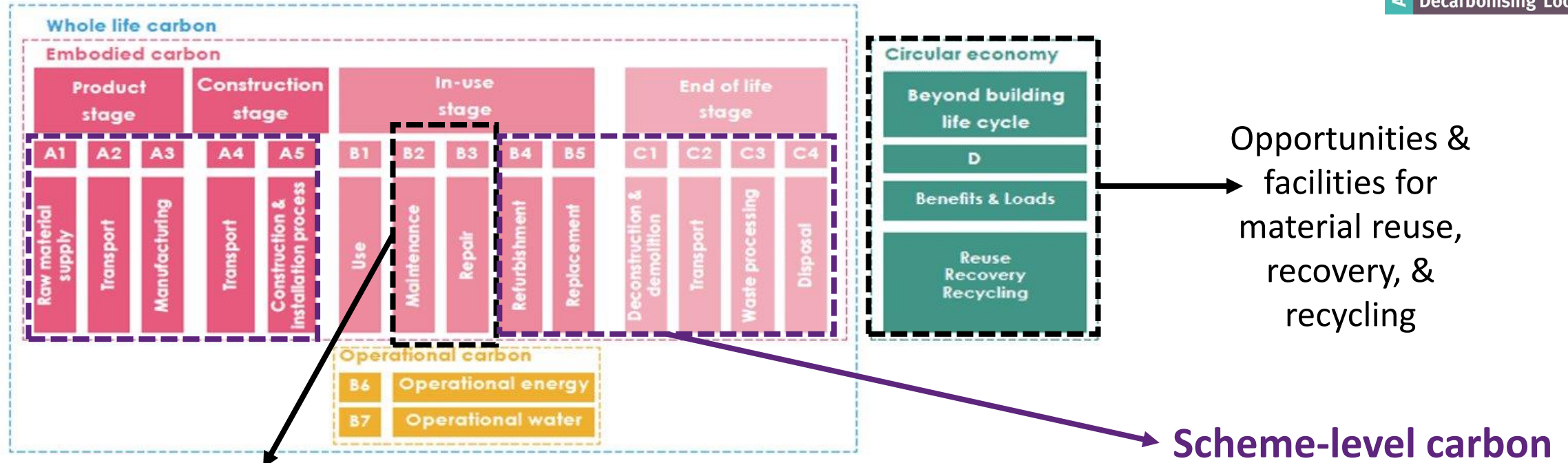
Baseline verification & carbon hotspot identification



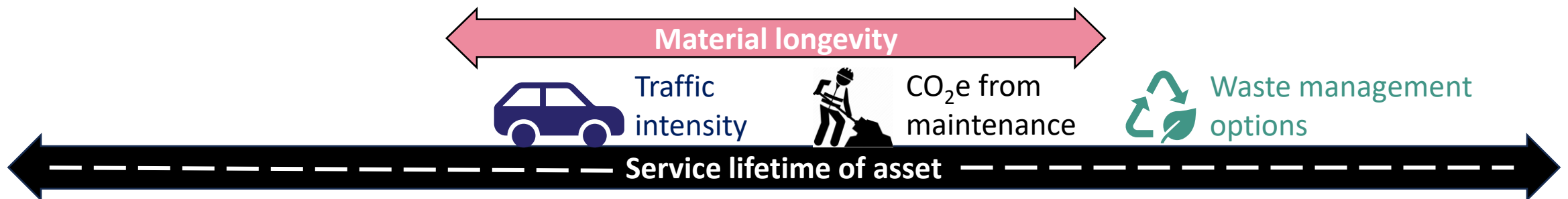
# PROGRESS SO FAR...

	Premises & Sites 	Staff & Contractors 	Vehicles & Plant 	Products & Services 
<b>Dowhigh</b>	TBD	TBD	CO <sub>2</sub> e data provided for excavation & foundation completion	CO <sub>2</sub> e data provided for materials & waste
	Complete	Complete	Vehicles complete; plant to be verified	Materials complete; services to be verified.
	Awaiting scheme completion	Awaiting scheme completion	Awaiting scheme completion	Awaiting scheme completion

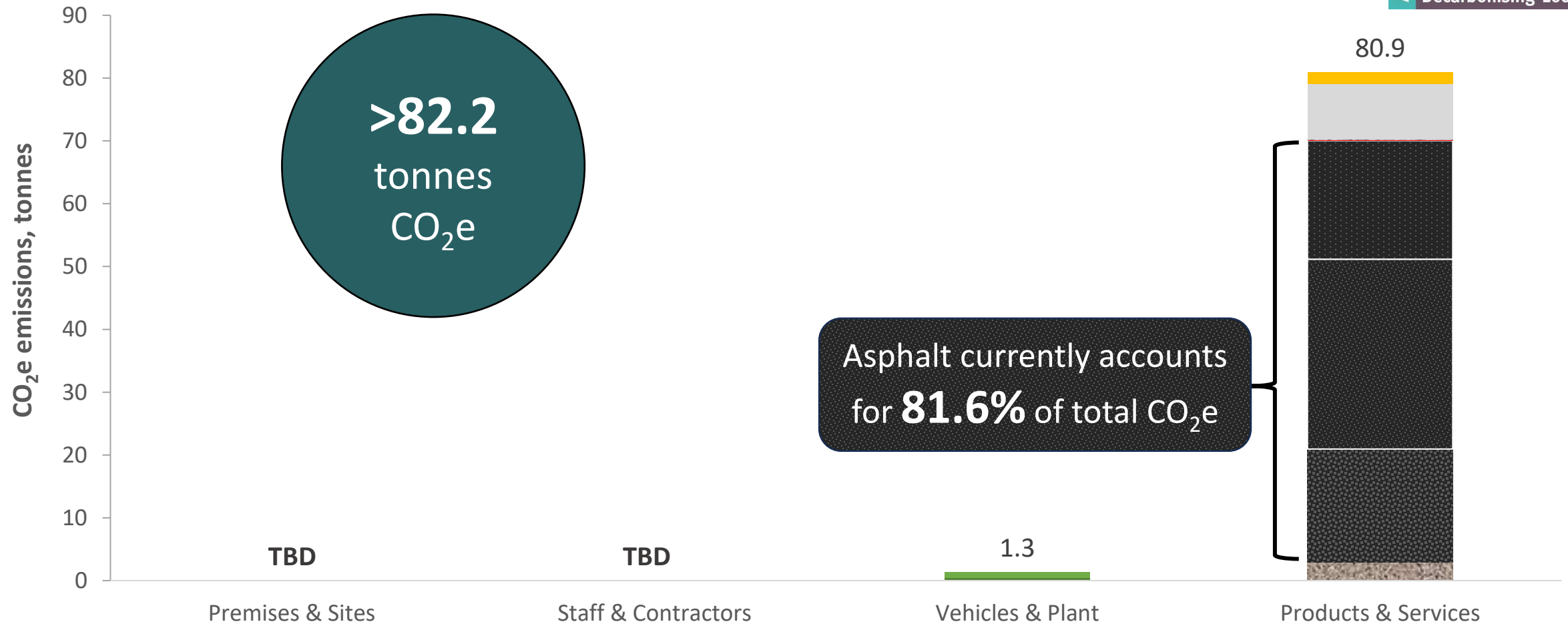
# FULL LIFE-CYCLE CARBON ANALYSIS



How do material choice & scheme design influence carbon emissions from future maintenance & repair?



# HEADLINE DATA – SCARISBRICK CRESCENT

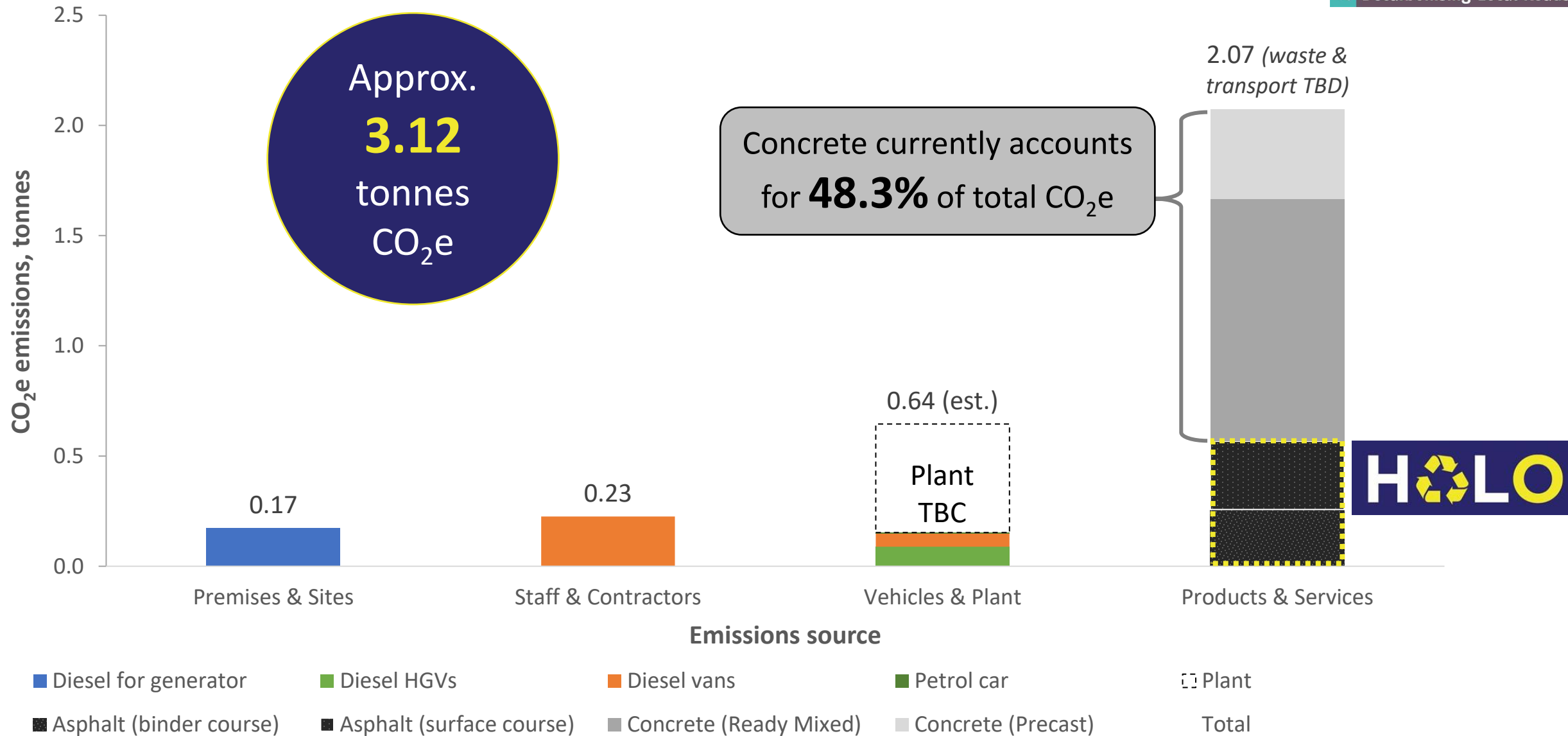


## Emissions Source

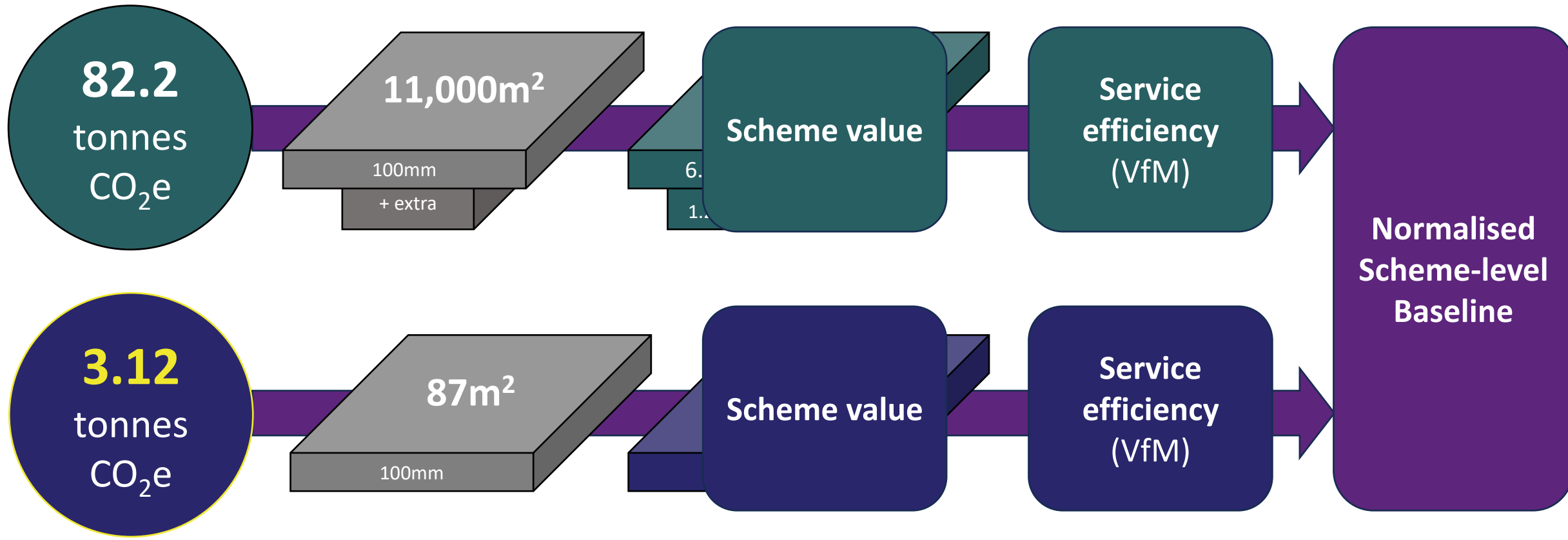
- Excavations
- Formation completion
- Aggregates
- Asphalt (base course)
- Asphalt (binder course)
- Asphalt (surface course)
- Bitumen
- Natural stone
- Precast concrete
- Waste



# HEADLINE DATA – CHATTERERTON ROAD



# CARBON BASELINE NORMALISATION



# OPTIONS CONFIGURATOR

An optioneering tool for developing and prioritising low-carbon scheme options.

- **Simulating innovative new policies, processes, & materials** to identify the best-performing option to implement.
- **Evaluating costs, operational performance, risks, and resource demands** prior to significant investment.

Can future schemes be reliably modelled using an optioneering approach?

Do LCC & its partners have sufficient data and resources to create viable options?

Will optioneering enable better decisions?

Can optioneering processes be effectively integrated into BAU processes?

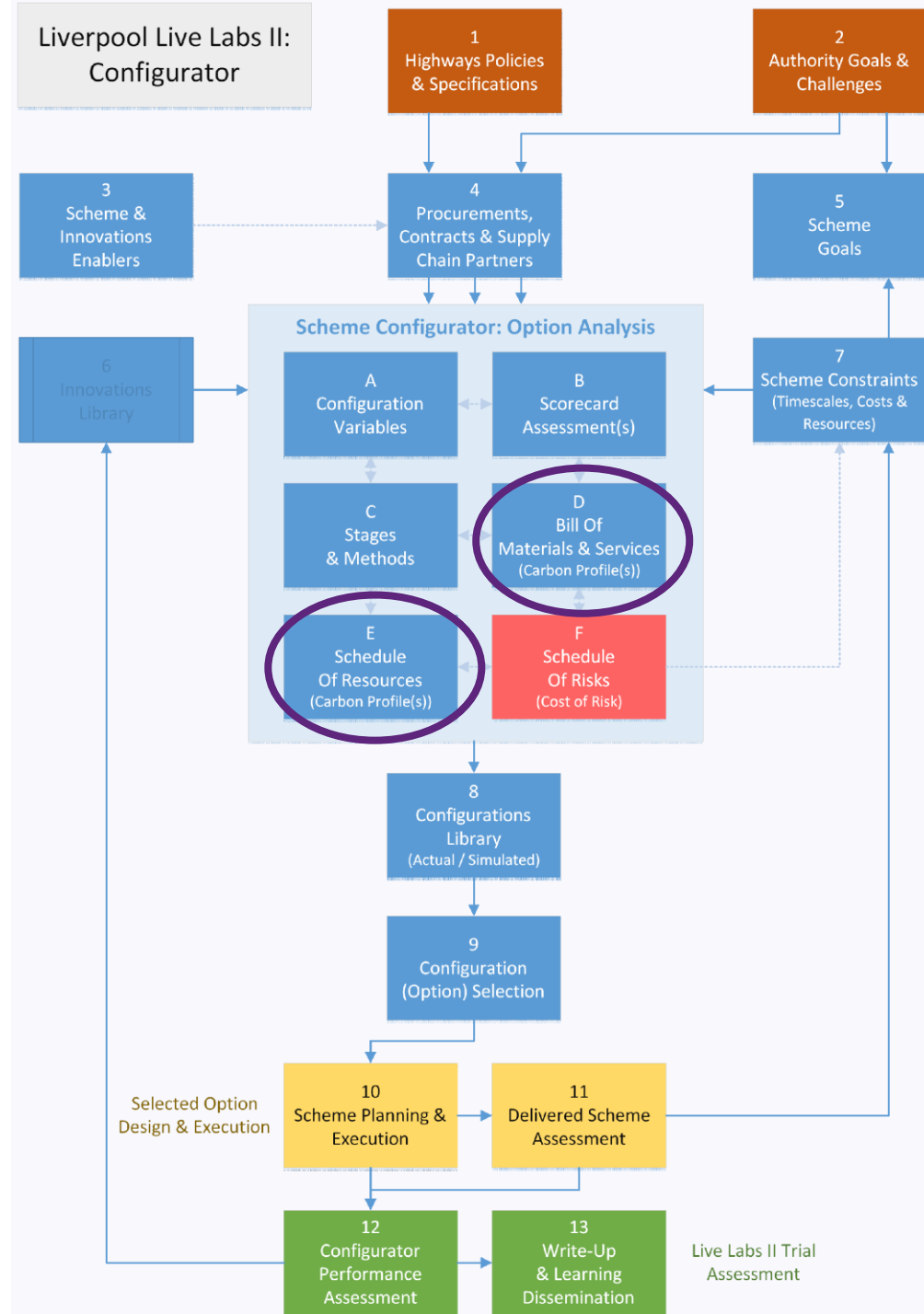
Decision Equipped.



Future Highways Research Group



Pell Frischmann  
Excellence through innovation



Live Labs II Trial Assessment

# KEY REFLECTIONS

## Opportunities

Bringing LCC and contractors together to:

- develop a consistent approach to measuring carbon
- exchange knowledge & learning
- benefit from shared resources & materials



Identifying carbon hotspots to prioritise for decarbonisation at the earliest opportunity.

Gaining knowledge from & sharing resources with other Live Labs, e.g:

- CEDR Innovations Hopper
- Devon & Wessex place-based carbon analysis



## Challenges



Timescales for recruitment & scheme completion affecting data collection.



Determining carbon factors for specific & novel materials.



Extending carbon impact of scheme to full asset lifecycle.



Normalising baseline to scale of scheme.



# Thank you for your attention!

