

GI Audits & Delivering green infrastructure in our Cities and Towns

Arup – Cities Alive



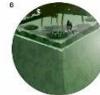
Automated public transport is advancing rapidly. In the future we can expect to see more diverse electric cars, buses and taxis in the streets. This will reduce the congestion and air pollution on the car, lower pollution and congestion, increase safety, make cities for people and provide the opportunity for green outdoors.



Vertical farming may become more common as urban populations increase and available space shrinks. The use of roofs, vertical spaces and basements to grow crops could lead to more environmentally friendly distribution routes, healthier diets and higher yields.



In denser city environments **public realm, streets and squares** will gain in importance as vital places for people to meet, move and socialize. Large city trees and urban woodlands will be more essential than ever to create attractive and healthy spaces with corrective microclimates, healthier diets and higher yields.



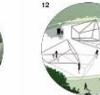
Green roofs, walls and facades can help to become more resilient in cities, as we need to adapt to and rebuff the forces of the city. They are spaces for recreation and nature, supporting valuable ecology, as pleasant places for urbanites to help out. They help reduce pollution, reduce warming, reduce rainwater runoff and improve air quality, and they should incorporate or support multimedial deep features like temporary floodable areas to provide climate change resiliency.



Cool city parks – spaces for large urban populations to socialize, exercise, keep healthy and escape – will become even more important. New green spaces will need to be created to provide vital urban cooling, shade and weather protection, and they should incorporate or support multimedial deep features like temporary floodable areas to provide climate change resiliency.



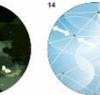
Extensive green networks through the city are the aim of a green infrastructure design approach. Networks can be formed over time to create an urban greening 'top ecosystem' that can support the sustainable movement of people, goods, services and provide substantial climate change adaptation.



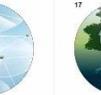
Entertainment in the urban environment for citizens is very likely to move into the digital age. Features such as interactive installations allocated to current urban environments will provide opportunities for social interaction, community movement and tourism – all essential for successful cities.



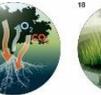
Green corridors provide important routes for wildlife to migrate and travel through the city. Urban green spaces are for more effective urban climate. This is a key objective of a green infrastructure design approach. Another key objective is to provide 'smart lighting' that responds to the power of people, providing security while also saving energy.



Smart weather covering could help keep public spaces usable in varying conditions. This may include covers that rain events or when sunburning is intense. By collecting solar energy during daylight they could provide 'smart lighting' that responds to the power of people, providing security while also saving energy.



Large green trees need to form a vital component of a green infrastructure city ecosystem. For the multiple benefits they deliver, which include a role as the 'carbon sinks' a city can get. They also provide shade and sustainable drainage for flood protection, and a higher percentage of large trees is essential to generate better microclimates. Greater city trees will help provide microclimates and better urban quality.



Urban wetlands will need to become more commonplace as essential and working city components to filter storm protection, reduce flooding and need beds for cleaning and purifying water through natural processes. These habitats can also support attractive and significant wildlife areas to increase city biodiversity.



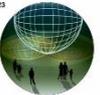
'Tactical' public realm areas and streets will continue to increase city 'smart greening' in the city. **Healthy streets and urban squares** will need to work harder, incorporating more permeable surfaces and sustainable drainage for flood protection, and a higher percentage of large trees is essential to generate better microclimates. Greater city trees will help provide microclimates and better urban quality.



Glowing trees are being researched for entertainment and recreation with light and sound. These spaces can be used for public or commercial events and increase the attractiveness and success of urban spaces.



Interactive spaces provide the opportunity for entertainment and recreation with light and sound. These spaces can be used for public or commercial events and increase the attractiveness and success of urban spaces.



Glowing pavements can contribute to the pathway to smart greening with light and sound. These spaces can be used for public or commercial events and increase the attractiveness and success of urban spaces.



With land at a premium, creating city space for people will need to be considered. **Automated care** will act to improve safety for pedestrians, while lowering risk and noise to create better city environments where people come first.



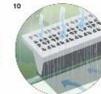
City environments will need to be modified to design or retrofit **sustainable drainage systems** within streets and city green spaces to better cope with predicted extreme weather events. Measures may also include permeable pavements for public realm and 'water roads', designed to hold stormwater which is also crucial for conservation and drainage systems.



Green bridges can maintain important links in green infrastructure city systems. They also act to provide corridors for wildlife, corridors to benefit city biodiversity, and bring opportunities for healthier living, quality and pedestrians encourage our waterways and rivers.



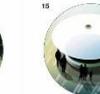
The urban environment will need to work harder in the future in order to provide better uses when city space is in demand. **Adaptable public spaces** can be designed for multiple functions, as meeting needs, markets and entertainment and education centres. This approach will help local business and originate local community space.



Bike sharing is already very popular in many cities, and research shows significant health benefits to city dwellers who are provided with convenient cycle ways and good facilities. This trend needs to be encouraged – opening up delivery public transport and making better use, along with innovative solutions such as underground bike racks, it can help save valuable city space.



Finding city space for urban recreation may look to replicate existing city infrastructure above ground or over existing space or **underground parklands**. Cities are already pioneering research into how to integrate green spaces in tight urban footprints. Urban greening should be designed to city by multiple layers within the city to effectively utilize available space.



Solar panels are likely to become more commonplace as cities look to spread the energy used. This is also necessary a cornerstone of municipal environmental policy in many cities. With zero carbon emissions they can effectively provide heat and power to urban structures.



Our urban environments may become closer to go to **smart greening** reality, especially as cities get smaller and more sustainable. This provides opportunity for new awareness of the city as well as practical solutions to way-finding, navigation and tourism.



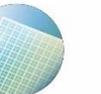
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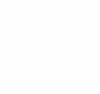
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Arup – Wildscreen & Pocket Habitats



Retrofit is about using the space we have more effectively

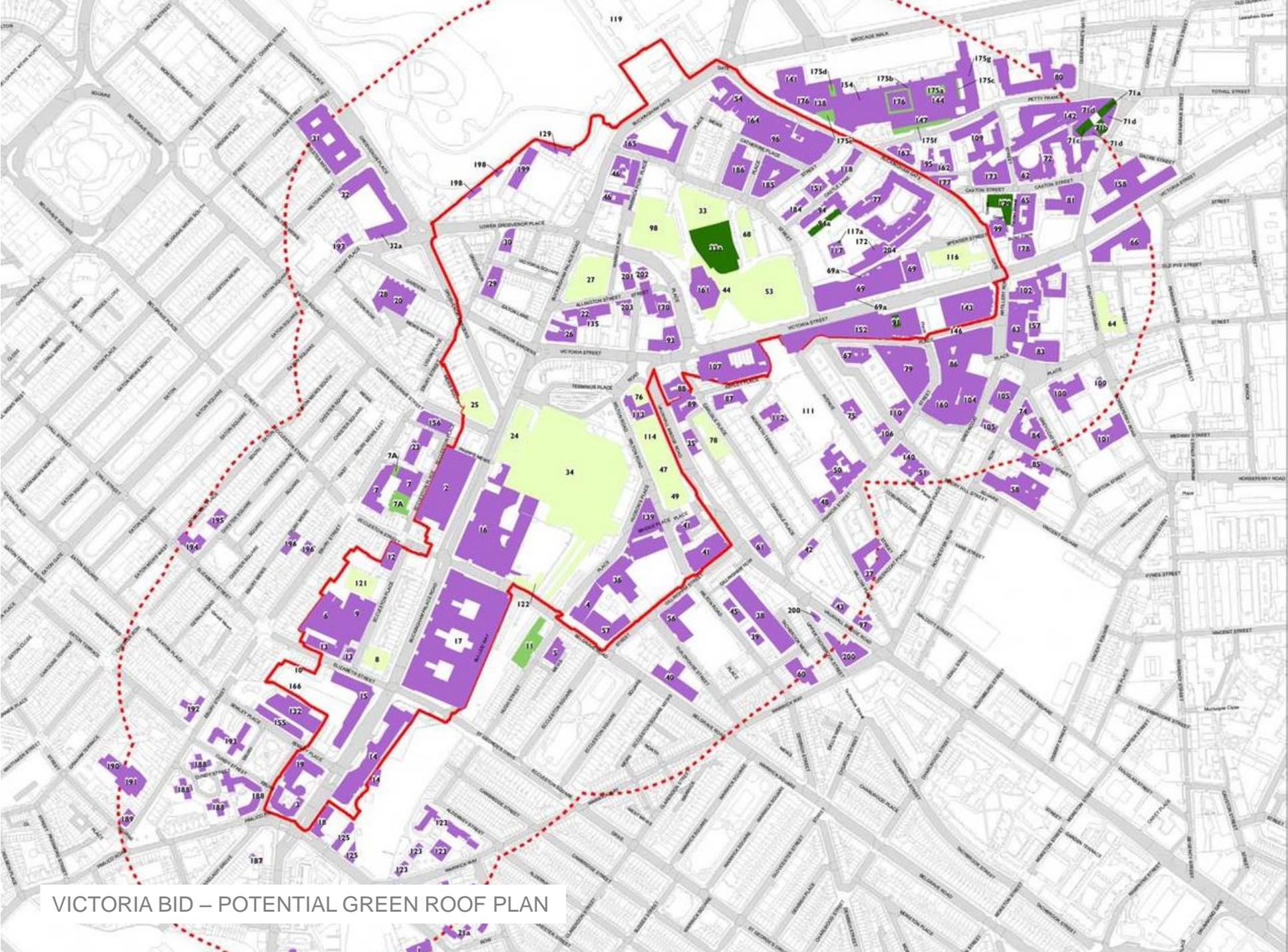
New build is about planning green infrastructure at the start - as an integral and equal component

‘Cities need green in sizes **S, M, L**
and XL otherwise the human
ecosystem is incomplete’

Arup – Green Infrastructure (GI) Audit

- Partnership with Victoria Business Improvement District
- Interviews with 50 organisations as well as reviews of ten completed GI Audits
- Determining best practice when carrying out GI Audits





VICTORIA BID – POTENTIAL GREEN ROOF PLAN



ST. ERMIN'S
BEE & BEE HOTEL

ST ERMIN'S BEE & BEE HOTEL, VICTORIA LONDON



RUBENS HOTEL IN VICTORIA- LONDON'S LARGEST GREEN WALL

Arup – GI Audit, Calderbank

- Mike Batley, CSGNT
- “to discover a new rationale for the main street that provides a range of local benefits which together prioritise sustainability in all its forms”
- GI Audit
- Public consultation





VILLAGE
ENTRANCE
- BASELINE



PROPOSAL



SIDE STREET
- BASELINE



PROPOSAL





CENTRAL
MEDIAN
- BASELINE



PROPOSAL

WALL &
PAVEMENT
- BASELINE



PROPOSAL

Arup – Cardowan SWMP

- Glasgow City Council
- “SWMP for the Cardowan Catchment”
- Garthamlock Community Growth Area
- Scottish Water sewers already at capacity



JERVISION ROAD - BASELINE



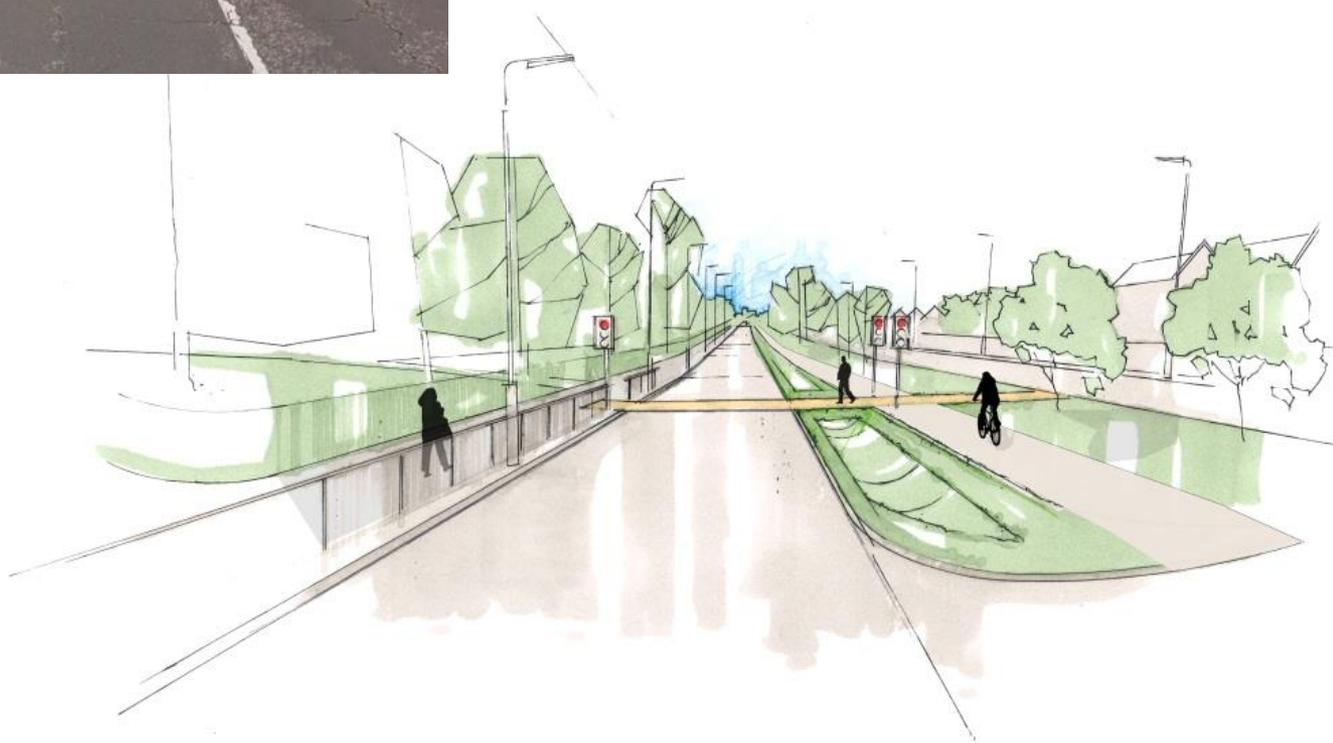
PROPOSAL

CRANHILL
PARK
- BASELINE



PONDS PROPOSAL

EDINBURGH ROAD - BASELINE



PROPOSAL

London Ecology Masterplan The Crown Estate

*'When one tugs at a single thing in nature
he finds it attached to the rest of the world'*

– John Muir, 1901





THE CROWN ESTATE – GREEN LINK - REGENTS PARK TO ST JAMES PARK

Timeline

50 year+ vision

Wide stakeholder consultation to guide Masterplan production

Review of existing buildings and opportunities for retrofit

Early involvement in building design process for all new developments

Baseline habitat and species surveys across whole Estate

Repeat every 2-10 years depending on species

Individual monitoring programs for all green infrastructure



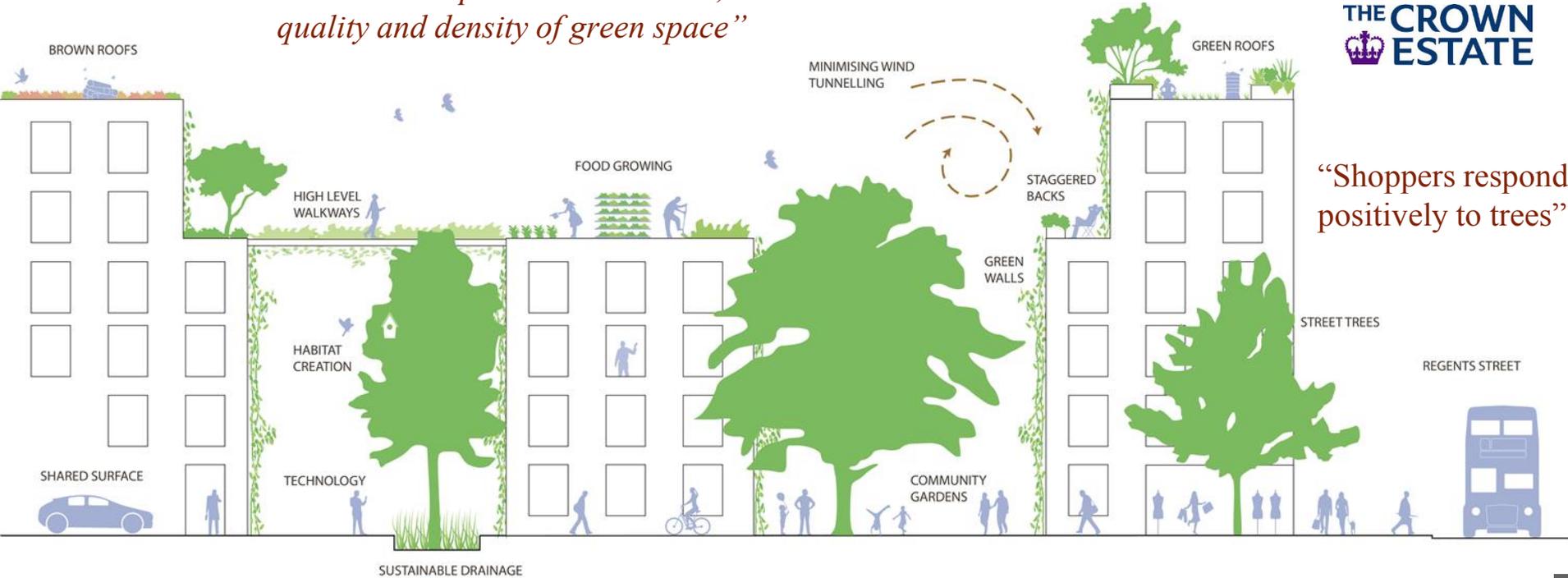
“There is increasing evidence that nature in the urban environment is good for both physical and mental health”

“Tree canopy helps create a sense of place”

“Trees can also enhance traffic calming measures”

“Good quality public environment can improve trading”

“A significant correlation was found between land prices and distance, quality and density of green space”



“Shoppers respond positively to trees”

“Visitors judge districts with trees as more pleasant”

“Desk workers who have a view of nature report better job productivity”

“Trees and parks can reduce local air temperature by 0.5-5°C”

Implementation



Public Participation



Walking app



Live webcams



Public website



Tenant gardening clubs



Bird watching tours

fraser.maxwell@arup.com

0131 3311999

<https://uk.linkedin.com/pub/fraser-maxwell/32/529/965>

Any Questions?