

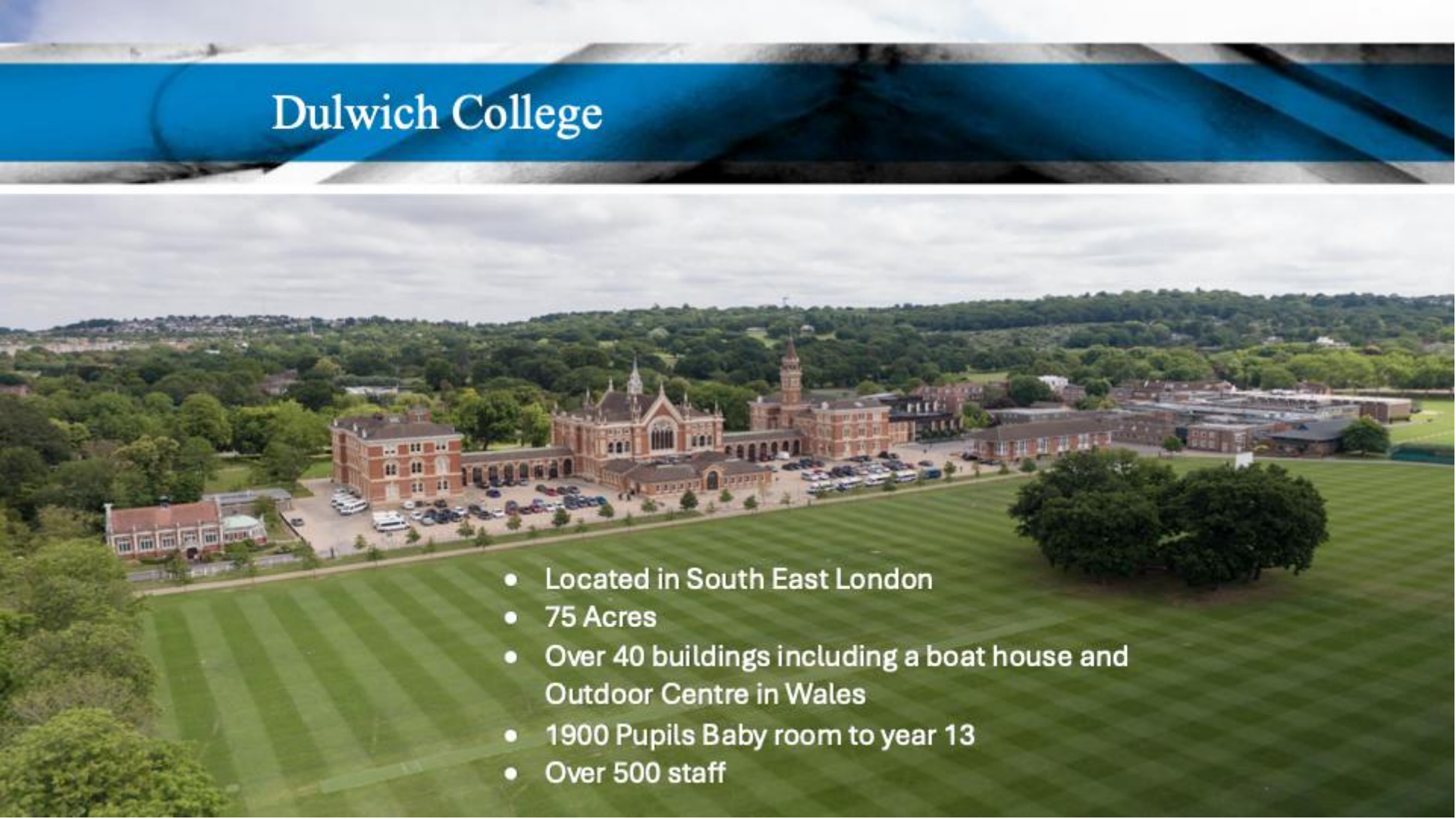


DULWICH COLLEGE
FOUNDED 1619

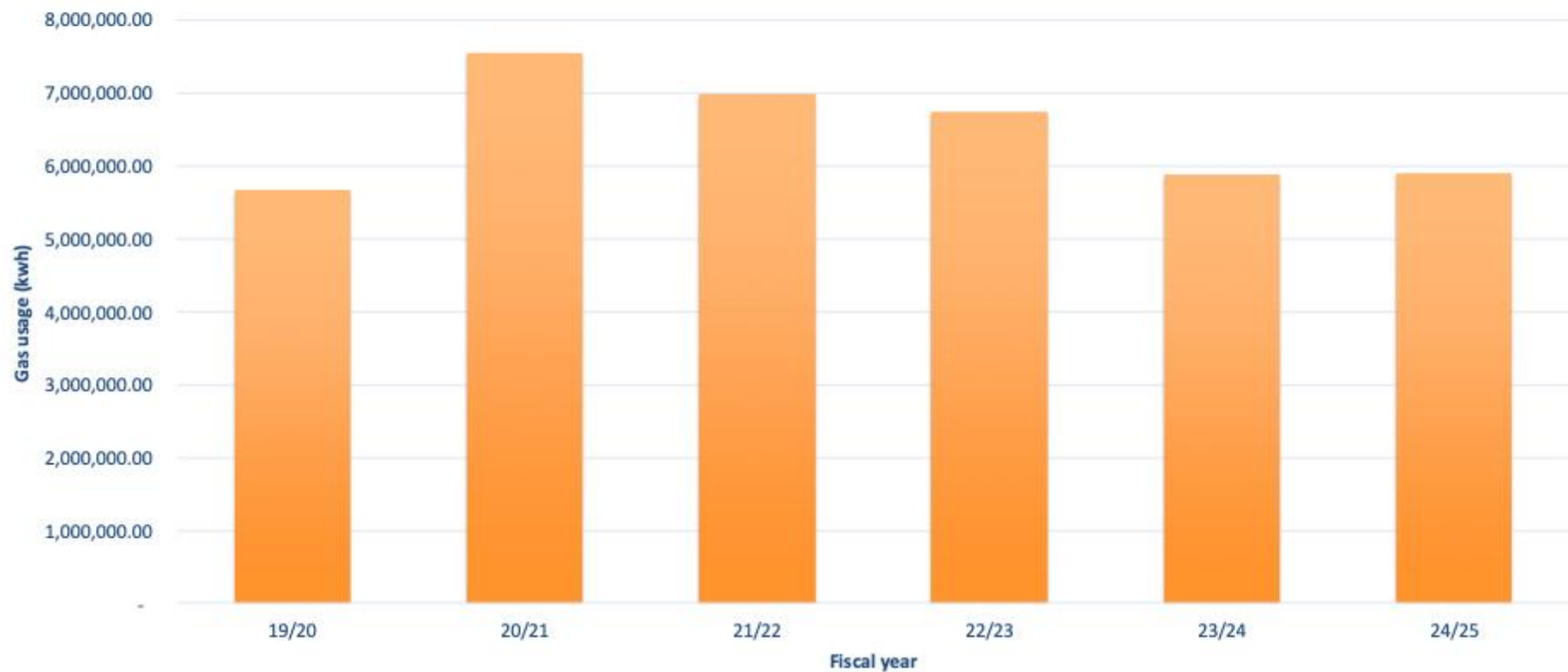
Sustainability at Dulwich College

Katy Millis
Head of Sustainability

Dulwich College

- 
- An aerial photograph of the Dulwich College campus. The central feature is a large, ornate red brick building with multiple spires and Gothic-style architectural details. To the left of this main building is a smaller, single-story red brick structure. A large, paved parking lot filled with cars is situated between the main building and the smaller one. In the foreground, a vast, well-maintained green lawn stretches across the frame, with a few large, mature trees on the right side. The background shows a dense line of green trees and a distant residential area under a cloudy sky.
- Located in South East London
 - 75 Acres
 - Over 40 buildings including a boat house and Outdoor Centre in Wales
 - 1900 Pupils Baby room to year 13
 - Over 500 staff

Gas usage

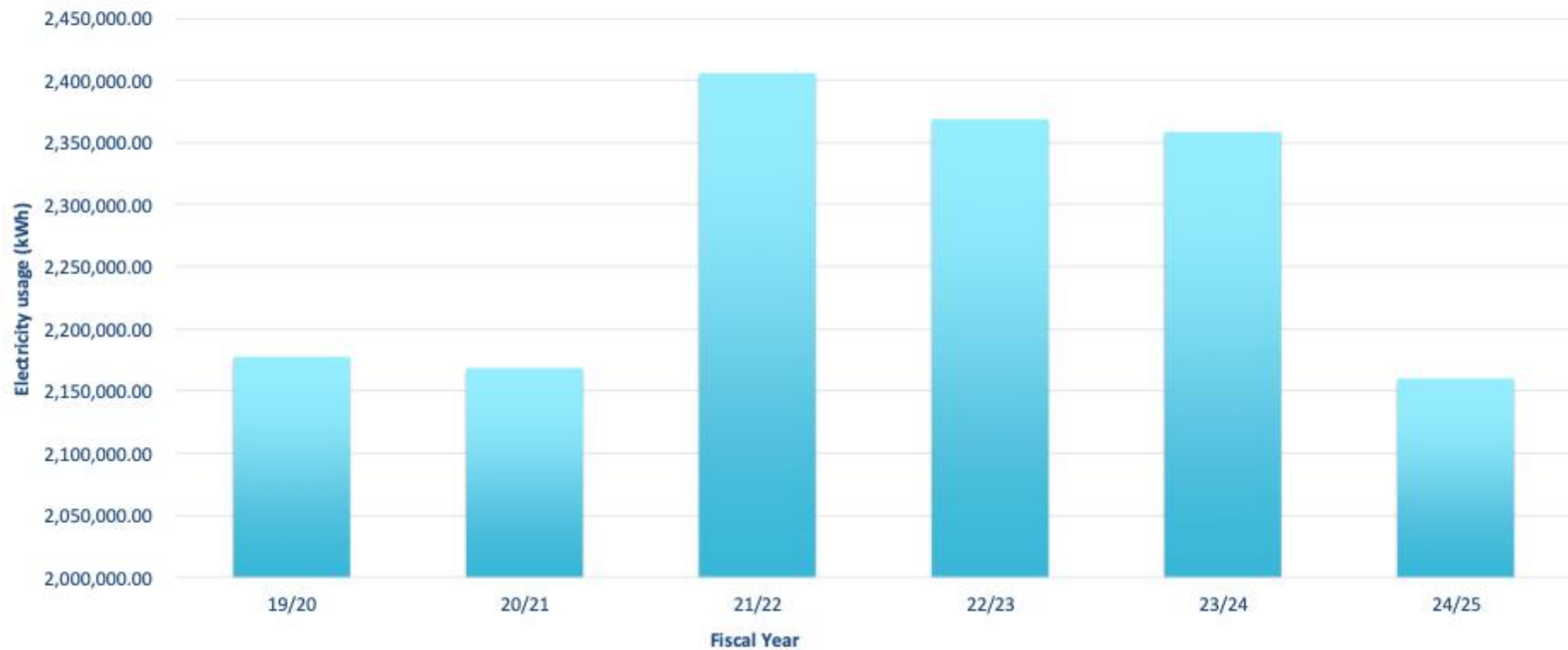


Gas actions



- Managing assets
- Building Management system [BMS]
- Timings
- Temperature settings

Electricity usage



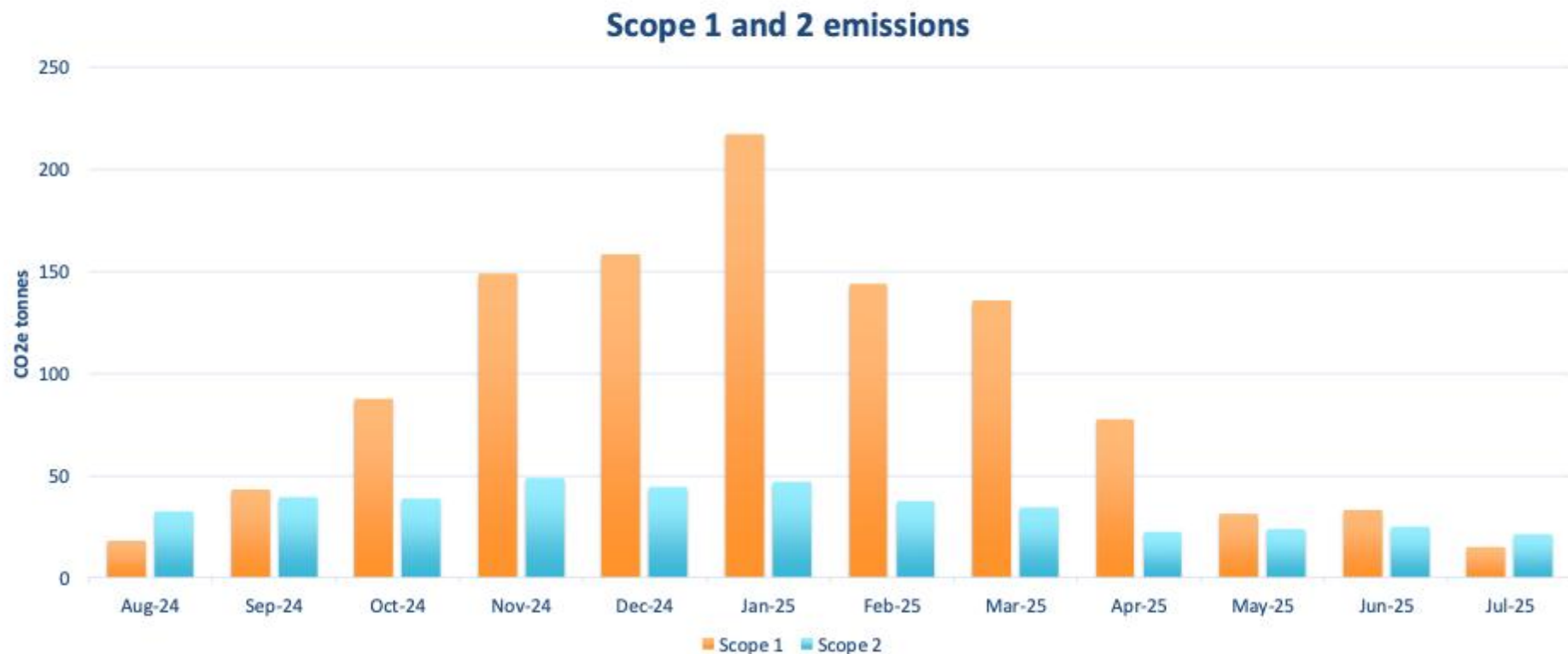
Electricity actions

- Tracking data
- LED light replacements
- PIR controls
- Site staff briefing for closedown
- Labels on light switches
- Solar PVs

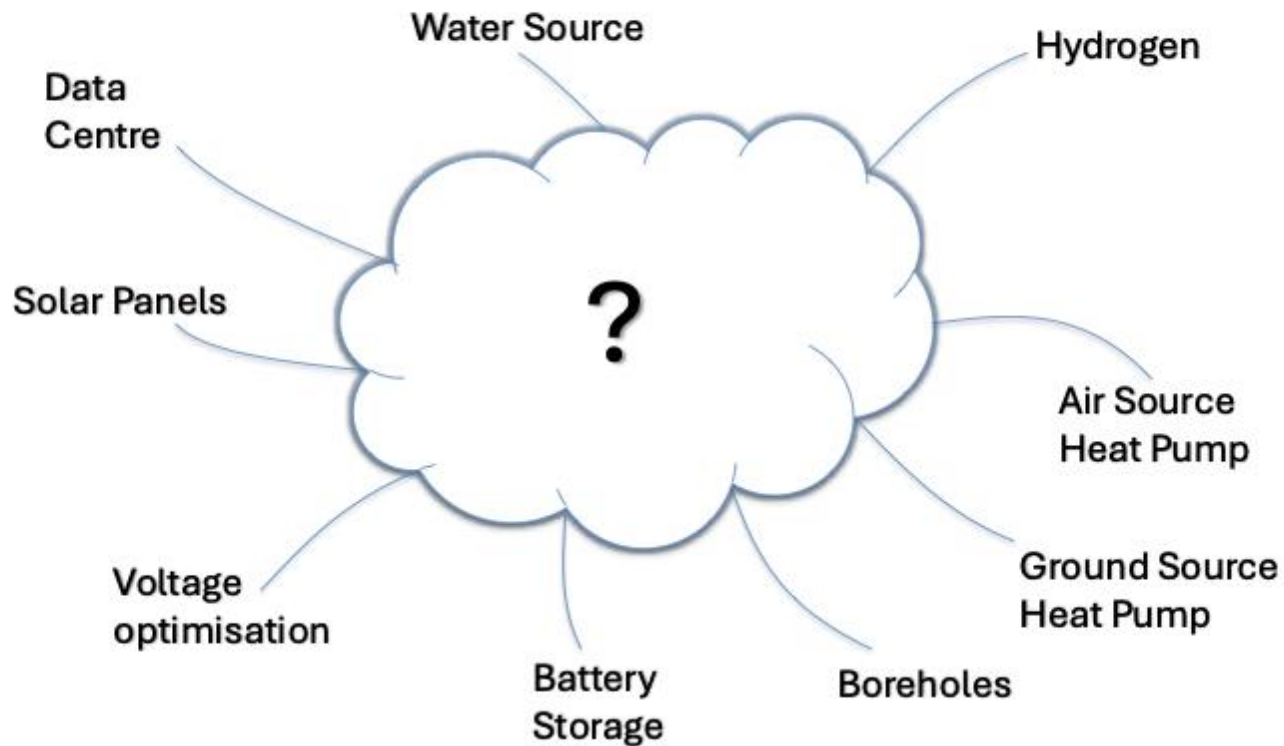
Best Energy Technology Trial phase
with Virtual Energy Management



Scope 1 and 2 emissions



Potential future projects

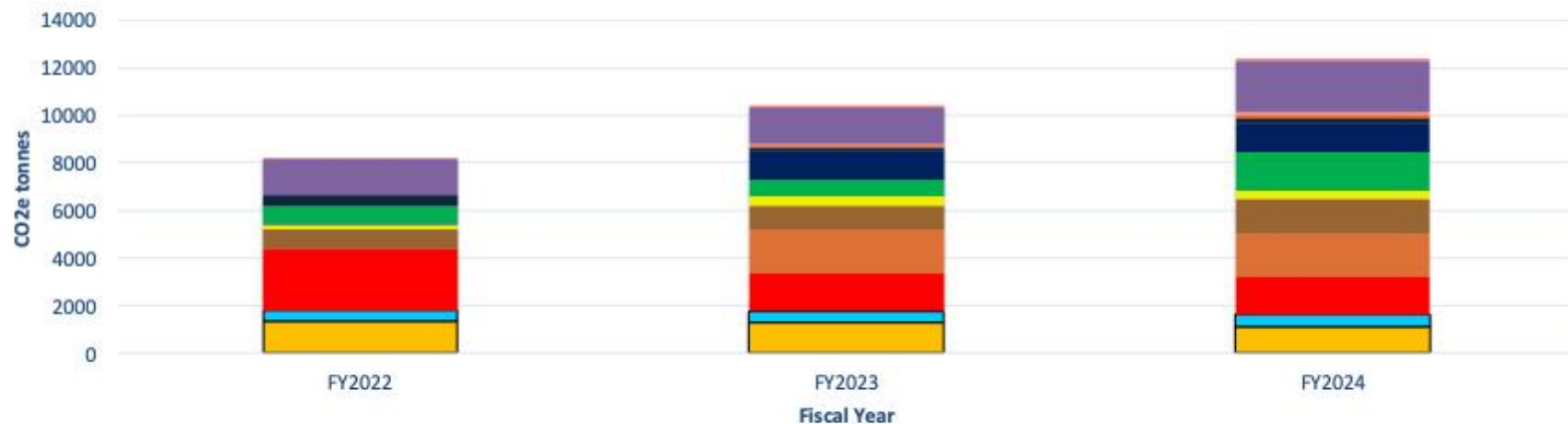


The emissions iceberg



Total emissions (Scopes 1, 2 and 3)

Total emissions



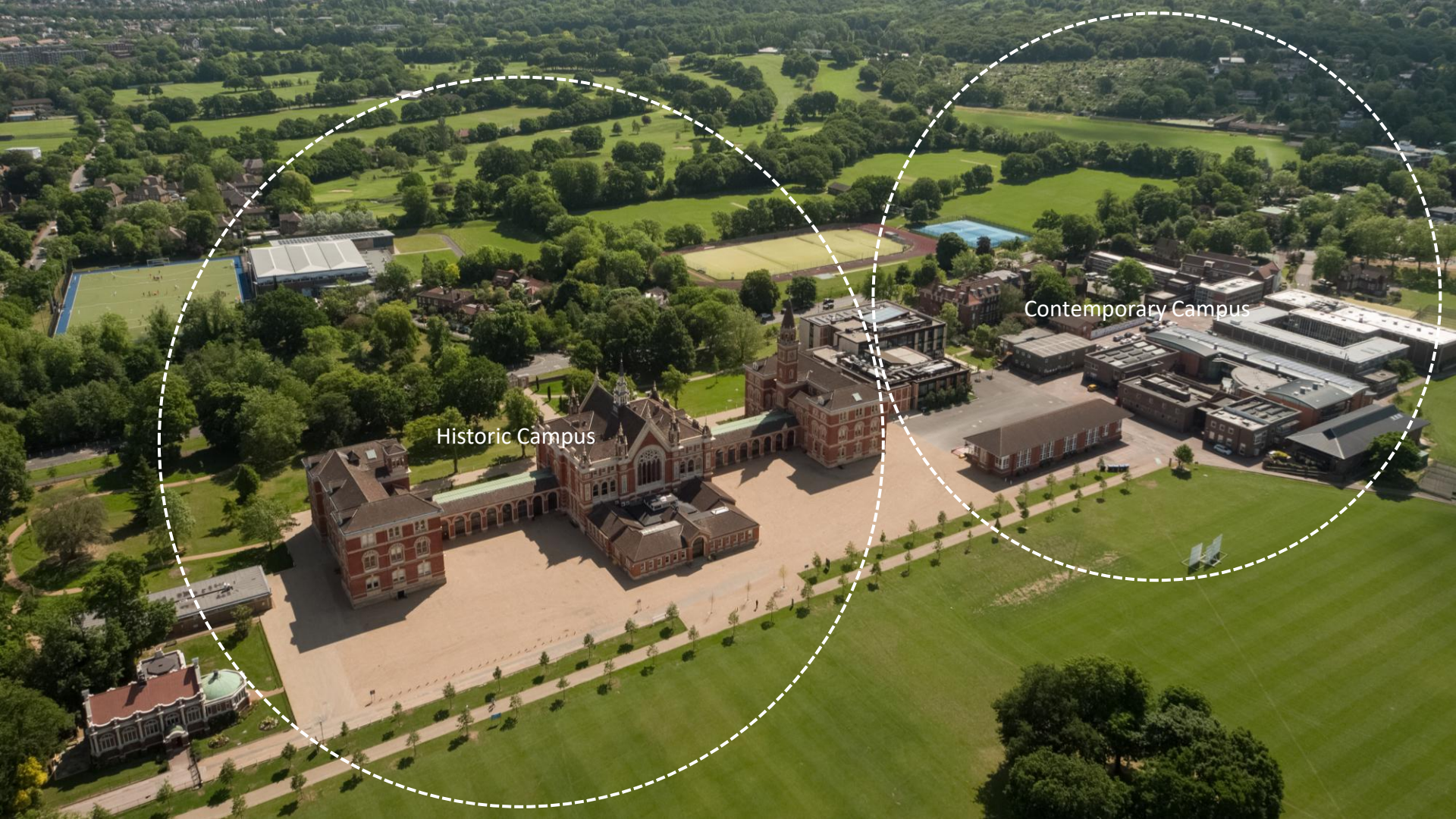
- Scope 1
- Scope 2
- Food
- Non-Food purchases
- Capital Goods
- Fuel related emissions
- Waste
- Outings & expeditions
- Staff business travel
- Boarding student travel
- Staff commuting
- Student commuting
- Investments
- Other

Student activity





Dulwich College Lower School Library Building
Tristan Wigfall - alma-nac

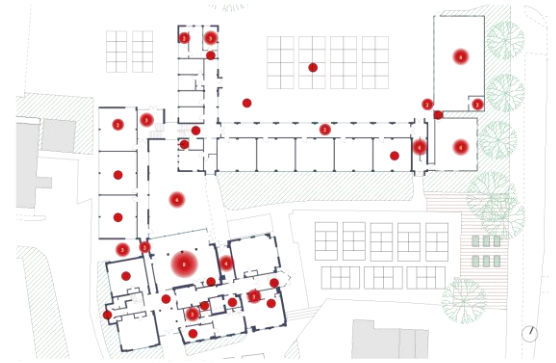


Historic Campus

Contemporary Campus

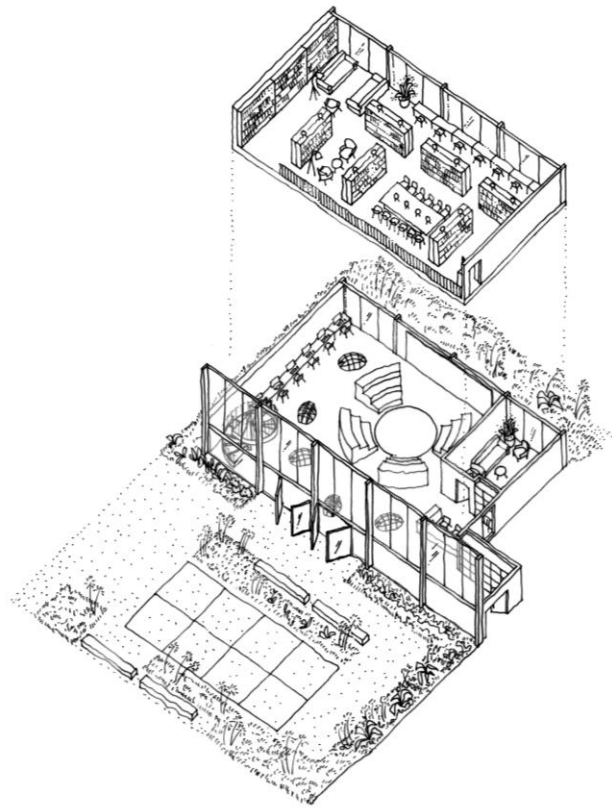


- A: Lower School – 1948
- B: Extension – 1957
- C: Junior School – 1993
- D: Library & ICT – 1998

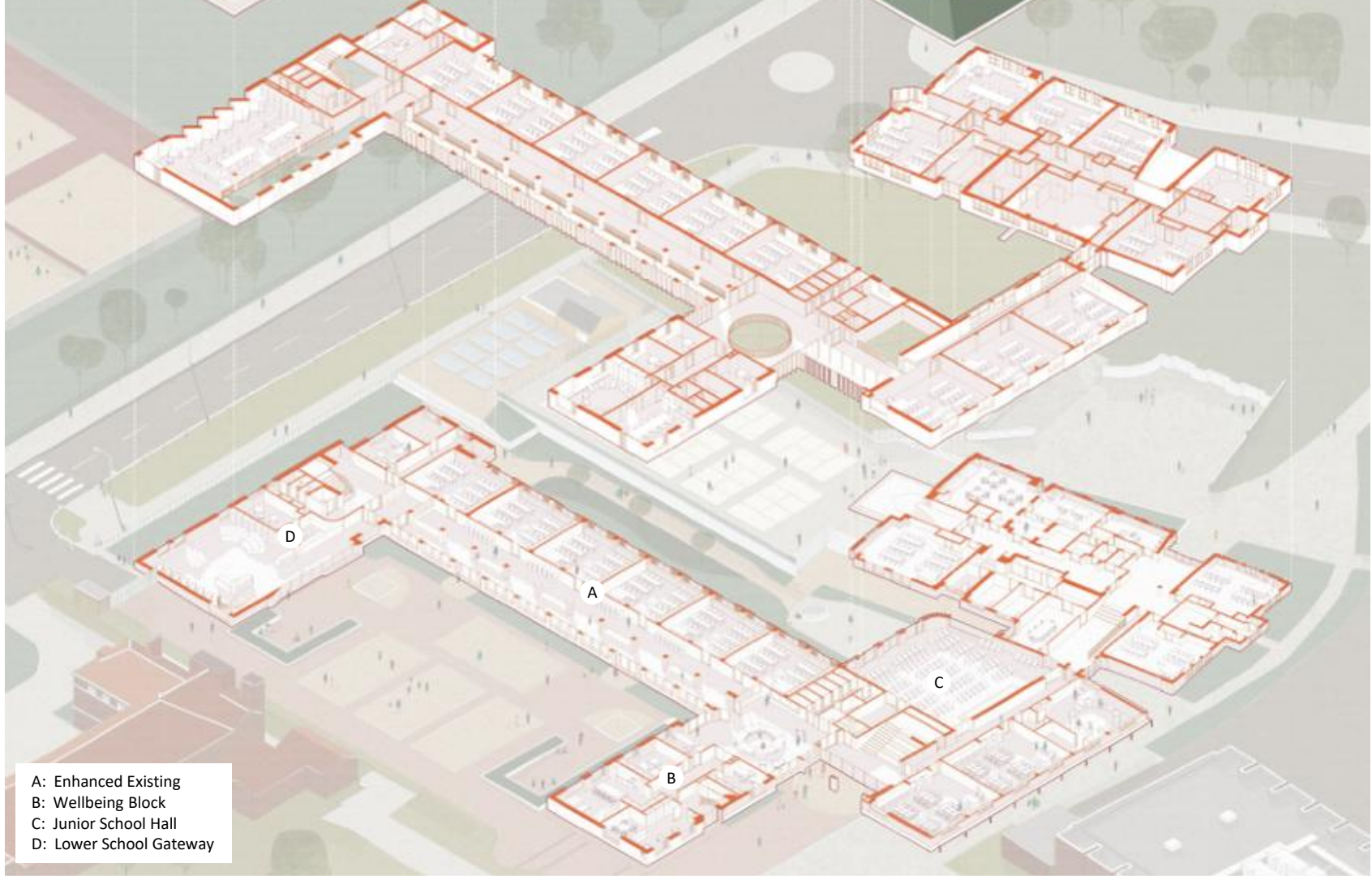




'You can judge a school by its library.' – Dr Joe Spence



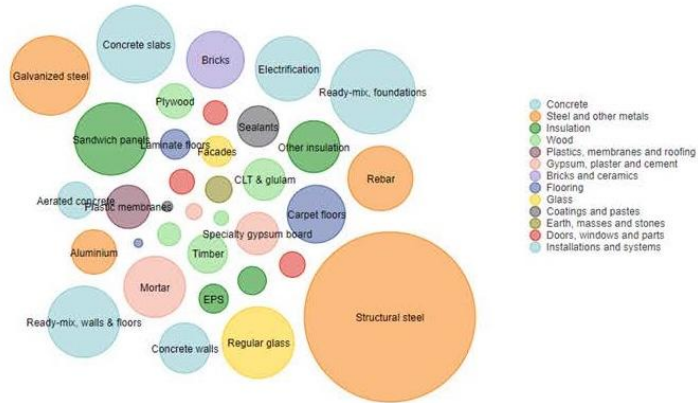
A New Lower School Library



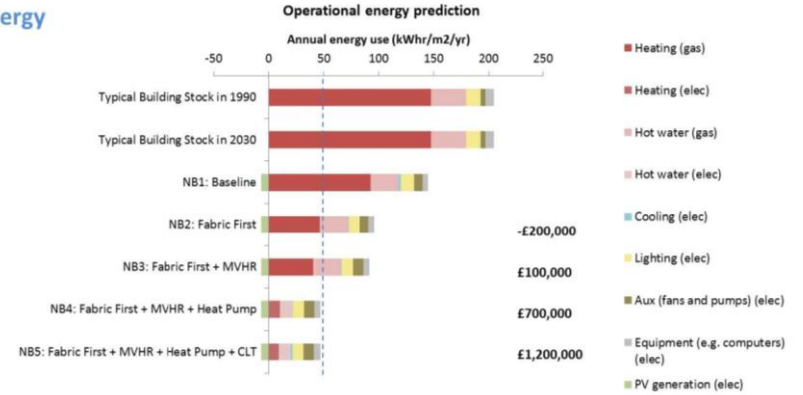
- A: Enhanced Existing
- B: Wellbeing Block
- C: Junior School Hall
- D: Lower School Gateway

Bubble chart, total life-cycle impact by resource type and subtype, TOTAL kg CO2e

Hover your mouse over legends or the chart to highlight impacts. Bubble minimum and maximum sizes constrained for readability



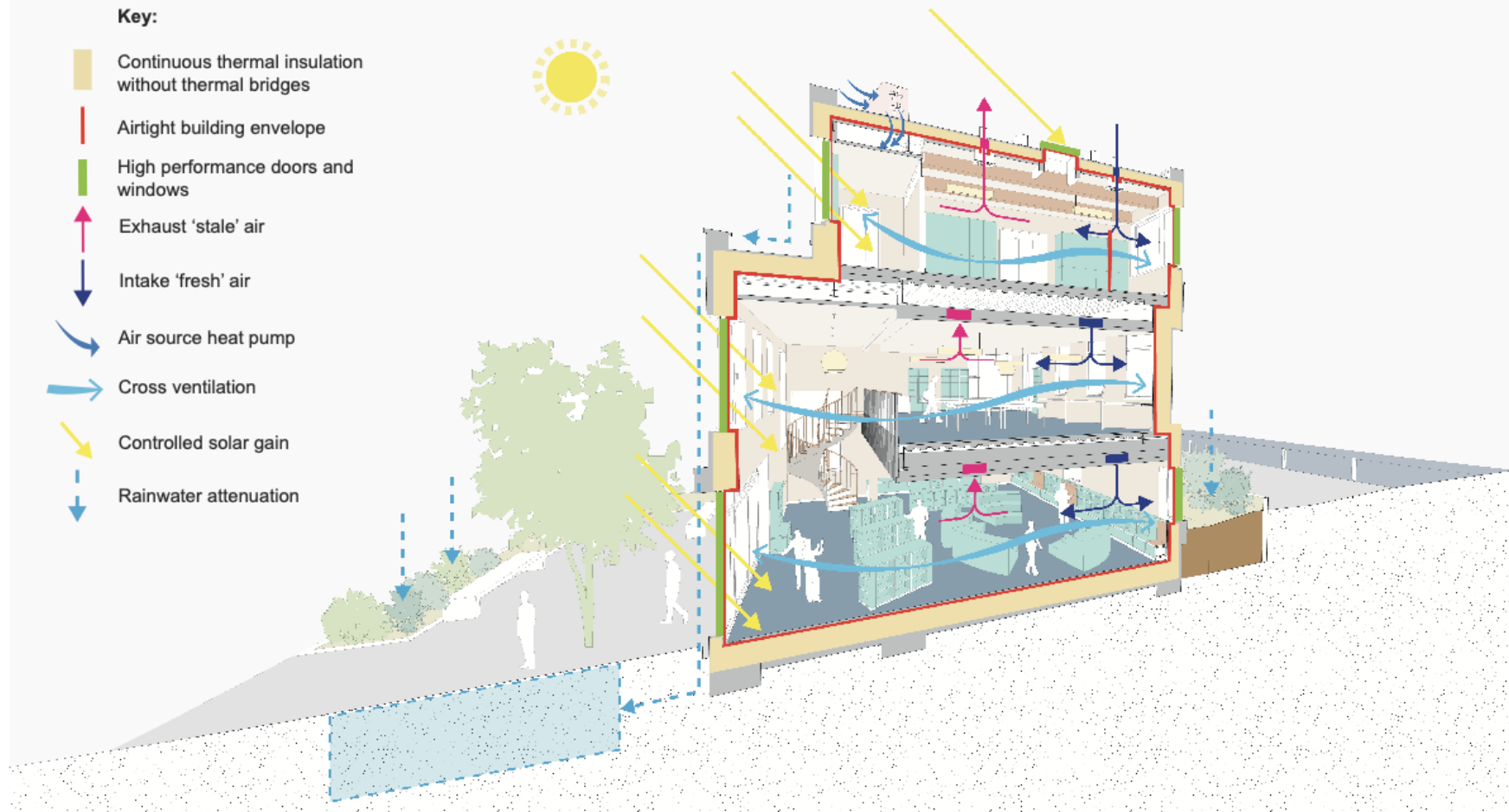
Energy



New build parts only. Existing parts not included in this analysis.

Key:

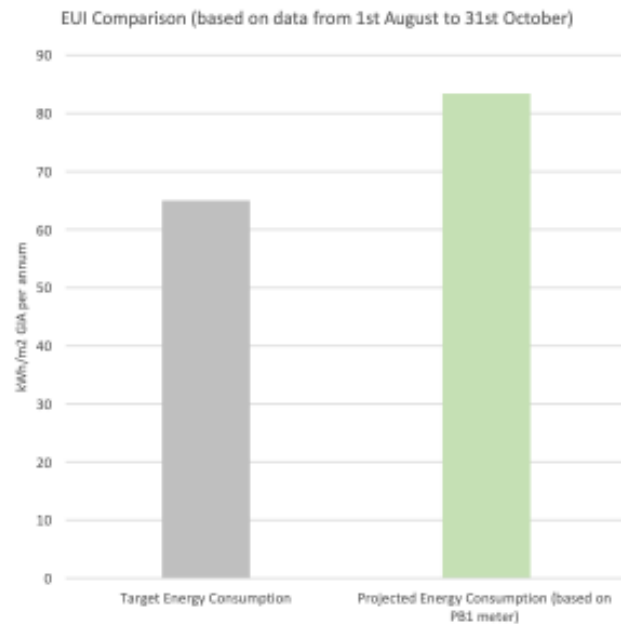
- Continuous thermal insulation without thermal bridges
- Airtight building envelope
- High performance doors and windows
- Exhaust 'stale' air
- Intake 'fresh' air
- Air source heat pump
- Cross ventilation
- Controlled solar gain
- Rainwater attenuation







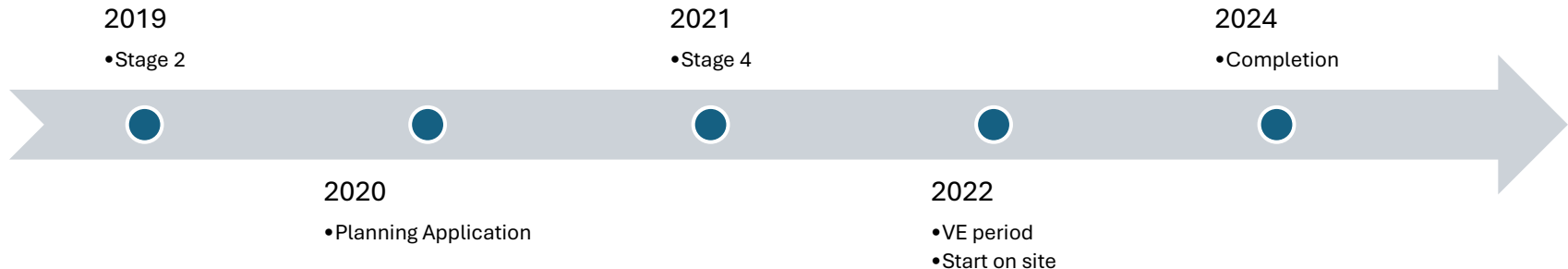
Target vs Projected EUI





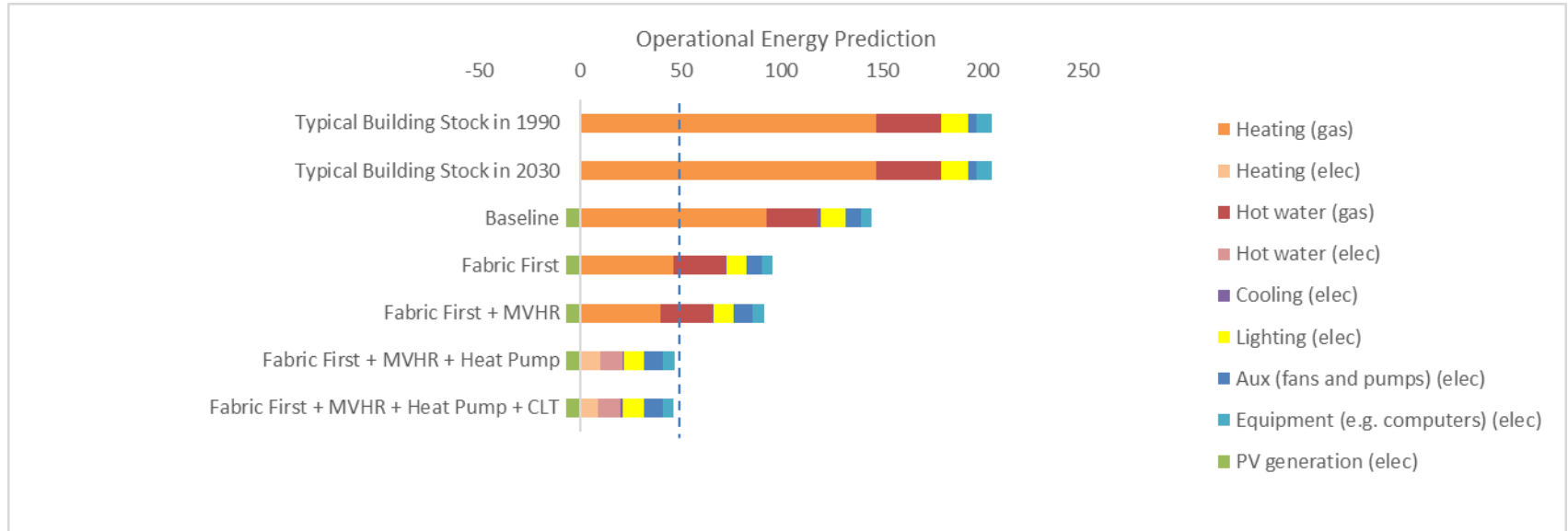
BACKGROUND

- Joined the project in 2019 at Stage 2, working through to completion
- Our services covered:
 - Building Services
 - Acoustics
 - Sustainability / Net Zero Carbon



DESIGN PROCESS

- Net Zero Carbon (NZC) requirements started to inform the design at Stage 2



DESIGN PROCESS

Operational Energy

65 kWh/m²/yr

Upfront Embodied Carbon

625 kgCO₂/m² (A1-A5)



Building Fabric

Passivhaus principles

Optimised glazing

Solar control glazing



Hot Water

Electric instantaneous water heaters



Heating

Air source heat pumps



Cooling

Automated openings

Free cooling

VRF heat pumps



Ventilation

Automated openings

MVHR



Lighting

Good daylight

Low energy fittings

Daylight dimming



Security

Eco mag locks

Low power mode CCTV cameras

CHALLENGES

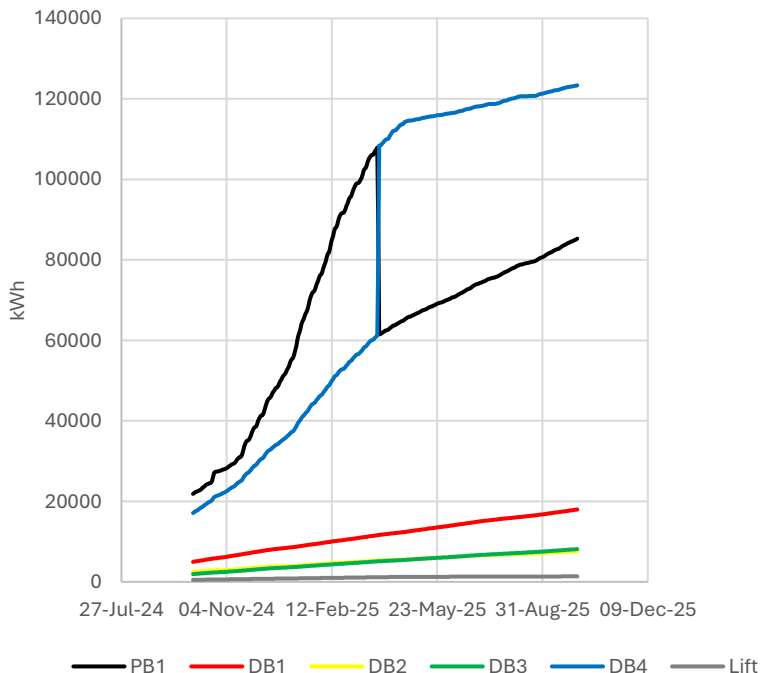
- Upskilling

- New process for design team
- New process for contractor team and suppliers

- Metering

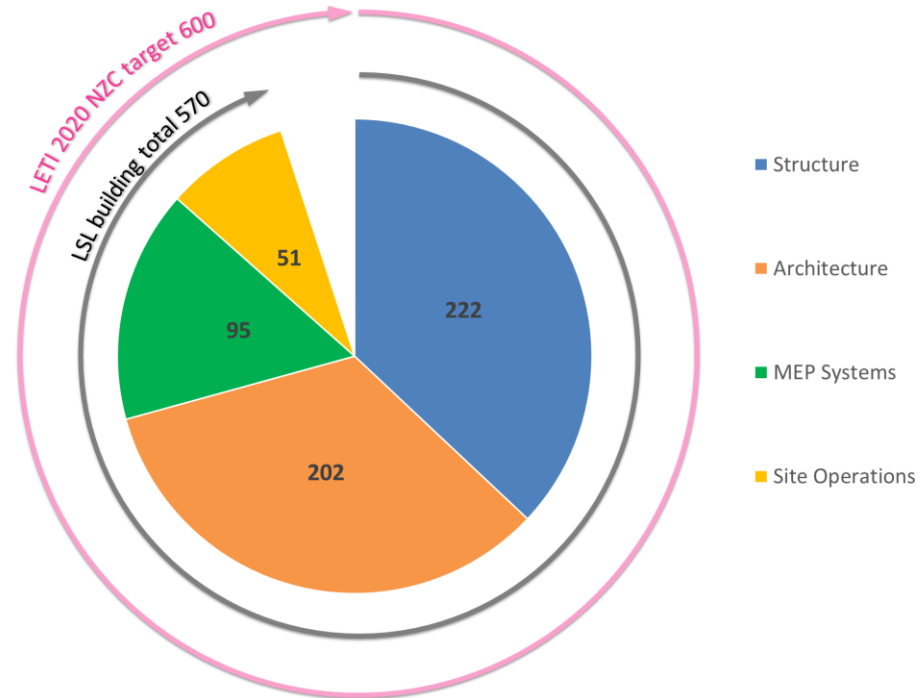
- Not all meters are logging
- Some meter data is incorrect
- Overall lack of confidence in data

Energy Consumption BMS Data



SUCCESSES

Dulwich College LSL Building: As Built Upfront Embodied Carbon (kgCO₂e/m² GIA)



LESSONS LEARNT

- ICT Classrooms have “kill” switches to turn off computers, but this doesn’t suit the school’s current ICT policies
- Multi-phase nature of the project means current users need to understand how the building was designed and why
- Lessons learnt have informed our input into the UK Net Zero Carbon Buildings Standard and our own Beyond Net Zero whitepaper



THANK YOU



David Montgomery - d.montgomery@maxfordham.com
Senior Engineer
Max Fordham LLP

Creating an exceptional learning environment

Mulberry Academy London Dock

ARCHITECT

KIER

Mulberry Academy

- Client: London Borough of Tower Hamlets / DfE
- Education provider: Mulberry Academy Trust
- Main Contractor: Kier Construction
- GIA: 12,280sqm
- 1,150 pupils: Six form entry + 6th form
- Completion: Summer 2024
- Passivhaus Classic Certification
- Operational zero carbon enabled





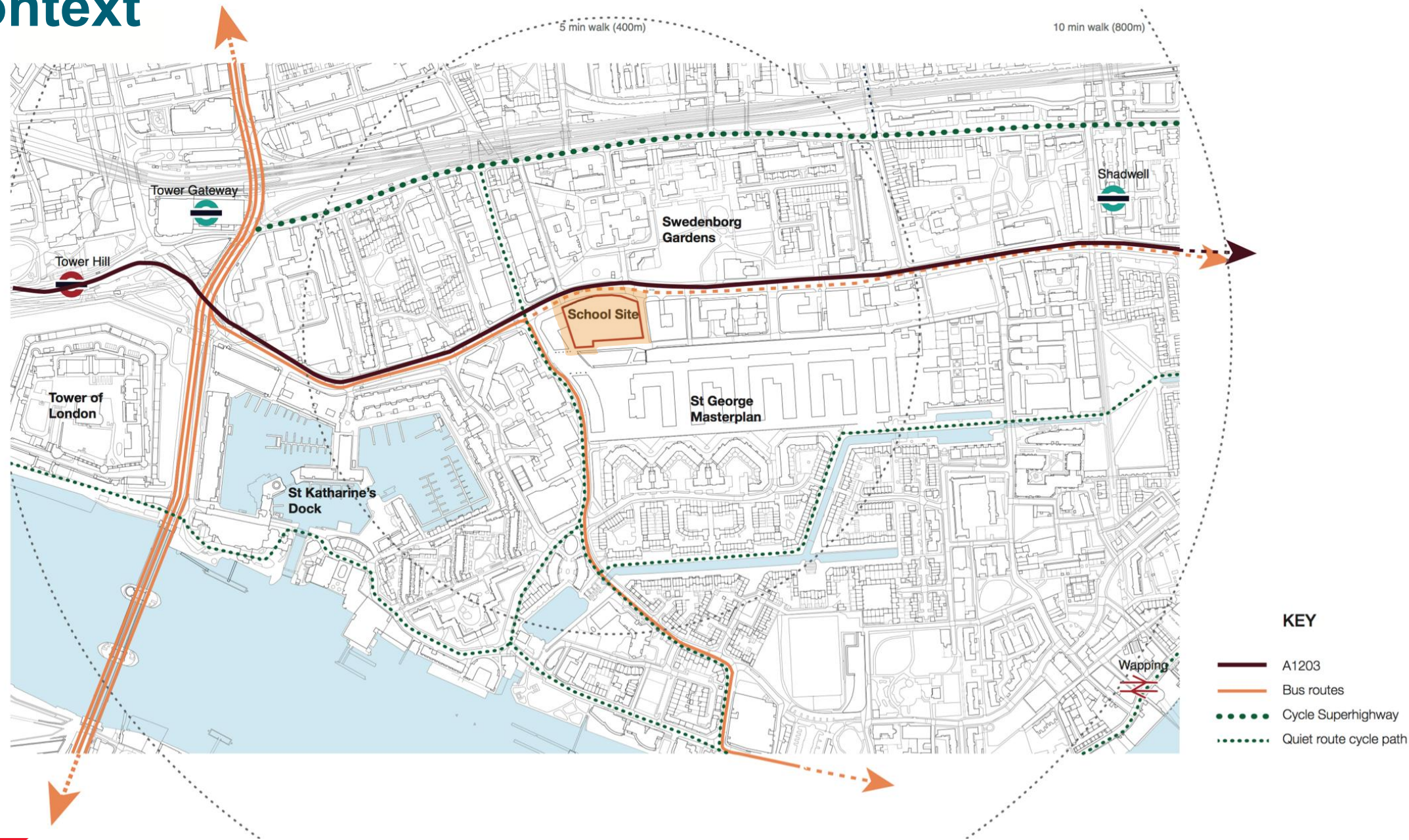
WILL DECIDE WHERE
WE ARE GOING,
TOGETHER.
FUTURE
WHERE WE WILL
NEW DAY.



An aerial photograph of a modern, multi-story building complex. The building features a large, rectangular rooftop swimming pool with bright blue water. Adjacent to the pool is a green rooftop soccer field with yellow and white markings. The building has a light-colored facade and is surrounded by various rooftop gardens, terraces, and walkways. The surrounding area includes other buildings, streets with cars, and greenery.

Challenges / Solutions

Site context



Challenge: Constrained site

- Multiple stakeholders + overlapping project requirements
- Party wall issues
- Very limited construction access



Technical Delivery

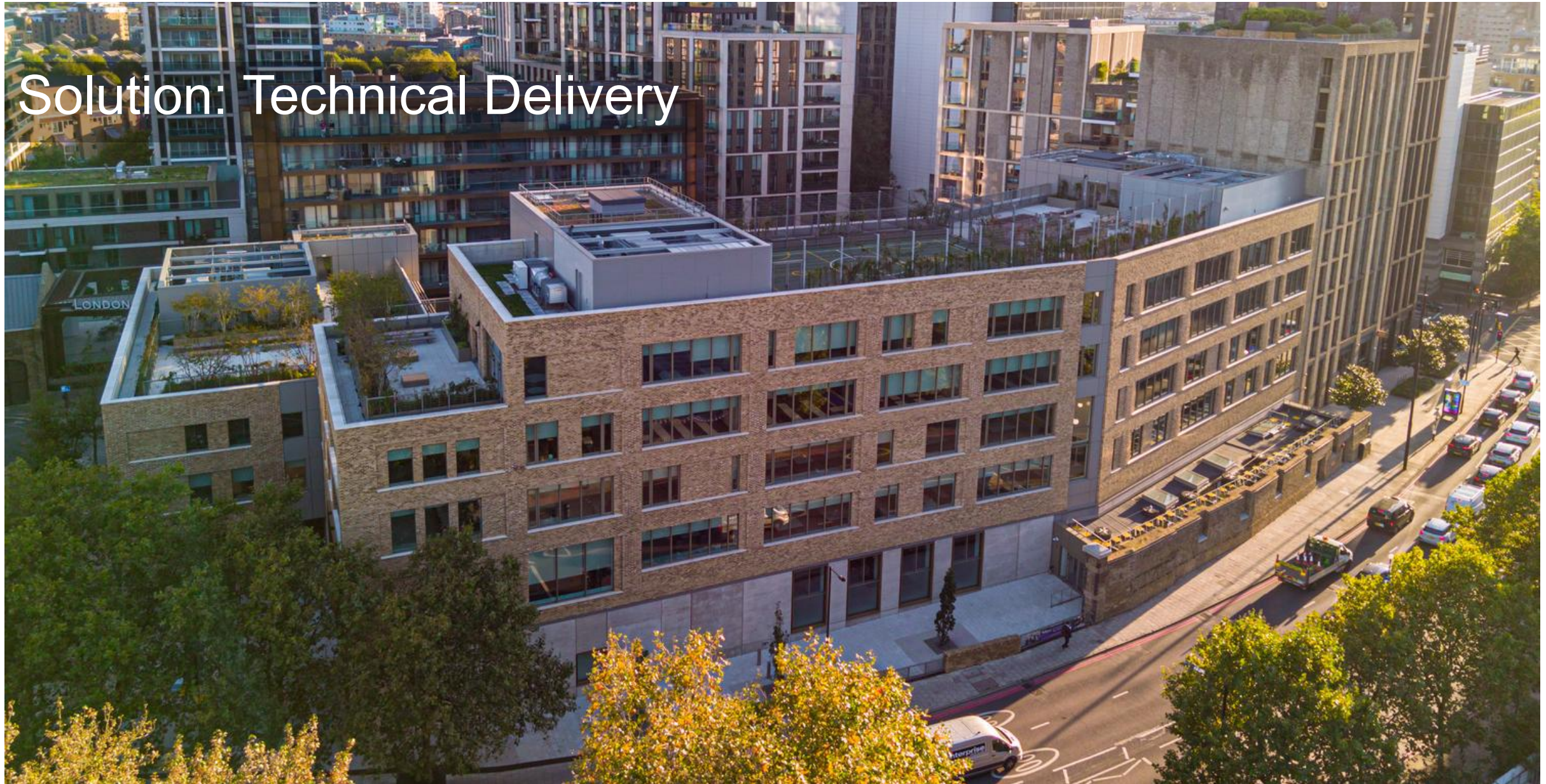
- Integrated site logistics
- Constant quality preparations
- Resilient neighbour relationships



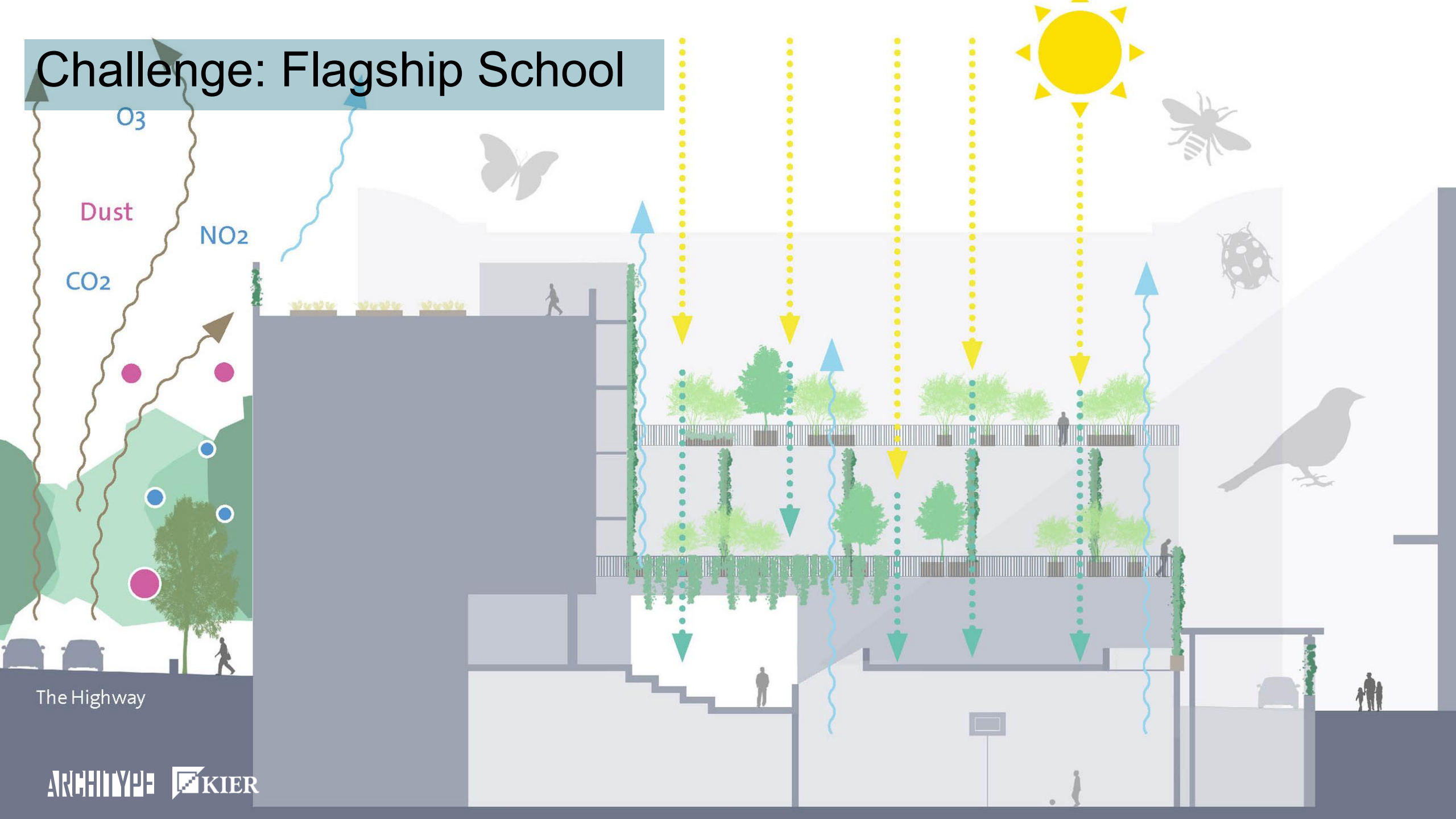
Solution: Technical Delivery



Solution: Technical Delivery



Challenge: Flagship School





Solution: Link to nature



Solution: Link to nature

Solution: Passivhaus outcomes



Solution: Passivhaus outcomes



PH Performance

Form factor (HLA / TFA):

- **1.53** [target 2.5]

Total thermal envelope:

- **13,276sqm**

Envelope in ground / party wall:

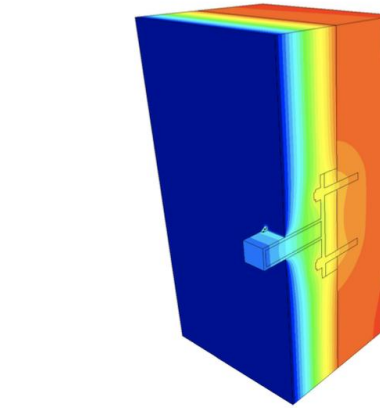
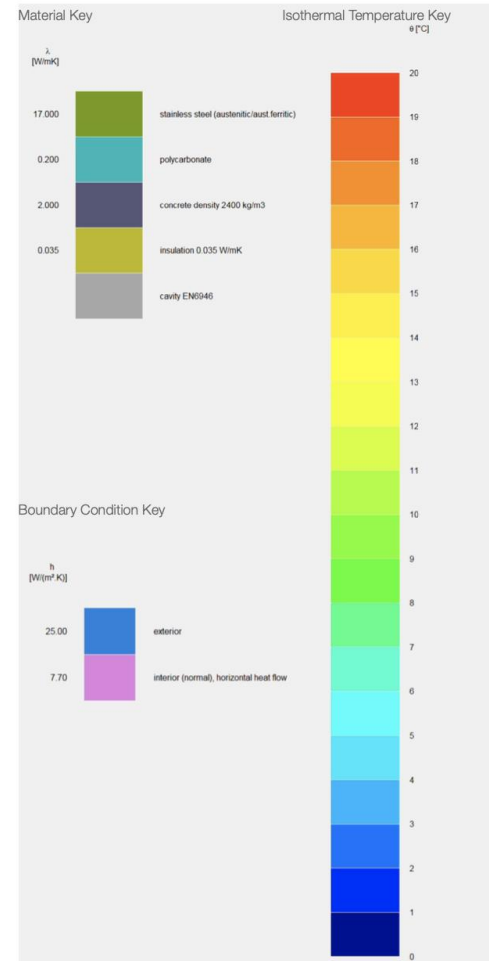
- **3,550sqm / 377sqm**

Thermal bridge % of heat loss area

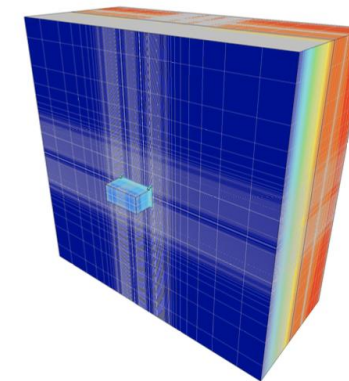
- **Circa 12%** [target <5%]

LDSS TRELLIS SPIGOT THERMAL BRIDGE

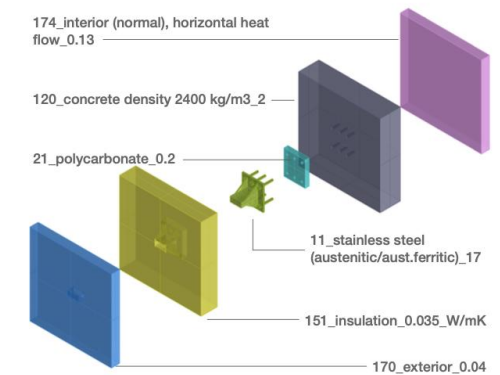
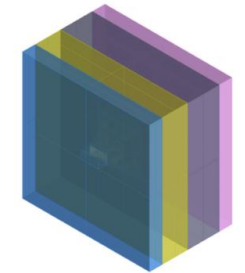
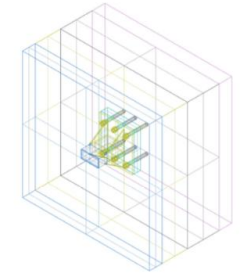
1.1 / GRAPHICAL OUTPUT



Isothermal cut away through trellis spigot



Isothermal with grids shown



Material inputs. Wire frame, assembled, exploded iso

PH Performance

Form factor (HLA / TFA):

▪ **1.53** [target 2.5]

Total thermal envelope:

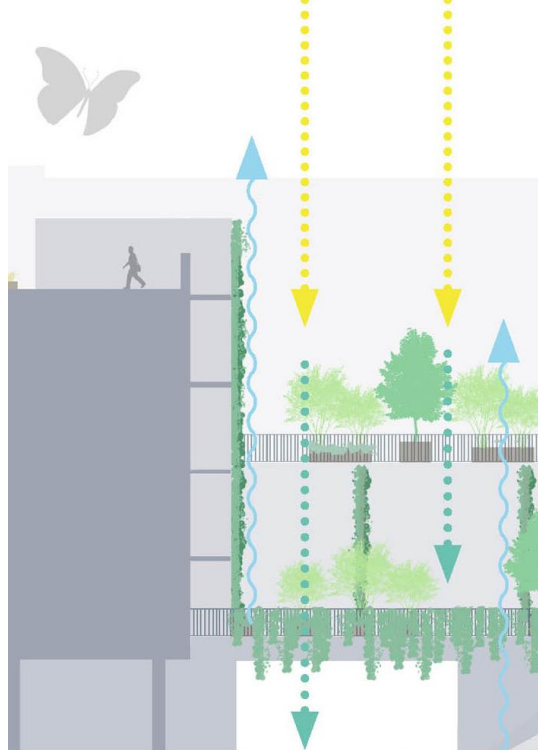
▪ **13,276 sqm**

Envelope in ground / party wall:

▪ **3,550 sqm / 377 sqm**

Thermal bridge % of heat loss area

▪ **Circa 12%** [target <5%]



Solution: Technical Delivery





mulberry
Academy London Dock

A Community Facility

A Collective Legacy

A Spacious Environment for Spacious Minds