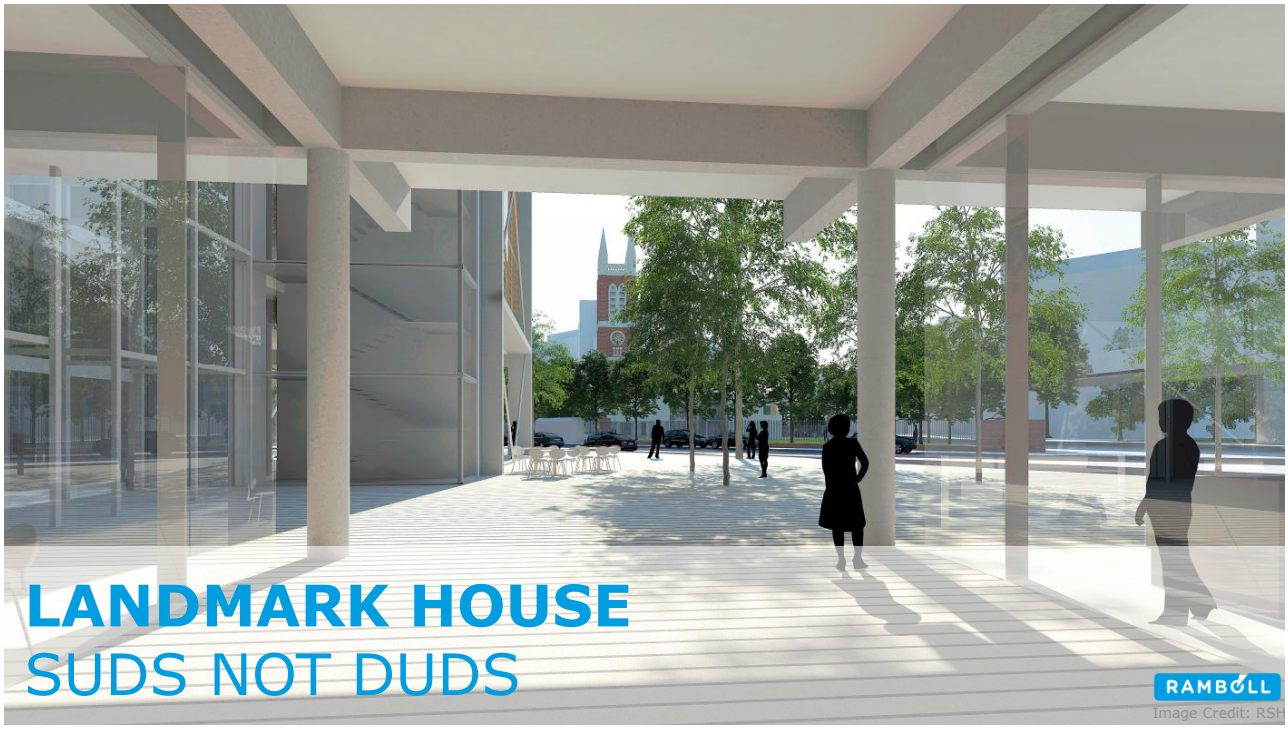


KATHERINE THEOBALD

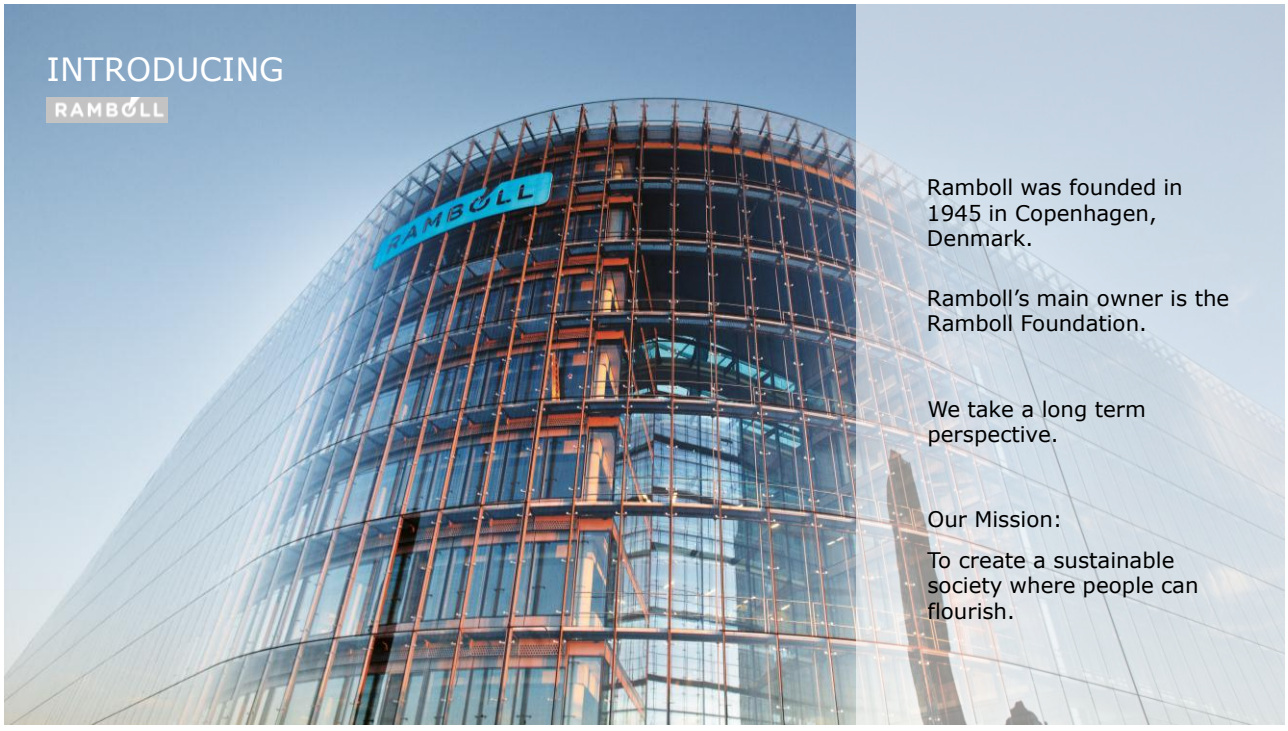
RAMBØLL

Graduate Engineer – Infrastructure and Highways

MEng Civil Engineering – University of Southampton.

Graduate Member of the ICE.

14 months experience working for Ramboll.



OUR CAPABILITY - INFRASTRUCTURE & HIGHWAYS

- Landscape Engineering
- Bridge engineering
- Ground engineering
- Infrastructure asset management
- Ports and marine engineering
- Urban development and master planning
- Project and construction management
- Rail engineering
- Road and motorway engineering
- Transport planning, traffic engineering and traffic safety
- Tunnel engineering

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Landmark House

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Client – Eastern and Oriental

Architects – Rogers Stirk Harbour + Partners

Landscape Architect - Gillespies

MEP & Transport – Buro Happold

Structural and Civil Engineering - Ramboll

Image Credit: RSH+P

SuDS not duds - expectations Vs reality

Cost Consultant – Gardiner and Theobald

Other Key Stakeholders:

- London Borough of Hammersmith and Fulham
- Thames Water
- Local Residents

Image Credit: RSH+P

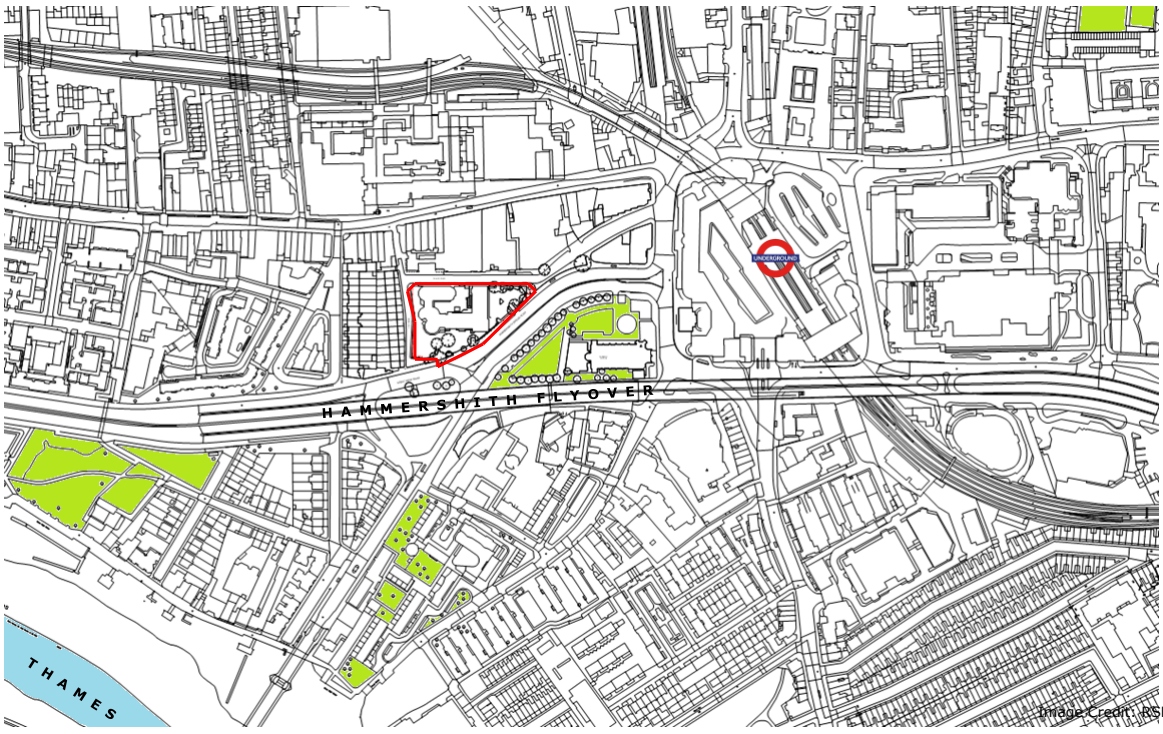
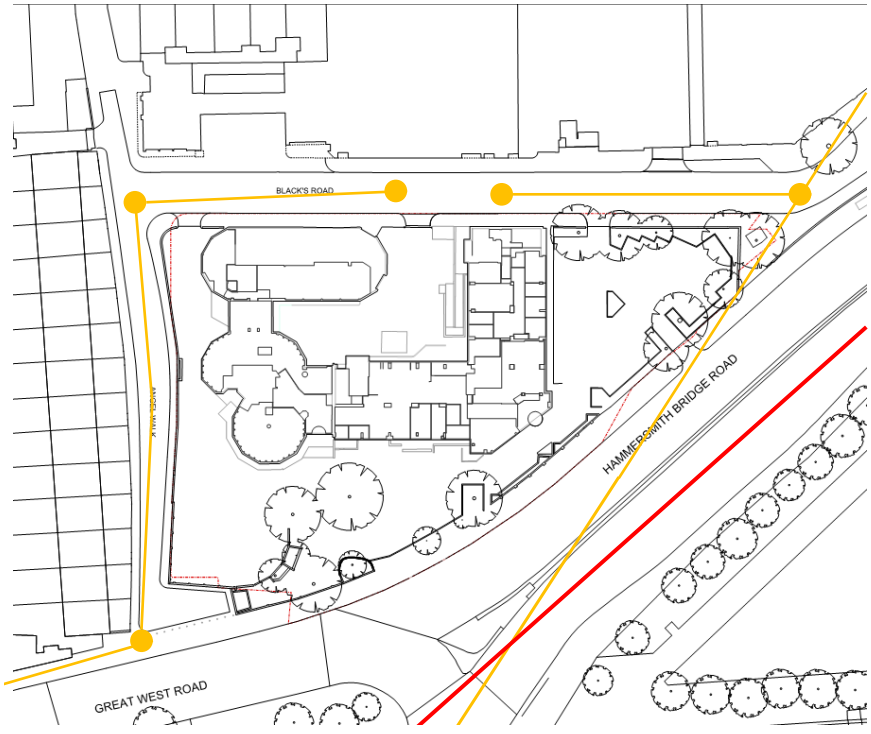


Image Credit: RSH+P

SuDS not duds - expectations Vs reality

Landmark House from St. Paul's Green

Thames Tower from intersection of Black's Road and Angel Walk



Basement of the proposed development occupies the majority of the site.

Very limited external areas.

Poor ground conditions with very low infiltration rate.

Image Credit: RSH+P

SuDS not duds - expectations Vs reality

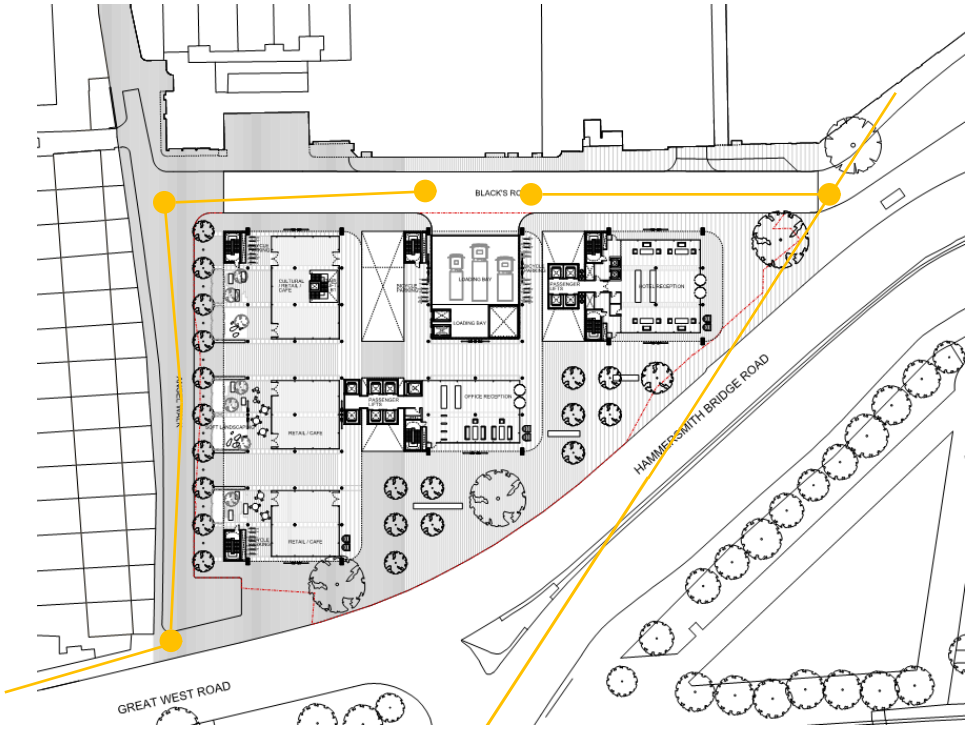


Image Credit: RSH+P

Image Credit: RSH+P

SuDS not duds - expectations Vs reality


Image Credit: RSH+P


Blacks Road
Hammersmith Bridge Road
Image Credit: Gillespies

Guidance and Requirements vary with location.

Generally Refer to:

- The London Plan;
- National Planning Policy Framework;
- Local Planning Authority Guidance;
- Sewer owner/operator advice through Pre-Development Enquiry;

SUDS HIERARCHY

STORE WATER FOR LATER USE

INFILTRATION

PONDS AND OPEN FEATURES

STORAGE IN TANKS OR SEALED WATER FEATURES FOR GRADUAL RELEASE

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SUDS HIERARCHY

STORE WATER FOR LATER USE	NO SCOPE FOR RAINWATER HARVESTING WAS IDENTIFIED IN THE EARLY DESIGN STAGE.
INFILTRATION	POOR GROUND CONDITIONS FOR INFILTRATION AND MAJORITY OF THE SITE IS COVERED BY THE BASEMENT.
PONDS AND OPEN FEATURES	VERY LIMITED EXTERNAL AREAS AND SMALL APPLICATIONS SUCH AS RILLS CONSIDERED TO BE A LIKELY TRIP HAZARD.
STORAGE IN TANKS OR SEALED WATER FEATURES FOR GRADUAL RELEASE	STORAGE IS FEASIBLE ON THIS SITE.

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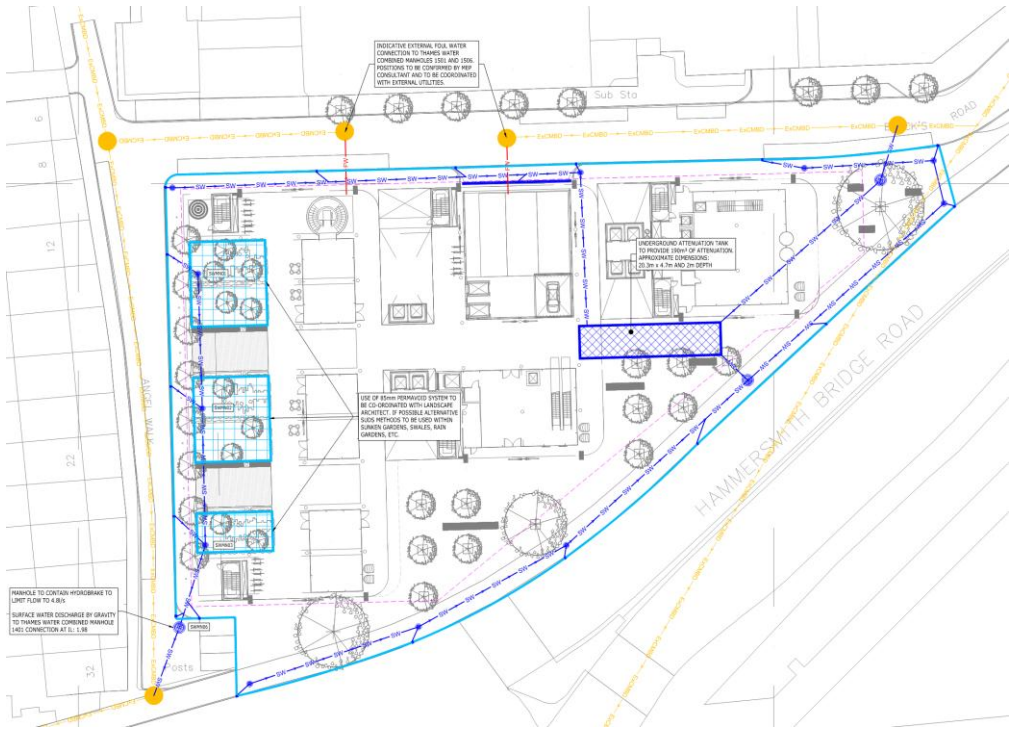

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RESPONSE TO DESIGN

- Thames Water response to the pre-development enquiry:
  - Site is within Counters Creek Critical Catchment Area;
  - All sewers adjacent to the site are at capacity;
  - Discharge rate equivalent to the greenfield run off rate must be achieved;

- Cost Consultants response to design:
  - Everything is too expensive.

- Response to the architectural design:
  - Building heights where reduced though the planning process to address stakeholders concerns with the height of the development.

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RESPONSE TO DESIGN

- London Borough of Hammersmith and Fulham response to planning submission:
  - Must aim to target a discharge rate equivalent to the greenfield run off rate.
  - The use of a single tank is not preferred, rainwater harvesting needs to be considered.
  - Consideration for measures above ground and at podium level.
  - Maintenance information for SUDs features must be provided.

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SuDS not duds - expectations Vs reality

New architectural design incorporates green roofs on each of the towers.

Catchment zones now split between the roofs, green roofs, podium level hardstanding and garden areas and sunken garden.

Large volume of storage now required.

Achieved through a network of sub-base replacement attenuation crates located on the podium.

Outfall restricted with Hydrobrake housed within a manhole within the service yard.

SuDS not duds - expectations Vs reality

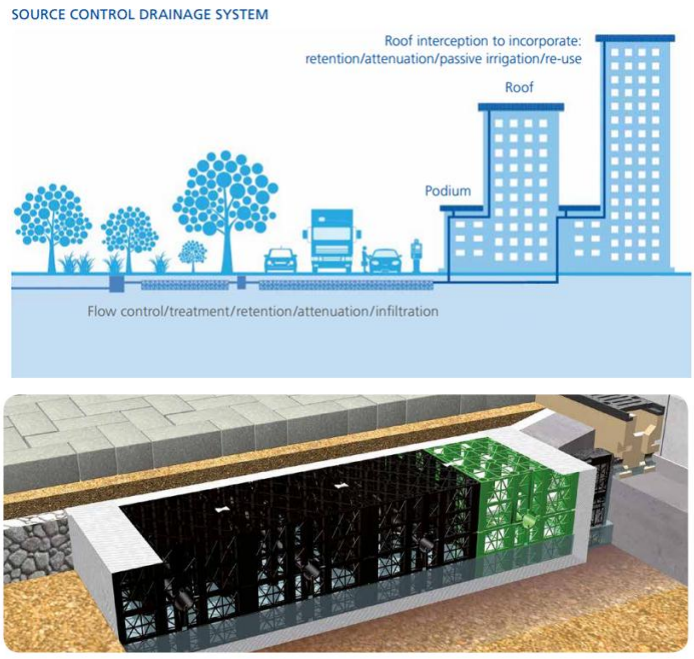

Image Credit: Polypipe

SUDS HIERARCHY

	DESIGN 1	DESIGN 2
STORE WATER FOR LATER USE	NOT INCLUDED	INCLUDED IN SCHEME THROUGH COORDINATION WITH MEP ENGINEER
INFILTRATION	NOT POSSIBLE	NOT POSSIBLE
PONDS AND OPEN FEATURES	NOT POSSIBLE/PRACTICABLE	NOT POSSIBLE/PRACTICABLE
STORAGE IN TANKS OR SEALED WATER FEATURES FOR GRADUAL RELEASE	STORAGE PROVIDED IN RAIN GARDENS AND BASEMENT TANK	STORAGE PROVIDED THROUGH SUBBASE REPLACEMENT ATTENUATION CRATES

KEY CHALLENGES

- Balancing what is practicable with the needs of LBHF and TW.
- Balancing the architects and clients visions with the needs of LBHF and TW.
- Tight program to produce original planning information and amendments.
- No 3rd party project manager

KEY SUCCESSES

- Collaboration and communication between drainage team and LBHF Drainage Officer to reach a swift solution.
- Gaining investment from the wider team to work with us to develop a solution to address the LPA's concerns without compromising their vision.

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LESSONS LEARNT

- Early consultation pays off – Pre App would have identified requirements early.
  - Allowance for time in the programme early tends to be time saved later.
- Awareness of the importance of SUDs is essential to gaining buy in from the team / all players.
  - Incorporating SUDs into the scheme early avoid surprises and allows measures to be central to the design not a late addition.

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