

Future Highways Research Group

FHRG Waypoint Meeting: Q1, 2025

Virtual (MS Teams)

ADEPT / Proving Research Partnership



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Welcome

Hannah Bartram, ADEPT

Agenda



- **Welcome, Introductions & ADEPT Update** (Hannah Bartram, CEO, ADEPT)
- **Local Government Headlines** (Chris Ames, Deputy Editor, Highways Magazine)
- **Members' Network News** (FHRG Members)
 - News and announcements from FHRG members.
- **Research Programmes Update**
- **ADEPT, FHRG & DfT(?) Carbon Leadership Programme** (Simon Wilson, FHRG)
 - Programme overview.
 - New Toolkit: Carbon Footprint Toolkit
 - Rationale.
 - Toolkit demonstration.
 - Carbon Analyser repurposing and general use depreciation.
- **Carbon Best Practice Assessment** (Karen Farquharson, FHRG)
 - Pilot outcomes.
 - Next steps.
- **DfT Collaboration** (Simon Wilson & Hannah Bartram)
 - Endorsement, support and funding?

Agenda

Continued...



- **Beyond PFI – Streetlighting** (Simon Wilson & Andy Perrin, FHRG)
 - Business requirements.
 - Options analysis (a thoughtful, comprehensive options set).
 - Future Options Analysis Toolkit and assessment process overview.
 - Options selection and OBC development.
- **Telegraph Campaign** (Simon Wilson & FHRG Members)
 - Thoughts and observations?
 - Should we respond? If so, how?
- **Greenspace Tools to Simplify Nature Recovery Management** (Graeme Forward, Kaarbontech)
 - Driving and informing nature recovery and adaptation.
- **Comfort Break (10 Minutes)**

Agenda

Continued...



- **LTICBT Benchmarks for Carbon Analysis** (Raiad Shazad, DfT)
- **AI Research Project (Simon Wilson, Proving)**
 - Outcomes and conclusions from November workshops.
 - Initial benefits case.
 - Initial benefits assessment.
 - Interim conclusions.
 - Next steps
- **Devolution (FHRG members)**
 - What role should the FHRG play going forward?
 - Sharing learning from colleagues who have experienced devolution?
- **Date of Next Meeting & AOB**
- **Close**



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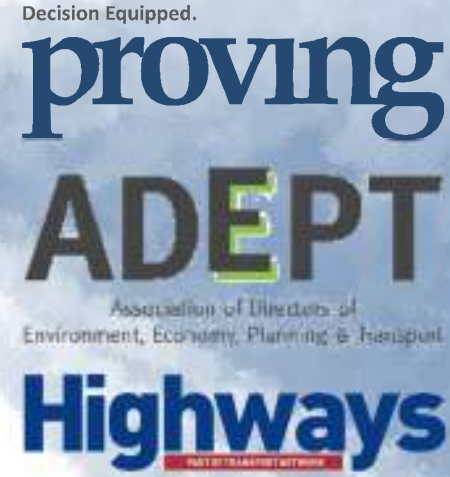
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Sector News: Highways Magazine

Chris Ames, Deputy Editor



Research Programme Updates

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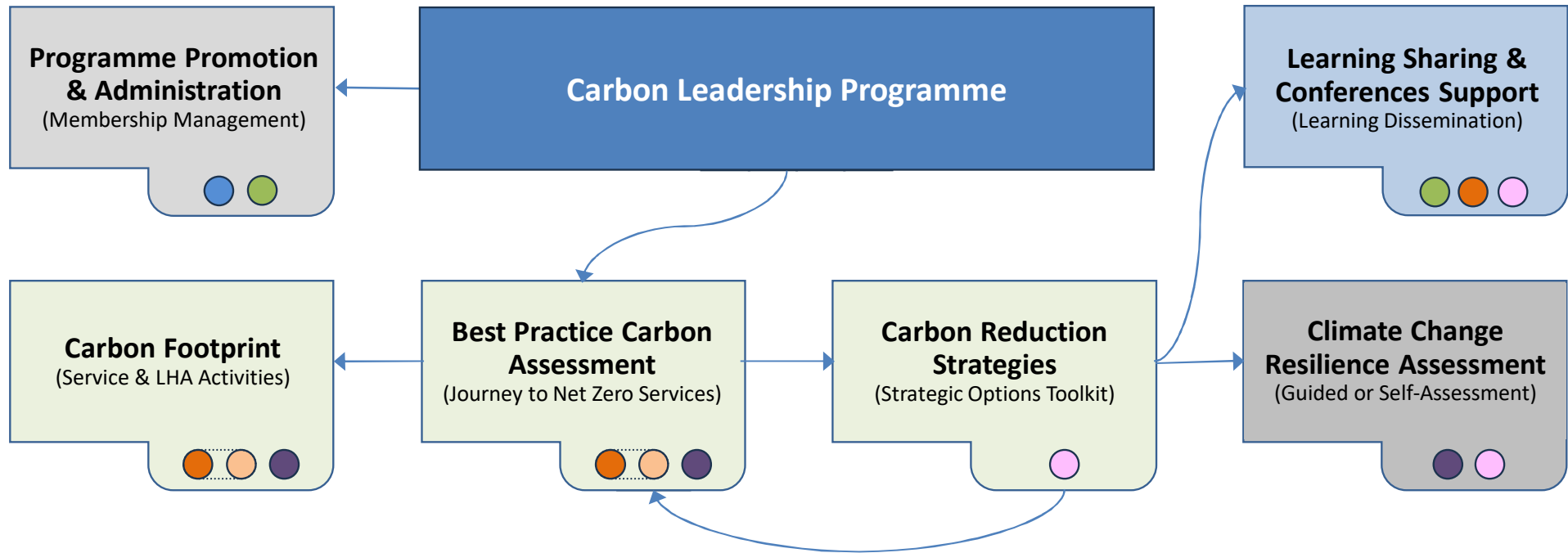
Carbon Leadership Programme

ADEPT, FHRG & (Possibly) DfT

(Simon Wilson)

Carbon Leadership Programme

Overview



- ADEPT Membership Management
- Carbon Support Partners
- ADEPT Promotion (Coast Communications)
- ADEPT Peer Reviewers
- Proving (Carbon Analysis & Benchmarking)
- Thought Leaders & Training Partners

**Preliminary & Tentative
For Discussion Purposes Only**



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Carbon Leadership Programme: Carbon Footprint Assessment

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(Simon Wilson)

New Carbon Footprint Assessment Toolkit



The CLPT has greater utility than Carbon Analyser, as it includes:

- **Whole-service carbon footprint analysis.**
 - Maintenance and,
 - New scheme construction.
- **Carbon profiling (activities and schemes).**
 - With online links to 5 emissions factor databases.
- **Best practice assessment (journey to net zero).**
 - 134 weighted factor assessment of LHA carbon management performance.
- **Strategic carbon reduction options.**
 - Business change portfolio management and reporting.
- **In May 2025, the toolkit will include a *Climate Change Resilience Assessment*.**
- **Benchmarking across all dimensions.**
 - Using the new uniform services framework for like-for-like benchmarking.

The new toolkit runs in Office 365 Excel and Microsoft Azure. This new arrangement significantly reduces the operating costs.

New Carbon Footprint Assessment Toolkit



Carbon Analyser was built as a research instrument. Its purposes included:

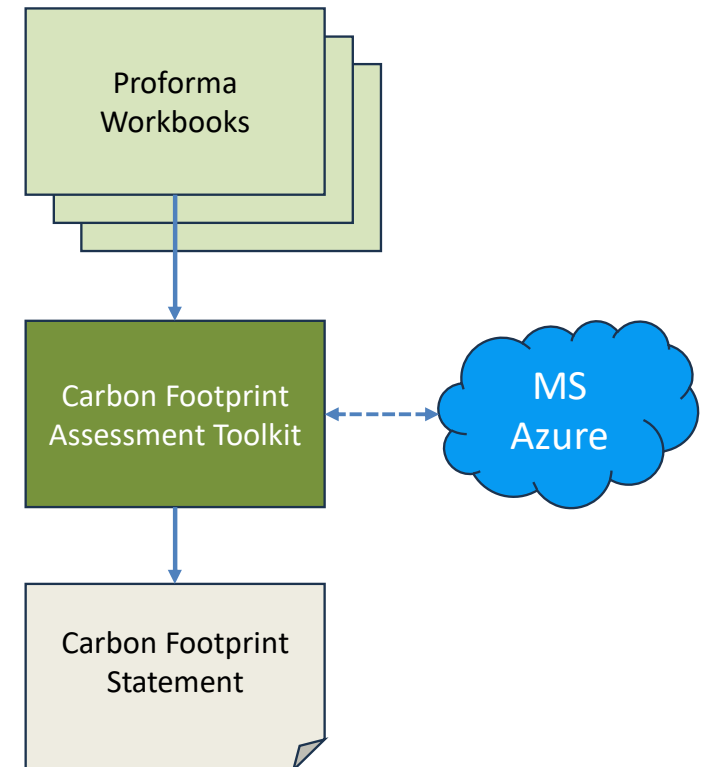
- Assessing the structure, methods, and calculations of the CCAS guidance.
- Assessing the various emissions factors proposed for the highways sector.
- Assessing the readiness (capabilities and capacities) of LHAs and their supply chain partners.
- Designing future, efficient, repeatable carbon accounting processes.
- Gathering data for the purposes of benchmarking.
- Preparing for a successor toolset to reduce the resources and costs for carbon accounting.

The new Carbon Leadership Programme Toolkit (including the Carbon Footprint Assessment (CFA) toolkit) has been developed based on 4.5 years of FHRG research and learning; all supported by the datasets produced using Carbon Analyser. The new toolkit will replace Carbon Analyser on the 31st March 2025. General access to the original Carbon Analyser instrument will be terminated on that day. All logins and passwords have been transferred to the new tool.

Carbon Footprint Assessment Demonstration



- **Simpler and faster assessments than Carbon Analyser.**
 - Using a blend of bottom-up and top-down analysis.
 - Preset functions and emission factors.
 - Months of data collection become days.
- **Easy account administration.**
 - Create your own accounts and users.
- **Simple proforma for those not using the toolkit.**
 - With a one-step import of data from supply chain partners.
- **Carbon Footprint Assessment Demonstration**





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Carbon Leadership Programme: DfT Collaboration?

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DfT Collaboration?



- **Possibly... discussions are in progress... all to be agreed.**
 - May / may not be mandated... linked / not linked to the incentive fund.
 - May be part or fully DfT funded.
 - Data will be used to create a UK carbon signature for local roads.
 - To inform future services planned and investments.
 - Currently with DfT procurement, so no decisions yet.
- **Will be an ADEPT-led and administered programme.**
 - Discussions currently exclude other components of the CLP.
 - Will be offered to all LHAs in the UK, prioritising FHRG members.
- **We will update you when the procurement process concludes.**



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Carbon Leadership Programme: Carbon Best Practice Assessment

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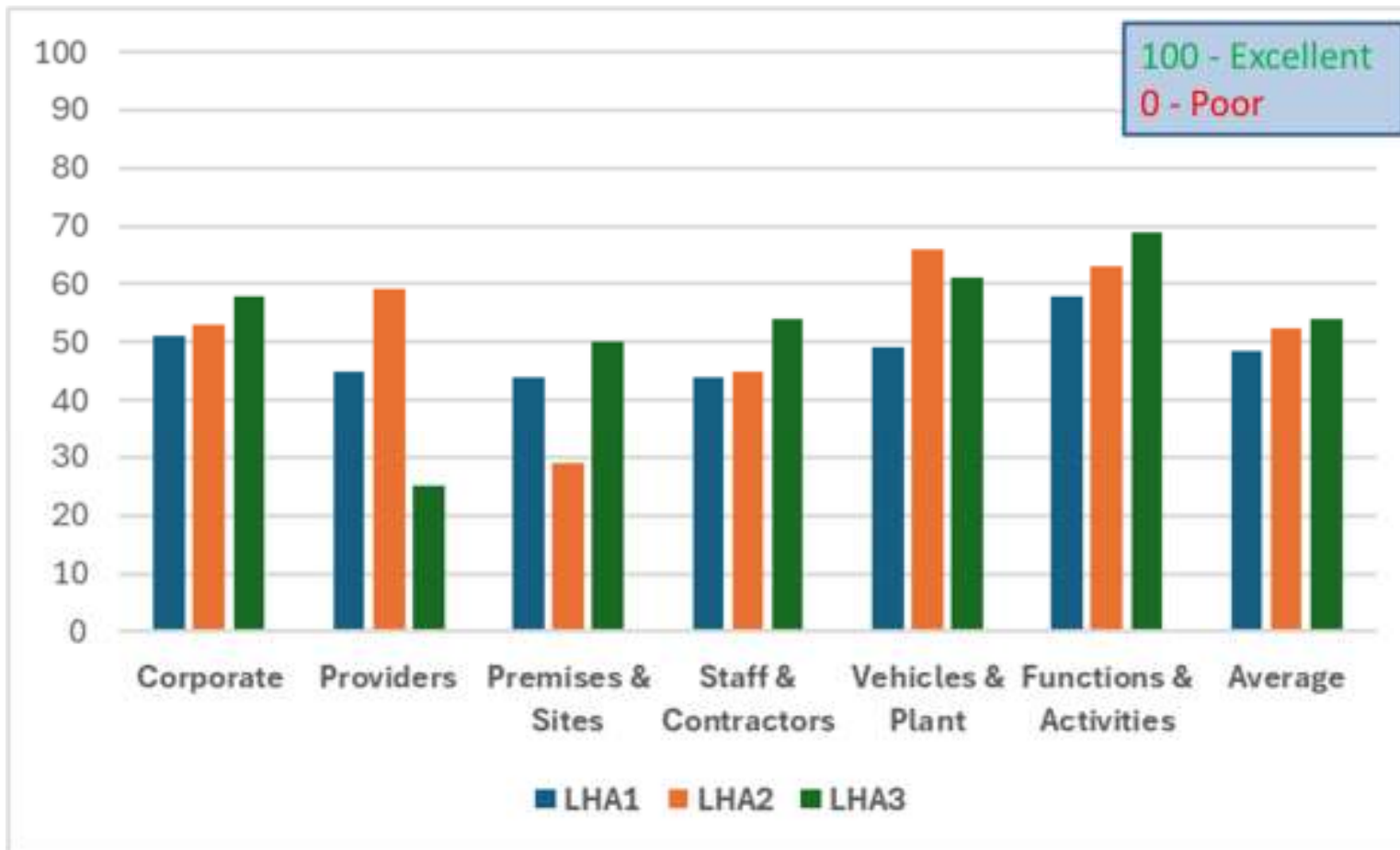
(Karen Farquharson)

Carbon Reduction Assessment Summary

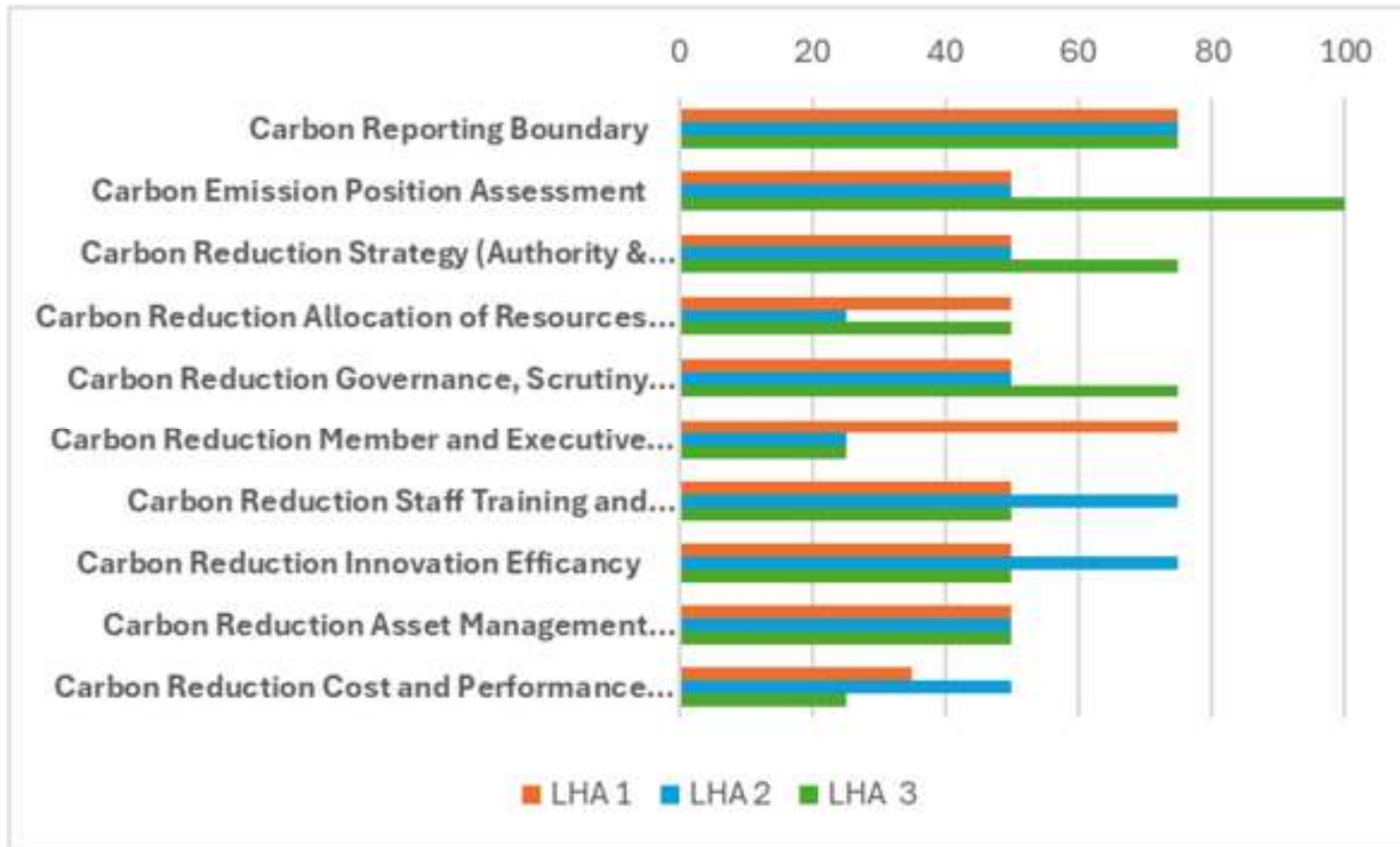


- **Completed three assessments (Dorset, Devon and Cheshire West & Chester).**
- **Building a profile of authority focus, activity and progress in reducing carbon emissions.**
 - Understanding of good practice and operational challenges.
- **Participating authorities are developing business plans, based on the priority improvements identified, to further reduce carbon emissions and progress towards net-zero.**
- **Supported by the carbon audit to record actual emissions.**

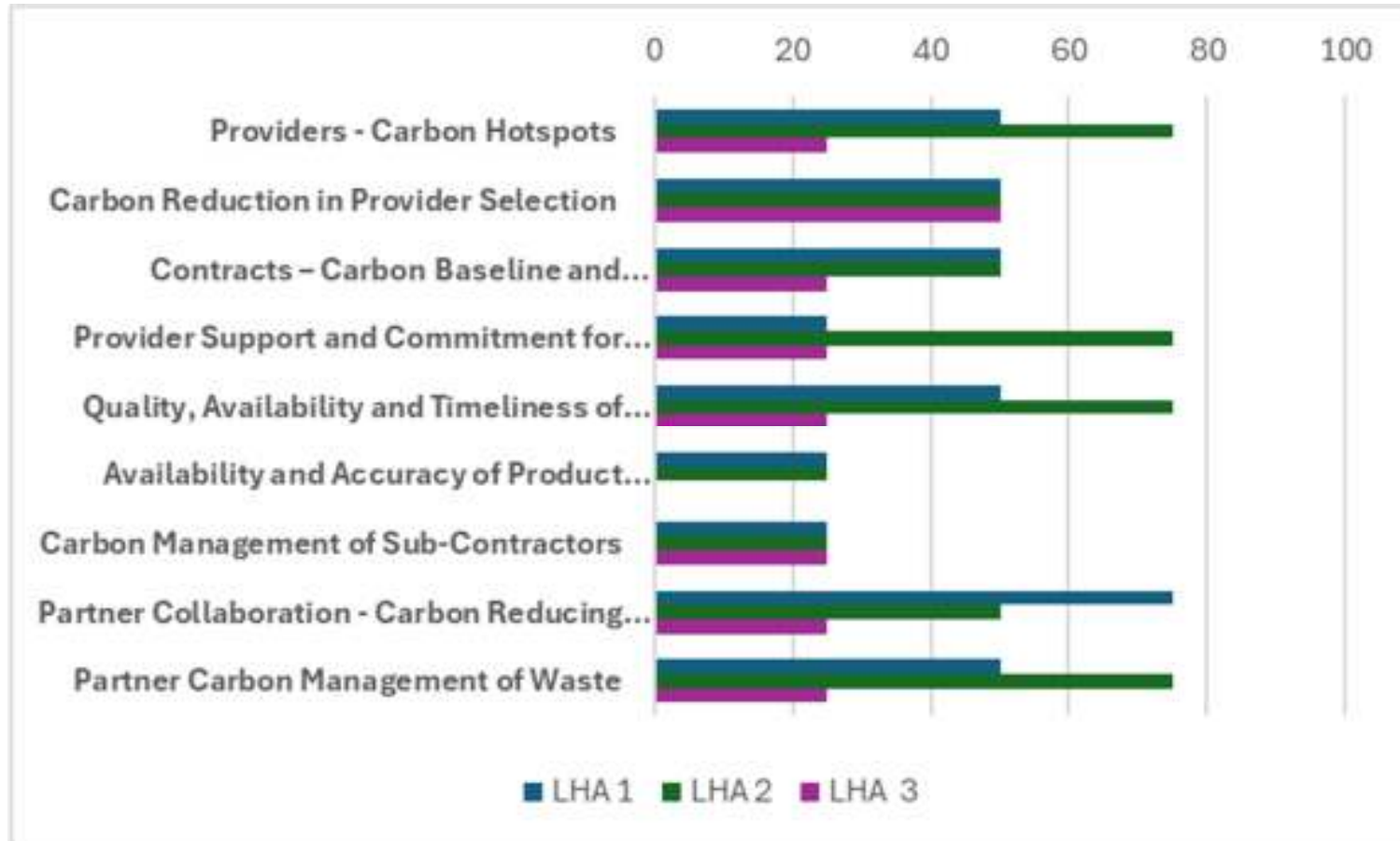
Carbon Assessment Summary by Dimension



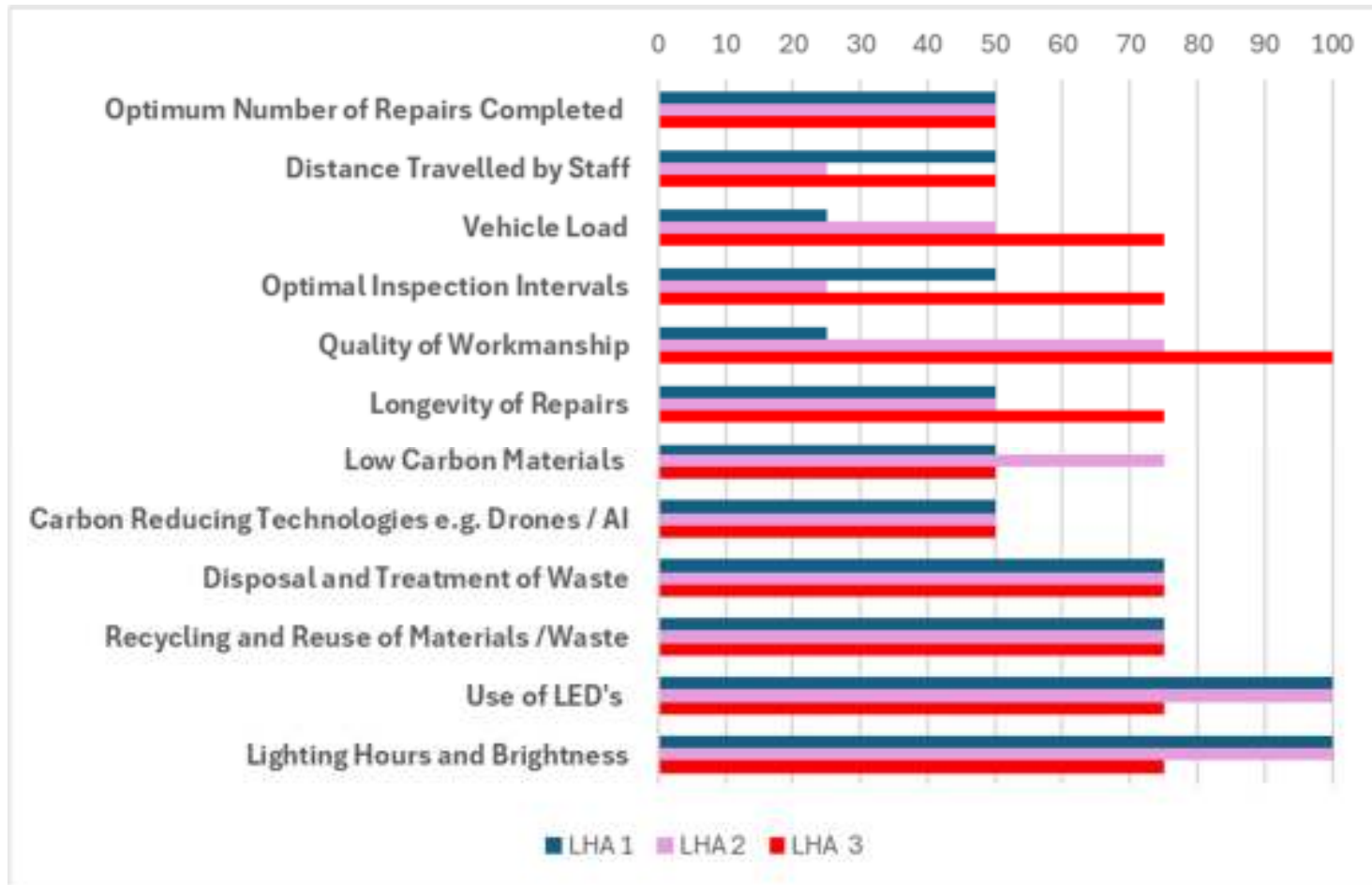
Corporate / Service Carbon Policy



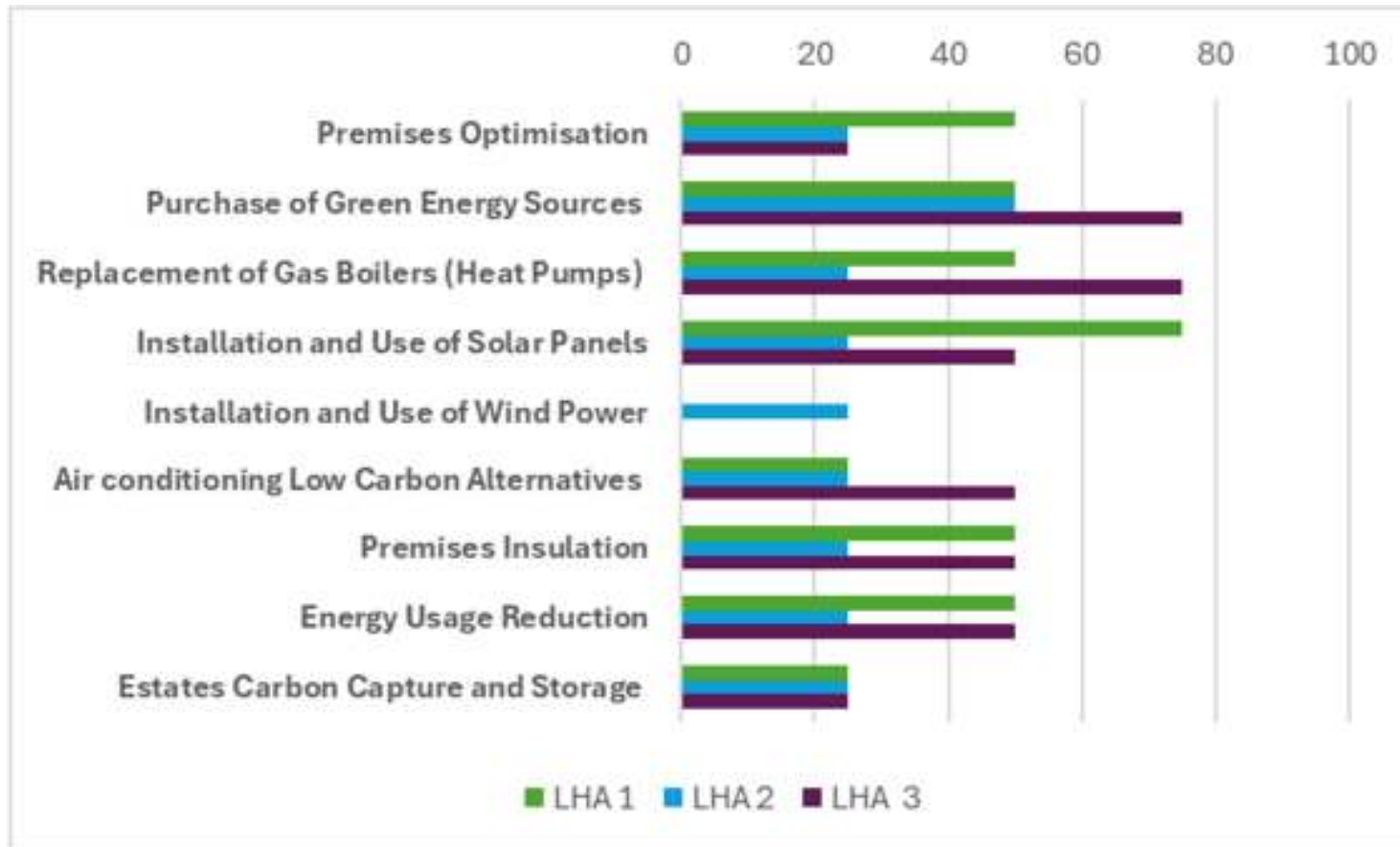
Purchased Goods and Services / Provider Management



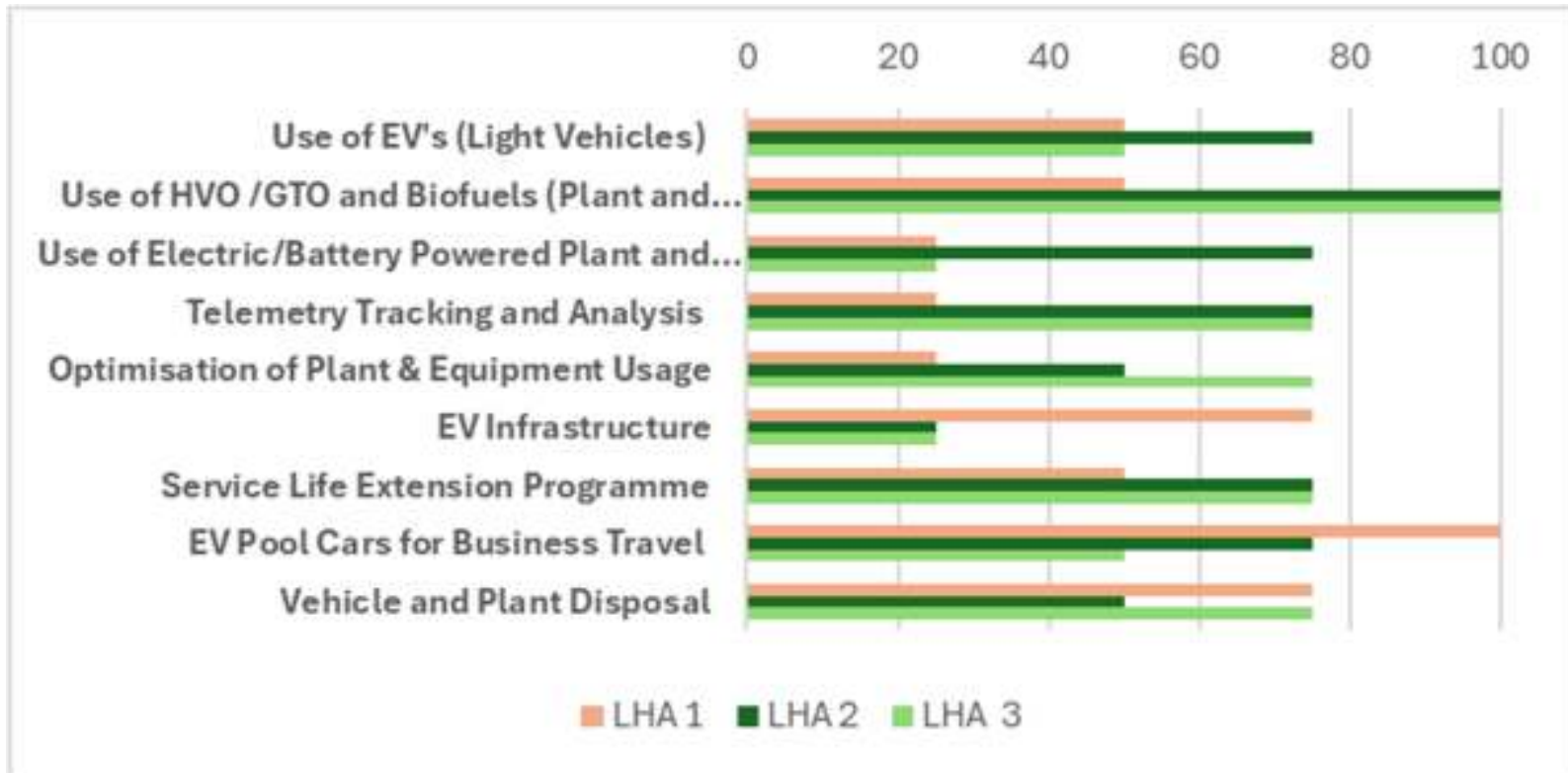
Functions & Activities Carbon Reduction



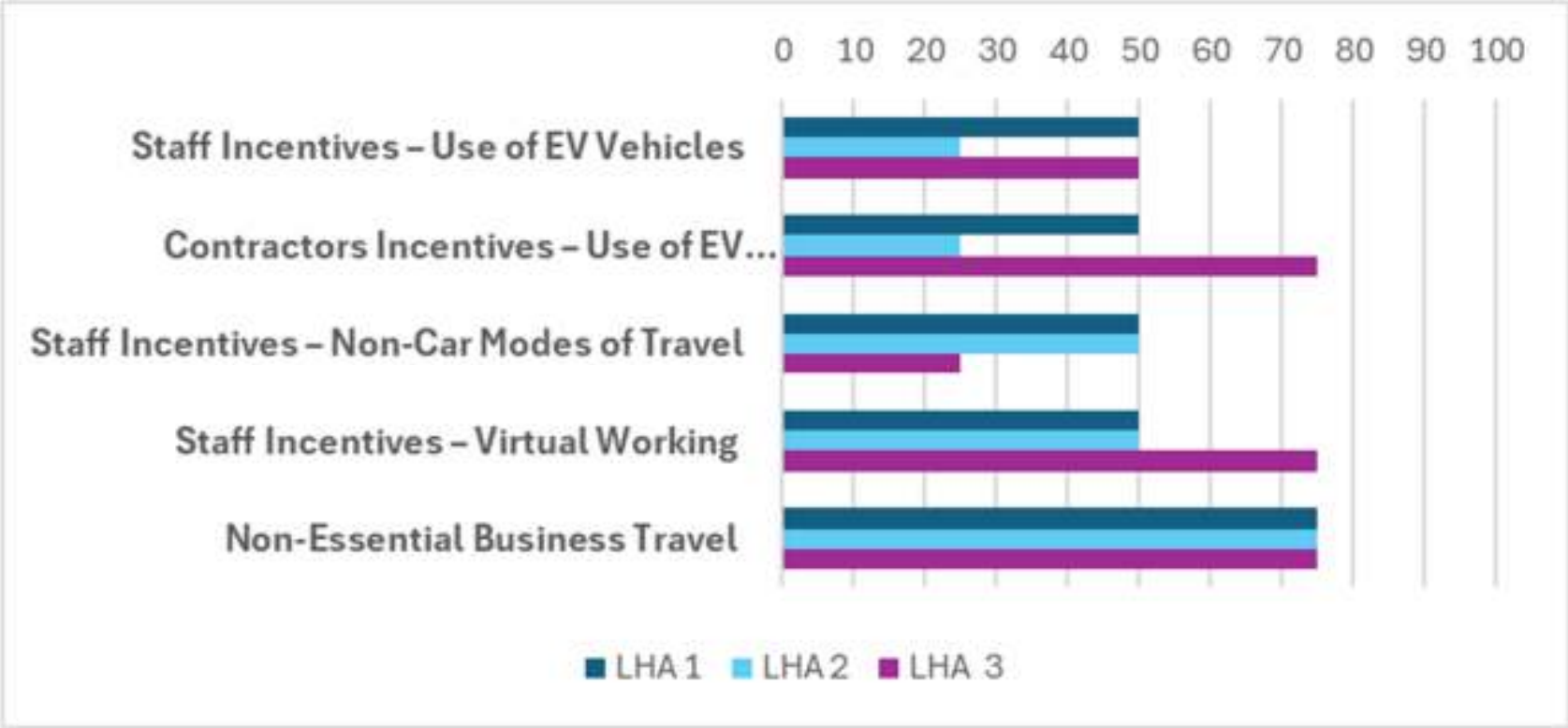
Premises & Sites Carbon Reduction



Vehicles & Plant Carbon Reduction



Staff & Contractors Carbon Reduction

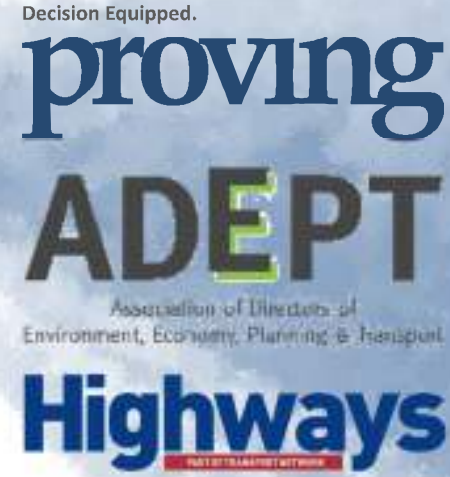


Carbon Reduction Prioritised Opportunities



ID	Factor Name	Weighting	Score (Text)	Score	Confidence	Opportunity (Text)	Opportunity	Priority
110	Carbon Reduction Cost and Performance Impact and Risk Assessment	100	Requires Improvement [25]	25	50	Definitely [100]	100	18.8
201	Providers - Carbon Hotspots	100	Requires Improvement [25]	25	25	Definitely [100]	100	18.8
204	Provider Support and Commitment for Service Carbon Reduction	100	Requires Improvement [25]	25	100	Definitely [100]	100	18.8
209	Partner Carbon Management of Waste	100	Requires Improvement [25]	25	100	Definitely [100]	100	18.8
506	EV Infrastructure	100	Requires Improvement [25]	25	75	Definitely [100]	100	18.8
203	Contracts – Carbon Baseline and Reduction Targets	75	Requires Improvement [25]	25	75	Definitely [100]	100	14.1
208	Partner Collaboration - Carbon Reducing Innovation	75	Requires Improvement [25]	25	100	Definitely [100]	100	14.1
301	Premises Optimisation	75	Requires Improvement [25]	25	100	Definitely [100]	100	14.1
503	Use of Electric/Battery Powered Plant and Equipment	75	Requires Improvement [25]	25	100	Definitely [100]	100	14.1
108	Carbon Reduction Innovation Efficacy	100	Satisfactory [50]	50	100	Definitely [100]	100	12.5
206	Availability and Accuracy of Product Emission Factors (Tiers 1 & 2)	50	Poor [0]	0	100	Definitely [100]	100	12.5
310	Premises Insulation	100	Satisfactory [50]	50	50	Definitely [100]	100	12.5
501	Use of EV's (Light Vehicles)	100	Satisfactory [50]	50	75	Definitely [100]	100	12.5
403	Staff Incentives – Non-Car Modes of Travel	75	Requires Improvement [25]	25	100	Probably [75]	75	10.5
104	Carbon Reduction Allocation of Resources (both Financial and Staff)	100	Satisfactory [50]	50	50	Probably [75]	75	9.4
106	Carbon Reduction Member and Executive Engagement	50	Requires Improvement [25]	25	75	Definitely [100]	100	9.4
109	Carbon Reduction Asset Management Planning	75	Satisfactory [50]	50	25	Definitely [100]	100	9.4
205	Quality, Availability and Timeliness of Carbon Data	50	Requires Improvement [25]	25	100	Definitely [100]	100	9.4
207	Carbon Management of Sub-Contractors	50	Requires Improvement [25]	25	100	Definitely [100]	100	9.4
311	Energy Usage Reduction	75	Satisfactory [50]	50	75	Definitely [100]	100	9.4
402	Contractors Incentives – Use of EV Vehicles	75	Satisfactory [50]	50	75	Definitely [100]	100	9.4
602	Optimum Number of Repairs Completed	100	Satisfactory [50]	50	50	Probably [75]	75	9.4
603	Distance Travelled by Staff	100	Satisfactory [50]	50	50	Probably [75]	75	9.4
609	Low Carbon Materials & Processes	100	Satisfactory [50]	50	75	Probably [75]	75	9.4

* The Priority is calculated by Weighting x Score x Opportunity to Improve



Beyond PFI: Options Analysis

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Situation & Business Requirements



- **Situation**

- 31 authorities currently have PFI streetlighting contracts.
- These contracts are maturing over the next six years.
- Alternative services delivery approaches are required.

- **Business Requirements**

- Operational continuity is critical.
- Rapid new technologies implementation.
- Additional business benefits include:
 - Lower-cost operating models,
 - Efficiency improvements,
 - Increased operational control,
 - Public safety assurance,
 - Local energy generation and carbon offsetting.
- A comprehensive exploration of the future options is required.
 - Including *value for money*, and *strategic fit* and *achievability* analysis.

Authority Impact



Barnet Street Lighting	Islington Street Lighting	Rochdale Street Lighting
Blackpool Street Lighting & Traffic Signals	Knowsley Street Lighting & Sign Replacement	South Tyneside Street Lighting
Cambridgeshire Street Lighting	Lambeth Street Lighting	Southampton Street Lighting
Coventry Street Lighting	Leeds Street Lighting	Staffordshire Street Lighting
Croydon & Lewisham Street Lighting	Manchester Street Lighting	Stoke Street Lighting
Derby Street Lighting	Norfolk Street Lighting	Sunderland Street Lighting
Dorset Street Lighting	North Tyneside & Newcastle Street Lighting	Surrey Street Lighting
Ealing Street Lighting	Northamptonshire Street Lighting	Wakefield Street Lighting
Enfield Street Lighting	Nottingham City Street Lighting	Walsall Street Lighting
Hampshire Street Lighting	Oldham Street Lighting	West Sussex Street Lighting
	Redcar and Cleveland Lighting Services	■ FHRG Member

Proposed methodology



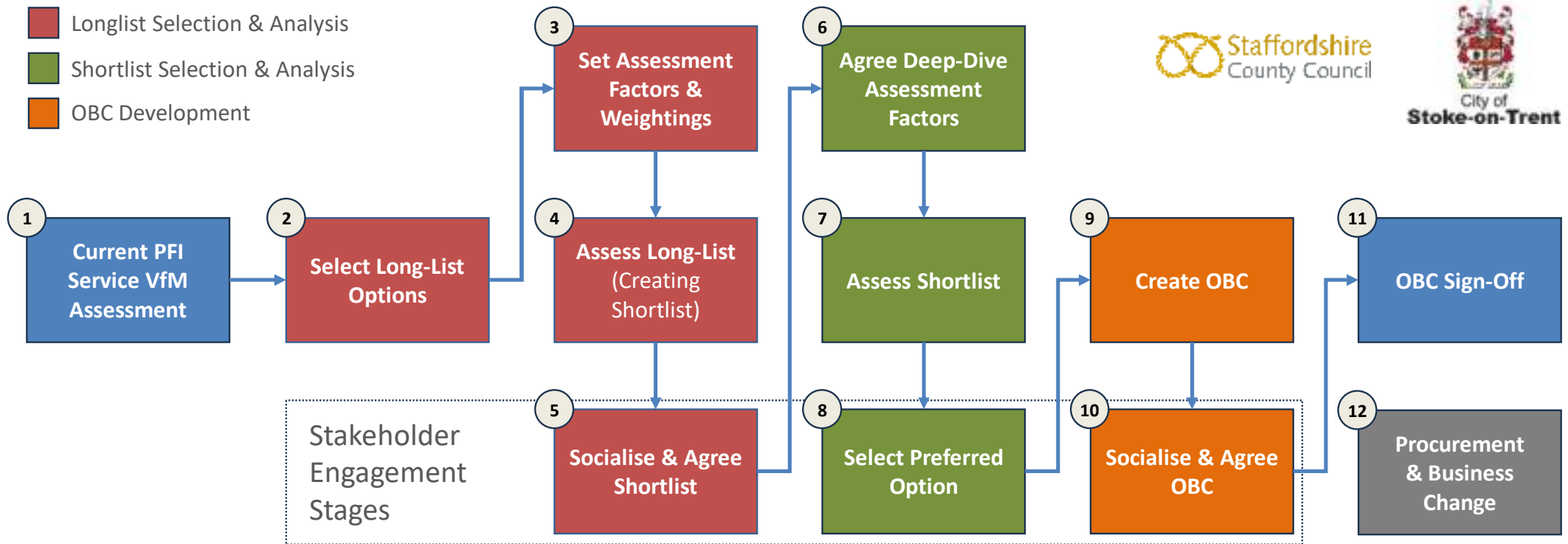
- **We propose to address this challenge by adopting a methodology similar to the service level future options assessments that has been undertaken with 16 LHAs over the past four years.**
- **This methodology applies a six-stage approach:**
 - Undertake a baseline value for money assessment of the current service, to gain a comprehensive understanding of current performance.
 - Determine the medium-term strategic objectives for the service, against which the chosen future operating will need to deliver.
 - Determine and define a long-list of potential future operating models.
 - Score each long-listed potential operating model in terms of:
 - Strategic fit
 - Attractiveness (VfM)
 - Achievability
 - Repeat stage four at a more granular level for the top scoring three to five options.
 - Develop the Outline Business Case for the preferred option.
- **To gather the comparative data and intelligence necessary to complete this process, we will also survey FHRG members to gain an understanding of the form and performance of current operating models.**

Options Analysis (Staffordshire & Stoke City)

Process Route Map



- Longlist Selection & Analysis
- Shortlist Selection & Analysis
- OBC Development



Draft Baseline VfM Factor Set

Streetlighting



- **The tools, factor sets, and survey are all currently under development. These will be developed in conjunction with Staffordshire County Council and Stoke City Council, and any feedback from other FHRG members would be welcome.**
- **Our draft VfM baseline factor set for the streetlighting function is set out on the following slide. This includes a working set of medium-term strategic objectives for a streetlighting service.**
 - The factor set, weightings and strategic objectives will be tailored for each individual authority.

Draft Baseline VfM Factor Set

Streetlighting



ID	Dimension	Factor Name	Weighting
100	Economy	Economy Assessment	
101	Economy	PFI Costs (Combined Charge)	100
102	Economy	Equipment	100
103	Economy	Resource (Engineers / Operatives)	100
104	Economy	Energy	100
105	Economy	Management / Professional / Administration	80
106	Economy	Finance Costs	80
107	Economy	Internal Costs	0
108	Economy	Equipment	100
109	Economy	Energy	100
110	Economy	Management & Administration	80
111	Economy	Additional Resource	60
112	Economy	Other	40
113	Economy	Cost of Risk	
114	Economy	Cost of Compensation (Including CEs / Functional FTP Events)	80
115	Economy	Cost of Risk (Anticipated & Emergent)	60
116	Economy	Revenue Generation	
117	Economy	Income / Services Trading	40
118	Economy	Grant / Investment Winning	60
200	Efficiency	Efficiency (Operations) Assessment	
201	Efficiency	Operational Performance (PFI / Internal)	100
202	Efficiency	Installation	100
203	Efficiency	Maintenance	100
204	Efficiency	Inspections	100
205	Efficiency	Repairs	100
206	Efficiency	Electrical Works	100
207	Efficiency	Emergencies	100
208	Efficiency	Energy Management	100
209	Efficiency	Asset Management (Asset Inventory)	80
210	Efficiency	IT/IS & Control Systems	80
211	Efficiency	Information Gathering & Data Analysis	80
211	Efficiency	Stakeholder Management	80

ID	Dimension	Factor Name	Weighting
300	Effectiveness	Effectiveness Assessment	
301	Effectiveness	Condition of Assets	100
302	Effectiveness	A' and 'B' Class Roads	100
303	Effectiveness	Residential Roads (including Home Zones)	100
304	Effectiveness	Town Centre & Heritage Lighting	80
305	Effectiveness	Public / Amenity Lighting (Car Parks, NHS, Schools)	80
306	Effectiveness	Illuminated Signs & Bollards	60
307	Effectiveness	Car Parks, Subway and Tunnel Lighting	60
308	Effectiveness	Scope & Scales of Street Lighting Services Offered	75
309	Effectiveness	Carbon Emission Performance	100
310	Effectiveness	Level of Light Pollution	100
311	Effectiveness	Statutory Compliance	100
312	Effectiveness	Customer Satisfaction	100
313	Effectiveness	Brightness	100
314	Effectiveness	Lighting Hours	100
315	Effectiveness	Safety	100
400	Strategic Value	Improved Asset Performance	100
401	Strategic Value	Improved Operational Efficiency	100
402	Strategic Value	Cost Reduction	100
403	Strategic Value	Carbon Emission Reduction	100
404	Strategic Value	Improved Customer Satisfaction	100
405	Strategic Value	Revenue Generation	80
406	Strategic Value	Prompt Deployment of Proven New Technologies	80

Future Options Analysis

Scoring Tool and Methodology



- **A screenshot of the proposed options analysis tool is set out on the following slide, followed by summaries of:**
 - The proposed factor definitions.
 - The proposed scoring methodology.
- **Again, these will be developed through testing with Staffordshire County Council and Stoke City Council.**

Future Options Scoring Tool

Illustrative



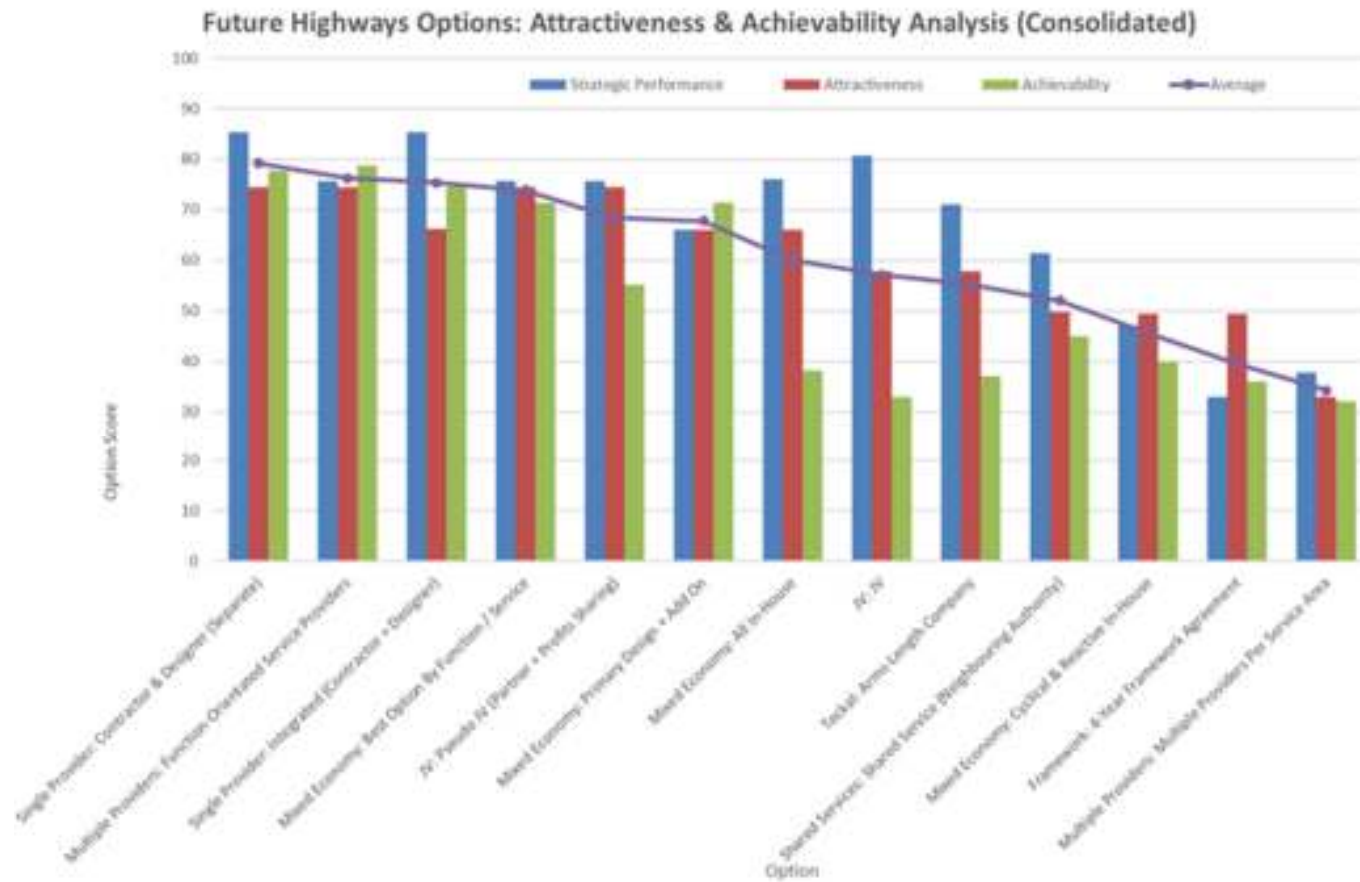
Refresh Data

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Option Family	#	Option Name	Strategic Performance							Attractiveness Analysis (VIM)		Achievability Analysis										Position Analysis								
			Improved asset performance	Improved operational efficiency	Cost reduction	Revenue generation	Carbon emissions reduction (including LED replacement programme)	Precept introduction of proven new technologies	Improved customer satisfaction	Total	Weight-Adjusted Score	Economy	Efficiency	Effectiveness	Stakeholder Value	Total	Weight-Adjusted Score	Complexity (Inherent Risk)	Capability & Capacity	Affordability	Authority Readiness	Provider Readiness	Sector Success Stories	Governance & Reporting	Partner Management	Cultural Alignment	Total	Weight-Adjusted Score	Attractiveness, Achievability & Strategic Performance	Rank
PEE	1	Corenet Service Model	+100	+100	+50	-50	+50	+50	-50	+36	+36	0	+50	-50	+50	+15	+13	+50	+50	0	-50	-100	+50	0	+50	+100	+17	+17	71.0	1
Single Provider	2	Directly Delivered Service (All In-house)								0	0				0	0												0.0	2	
	3	Single External Contractor								0	0				0	0												0.0	2	
Multiple Providers	4	Maintenance, Design, New/Upgrades								0	0				0	0												0.0	2	
	5	Geographic Areas								0	0				0	0												0.0	2	
Framework	6	Primary + Secondary (Risk Shared)								0	0				0	0												0.0	2	
	7	4-Year Framework Agreement								0	0				0	0												0.0	2	
JV	8	Joint Ventures								0	0				0	0												0.0	2	
	9	Pseudo JV (Partner + Profits Sharing)								0	0				0	0												0.0	2	
Teekal	10	Area-Length Company								0	0				0	0												0.0	2	
	11	Inspections and Reactive Only In-house								0	0				0	0												0.0	2	
Mixed Economy	12	Best Option By Function / Service								0	0				0	0												0.0	2	
	13	Shared Service (with Stoke City Council)								0	0				0	0												0.0	2	
Shared Services	14	Shared Service (with Stoke City Council)								0	0				0	0												0.0	2	
	15	Regional Combined Service								0	0				0	0												0.0	2	
Factor Importance			100	100	100	100	100	100	100			100	100	100	100			100	100	100	100	100	100	100	100	100	100			
Average Factor Score			+100	+100	+50	-50	+50	+50	-50	+2	+2	0	+50	-50	+50	+1	+1	+50	+50	0	-50	-100	+50	0	+50	+100	+1	+1		

Analysis of Outcomes

Illustrative Example (Service Level Review)



Proposed Factor Definitions

Attractiveness



Attractiveness		
Factor	Weighting	Definition
Economy	100	How much would this option cost to run compared to the current service delivery model. Are there any additional opportunities to reduce costs or increase revenues?
Efficiency	100	How productive and flexible would this option be once in operation, relative to the current delivery model?
Effectiveness	100	How would the outcomes and quality of service delivered, under this option, compare to the current delivery model?
Stakeholder Value	100	How would stakeholders (primarily service users) view this option relative to the current delivery model?

Proposed Factor Definitions

Achievability



Achievability		
Factor	Weighting	Definition
Complexity	100	How complex (scale, diversity, interdependencies, novelty and volatility) would the transition to this option be, considering both demobilisation and remobilisation, relative to continuing with the current delivery model had that been an option?
Capacity & Capability	100	How does our capacity and capability (including infrastructure and supporting services e.g. legal, HR and procurement), to transition to and maintain this option, compare to our ability to continue with the current service delivery model had that been an option?
Affordability	100	How affordable is it to transition to this option, relative to continuing with the current service delivery model had that been an option?
Authority Readiness	75	How prepared is the authority to embrace this option, in terms of political preference, relative to satisfaction with the current service delivery model?
Provider Readiness	100	How willing is the provider market to embrace this option relative to the current service delivery model?
Sector Success Stories	75	Are there any relevant and proven success stories of similar service delivery models?
Governance and Reporting	25	How complex would the governance and reporting processes be for this option relative to those required for the current service delivery model?
Partner Management	50	How easy would it be to manage partner relationships and performance under this option, relative to the current service delivery model?
Cultural Alignment	75	How well does this option align to the operational culture of the organisation and service, relative to the current service delivery model?

Proposed Scoring Methodology

Strategic Fit



Strategic Contribution	
100	This option would offer a significantly greater contribution to delivery of this strategic objective than the current service delivery model.
50	This option would offer a moderately greater contribution to delivery of this strategic objective than the current service delivery model.
0	This option would offer the same or a similar contribution to delivery of this strategic objective as the current service delivery model.
-50	This option would offer a moderately lesser contribution to delivery of this strategic objective than the current service delivery model.
-100	This option would offer a significantly lesser contribution to delivery of this strategic objective than the current service delivery model.

Proposed Scoring Methodology

Attractiveness and Achievability



Attractiveness	
100	This option would be significantly more attractive than the current service delivery model for this factor.
50	This option would be moderately more attractive than the current service delivery model for this factor.
0	This option would perform the same as or similar to the current service delivery model for this factor.
-50	This option would be moderately less attractive than the current service delivery model for this factor.
-100	This option would be significantly less attractive than the current service delivery model for this factor.
Achievability	
100	This option would be significantly less achievable than continuance with the current service delivery model, had that been an option, for this factor.
50	This option would be moderately less achievable than continuance with the current service delivery model, had that been an option, for this factor.
0	This option is equally as achievable than continuance with the current service delivery model for this factor, had that been an option.
-50	This option would be moderately less achievable than continuance with the current service delivery model, had that been an option, for this factor.
-100	This option would be significantly less achievable than continuance with the current service delivery model, had that been an option, for this factor.

FHRG Survey



- **The questions we propose to ask are:**

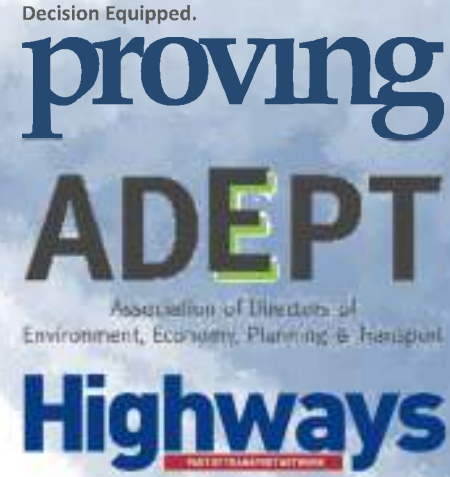
- Please briefly describe your service operating model for the streetlighting function (e.g. PFI, fully external non-PFI, direct delivery, mixed economy).
- Please provide the following base information:
 - Total number of lighting columns.
 - Total number of street lighting assets (including columns).
 - Total km of network served by streetlighting.
 - Total cost of the streetlighting service (capital and revenue).
 - Any key KPIs used to monitor the quality of the service.
- How satisfied are you with the current cost and quality of the service?
- Are you considering any alternative operating models going forward, and if so, which?

- **Are these the right questions?**

Next Steps



- **Undertake the FHRG survey and other intelligence gathering across the sector.**
- **Complete the VfM baseline assessment and future options study with Staffordshire County Council and Stoke City Council.**
- **Refine the toolset and methodology to reflect our learning.**
- **Use the final versions of the toolset and methodology to offer support where required to other LHA's exiting streetlighting PFI schemes or other forms of long-term contract.**



Daily Telegraph Campaign

Future Highways Research Group
(Simon Wilson, FHRG Members)

Telegraph Article



Scale of pothole problem revealed as repairs hit record low

Find out how your council performed as The Telegraph launches nationwide campaign to fix roads

FIX OUR POTHOLES

Gareth Corfield, Ollie Corfe

Related Topics
Potholes, Road safety, RNC, Department for Transport, Local councils

11 January 2024 10:11pm GMT

573

Off this article too



Pothole-ridden roads are being left unrepaired by councils at record levels, The

The FHRG has reached out to the authors (Gareth Corfield and Ollie Corfe) to see if they would like to present their methodology and findings to the FHRG.

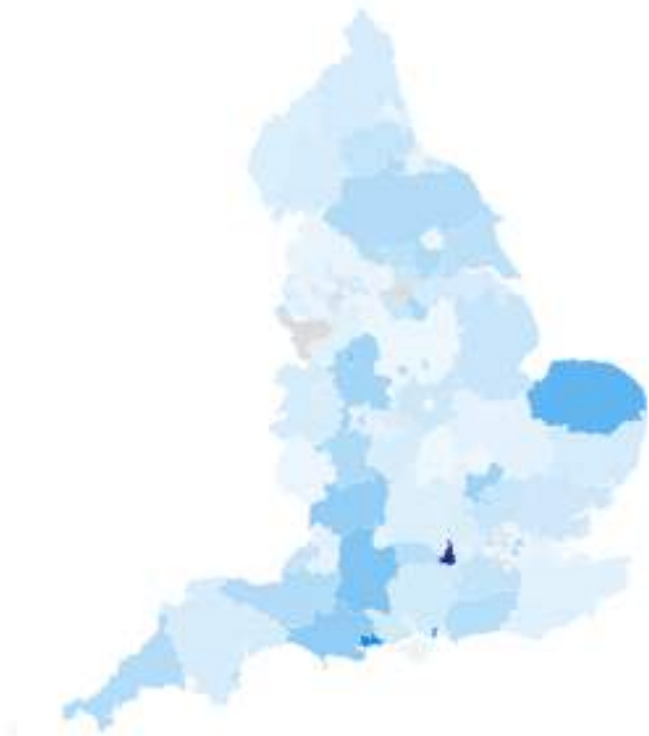
We are still waiting for a reply...

Telegraph Findings



How good is your council at fixing potholes?

Percentage of damaged minor roads repaired in 2023/24



We have not been able to review the methodology in detail.

- **What do members think, is it credible?**
- **Where did the authors get the data?**
- **Has there been any discussion within your authority?**
- **Should we continue to try to engage?**



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Comfort Break

10 Minutes



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Greenspace Tools: Simplifying Nature Recovery Management

Kaarbontech

(Graeme Forward)



CONNECT, COLLABORATE, THRIVE

FUTURE HIGHWAYS RESEARCH GROUP MEETING 6 FEBRUARY 2025



Developing greenspace tools
to simplify nature recovery mgmt

Who are KaarbonTech?



Quality
of Life

Air
Qualit
y

Lower
CO²

Mental
Health

Why does **greenspace**
management matter?

Climate

Physical
Health

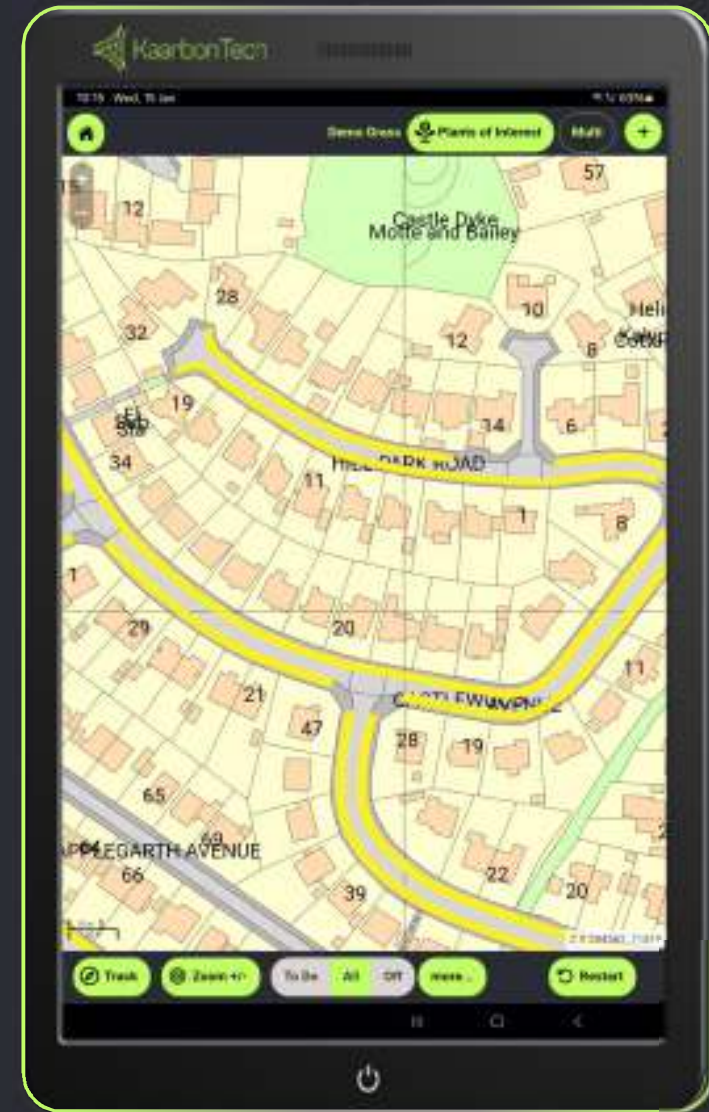
Water
Mgmt

Biodiversity

The evolution of asset management software

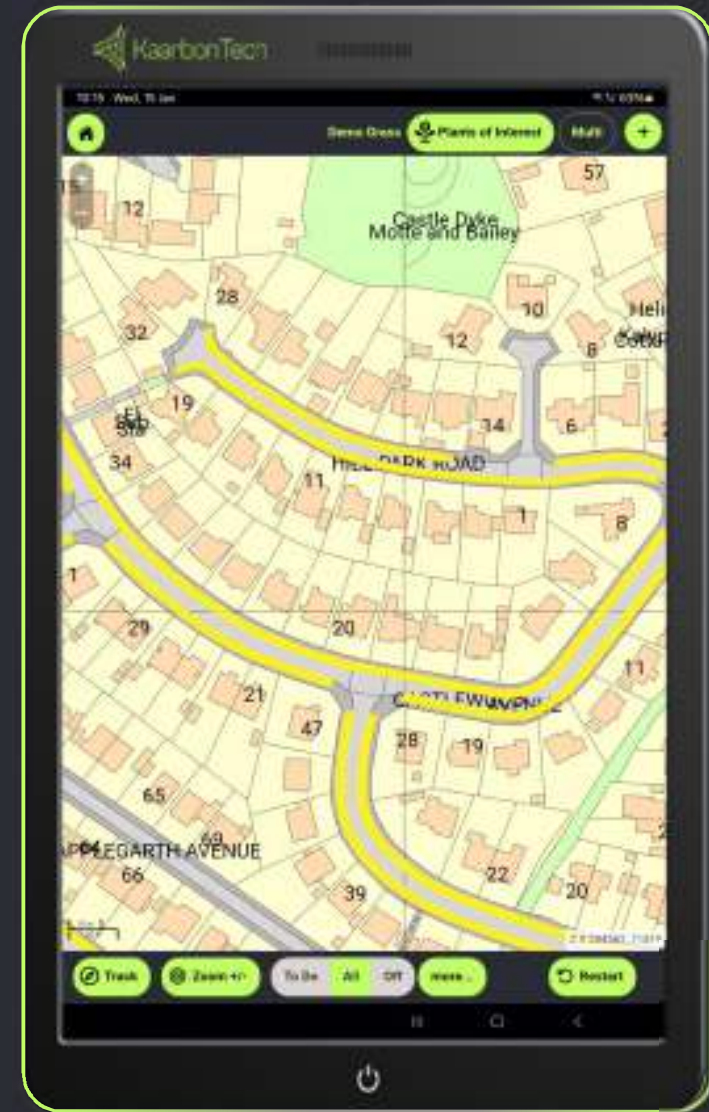
Facilitating data collection

- Fuel & labour are biggest costs
- Reduce time spent on site
- Minimise crew frustration



Facilitating data collection

- Record condition information across multiple assets
- Condition data at an asset level



Plants of interest

- ▶ Certain plant species need to be dealt with promptly & effectively
 - ▶ Noxious (harmful)
 - ▶ Poisonous
 - ▶ Invasive
- ▶ No centralised resource for this information
- ▶ Need to access this info easily from the app



Solanum elaeagnifolium (Blackberry nightshade)
Solanaceae
A common weed in gardens and difficult to eradicate.

Docks

Docks (*Rumex* spp.) are easily recognised with their large leaves and distinctive seedheads. These leaves are edible and used for herbal remedies and dyeing. They are common weeds in gardens and difficult to eradicate.



Dock

Plants of interest



Request a help article

Plants of Interest

The following is a list of some known plants of interest and ways to identify them. These may be of interest due to toxicity or being classed as an invasive species. More info links have been provided for external sources of information on these species

Contents

Poisonous Plants

- Foxglove (*Digitalis Purpurea*)
- Deadly Nightshade (*Atropa Belladonna*)
- Poison Hemlock (*Conium Maculatum*)
- Monkshood (*Aconitum Napellus*)
- Lords-and-ladies (*Rumex Acutifolius*)

Noxious/Injurious Weeds

- Common Ragwort (*Ranunculus Jacobaea*)
- Small Leaved and Curled Leaf Dock (*Rumex Crispus*, *Rumex Curvifolius*)



Managing oak processionary moth

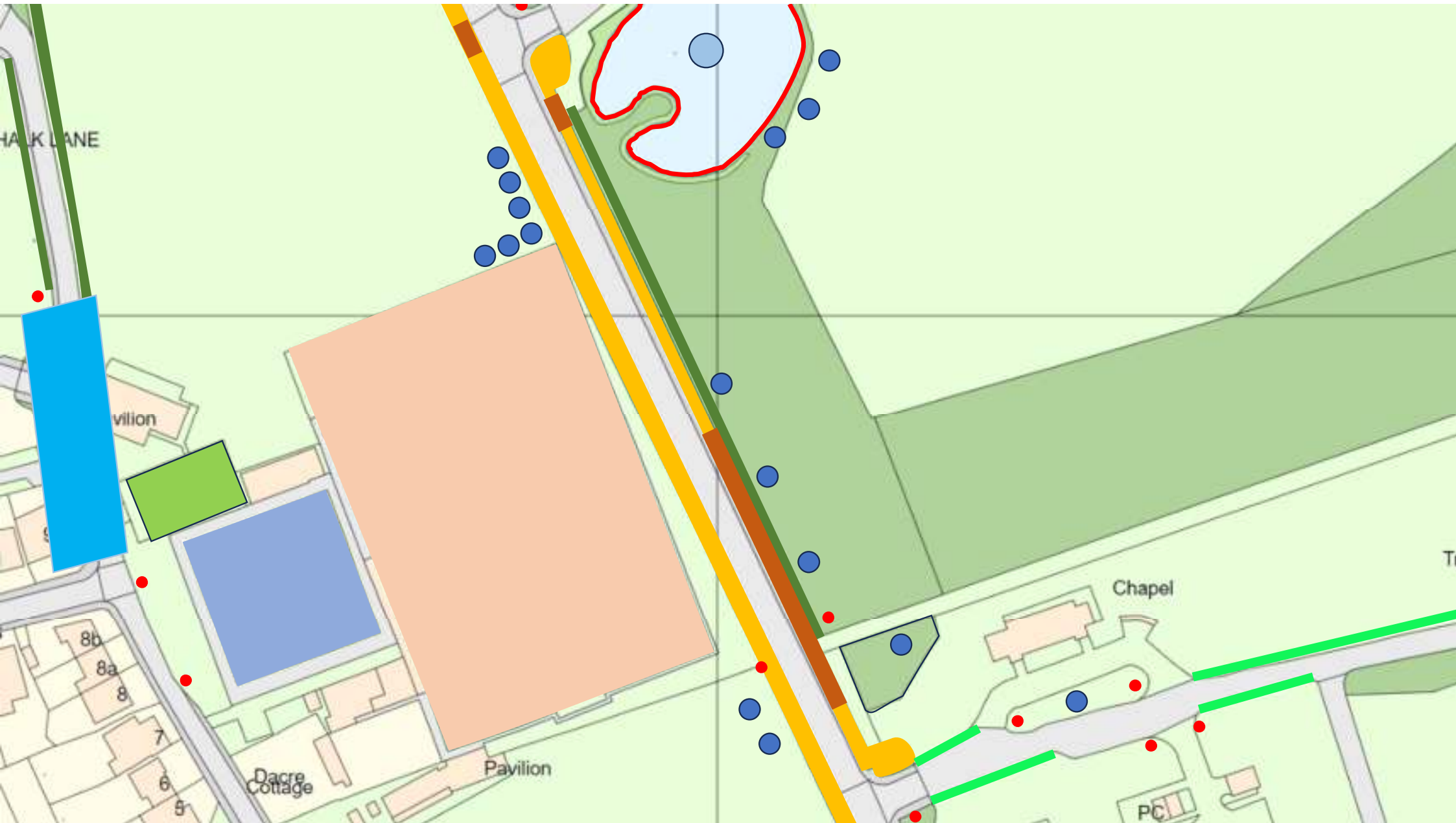
- Well known issue
- Spread from South England
- Visualise spread
- Plan mitigation measures

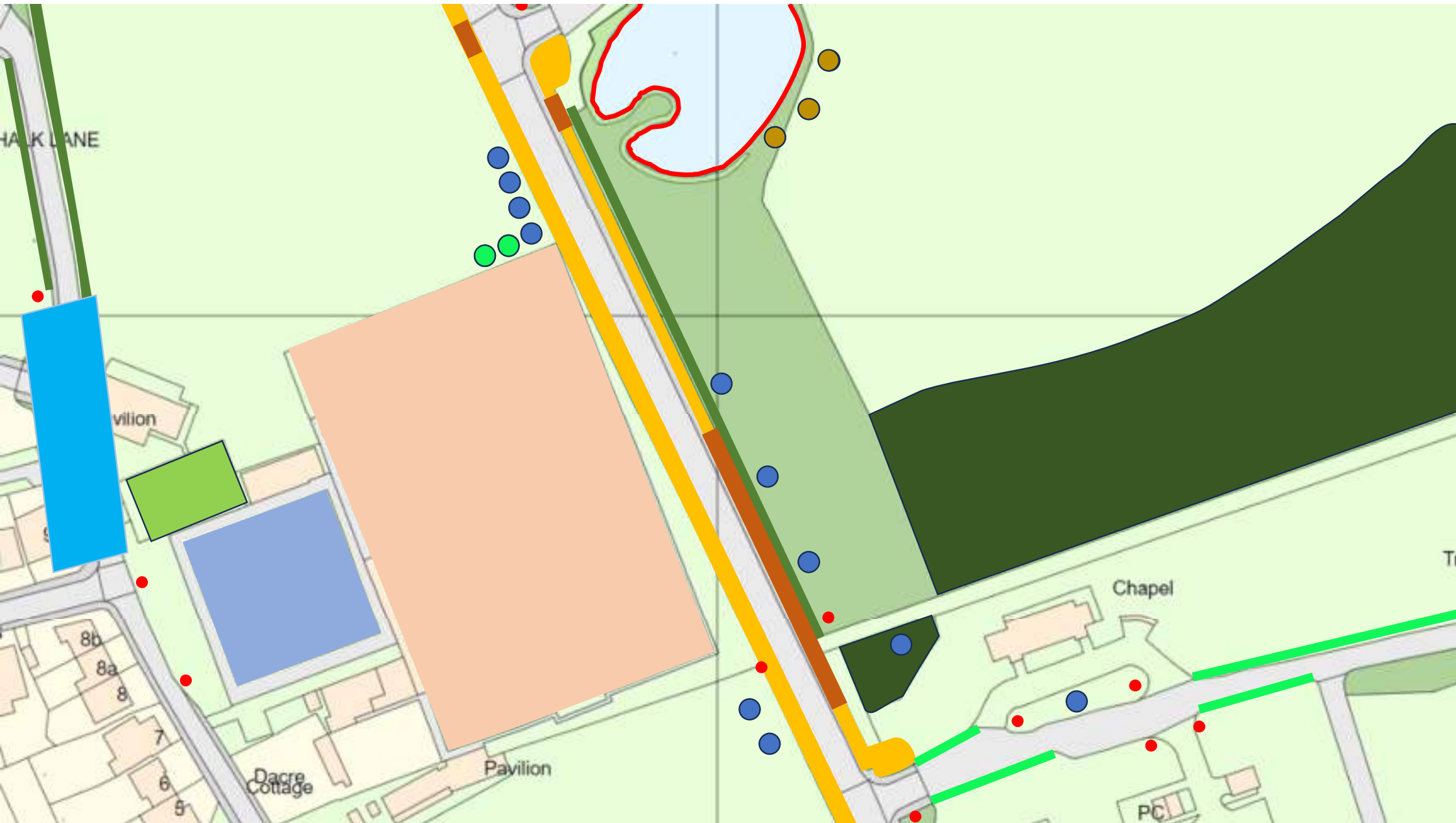


Proximity alerting

- ▶ Location based alerting in Tree & Grass SMART
- ▶ Operative informed
- ▶ Prevents errors in cutting
- ▶ Provides H&S warning







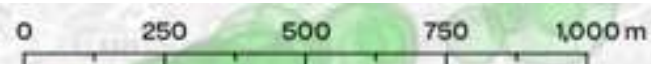


Driving & informing
nature recovery & adaptation

Capturing the right information

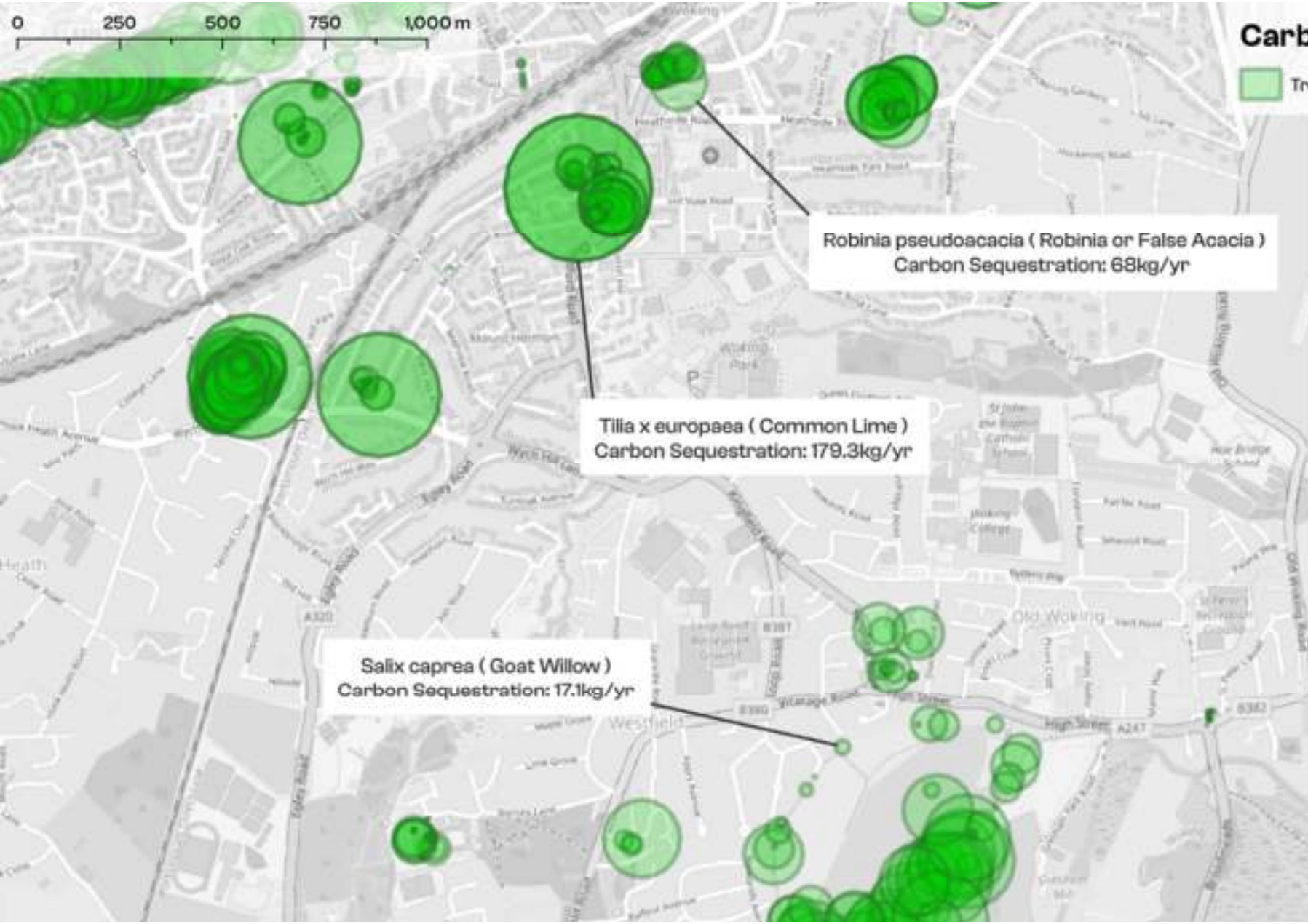
- ▶ Key to maximising long-term results is in capturing the right data
- ▶ Often inspection questions are chosen for short term results
 - ▶ Speed of inspection
 - ▶ Immediate risk
- ▶ Preparing for long-term climate resilience requires extra info
- ▶ To calculate carbon storage/sequestration need DBH, height, species
- ▶ Uniformity across authorities will allow data sharing/modelling



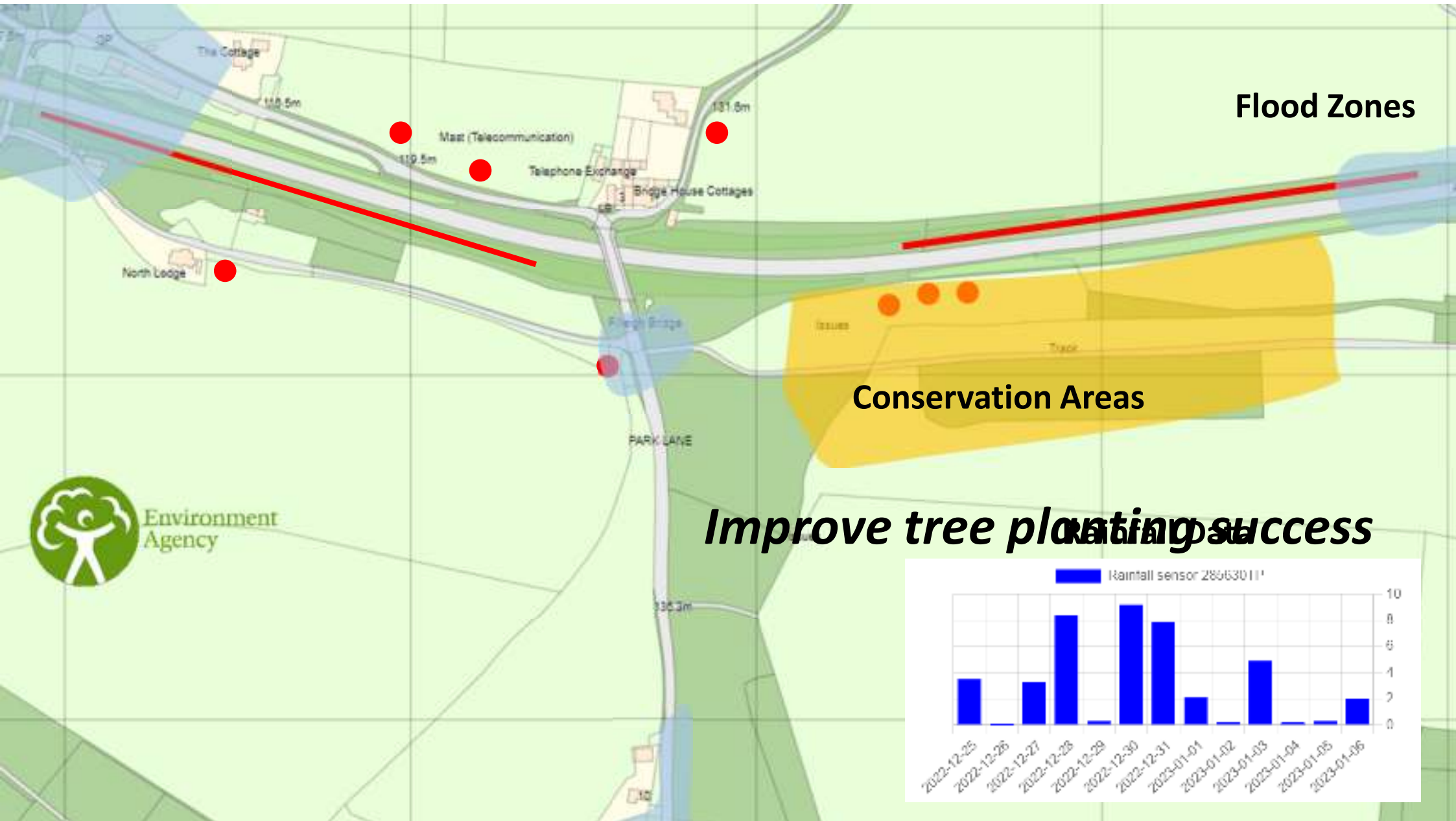


Carbon Sequestration

Tree - Size denotes sequestration (kg/yr)



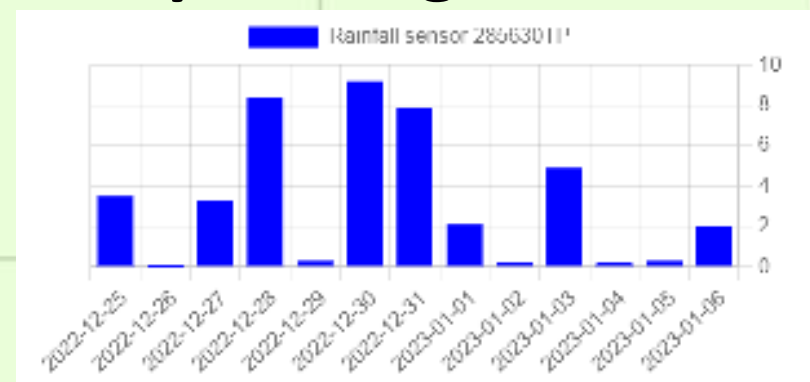
- Tree species
- Tree height (m)
- Diameter breast height
- Canopy spread
- Ave canopy height
- Number of stems
- Life stage
- Health & vitality
- Structural condition
- Leaf cover
- Defects
- Pathogens
- Comments
- Photos

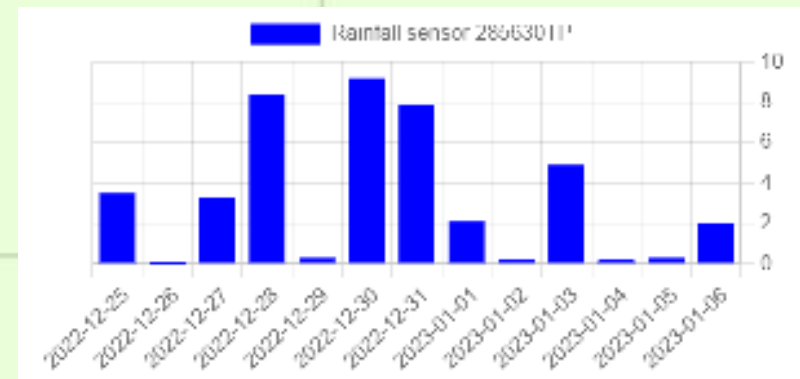
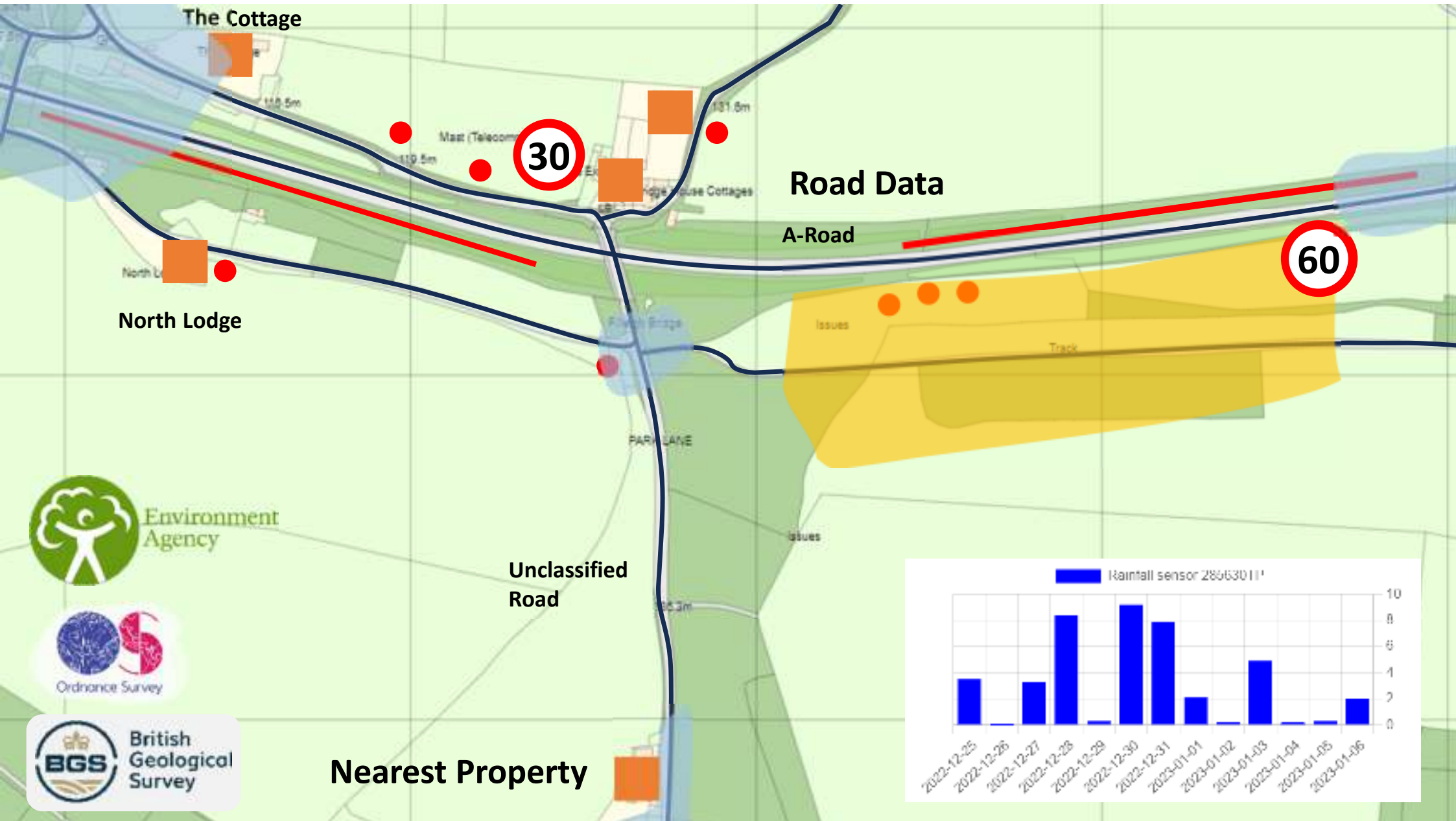


Flood Zones

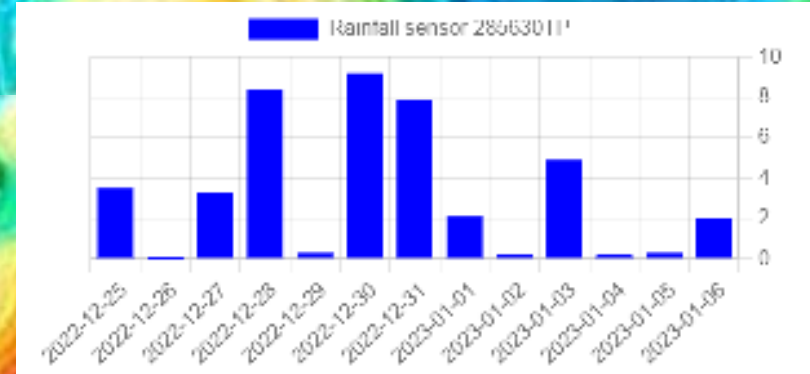
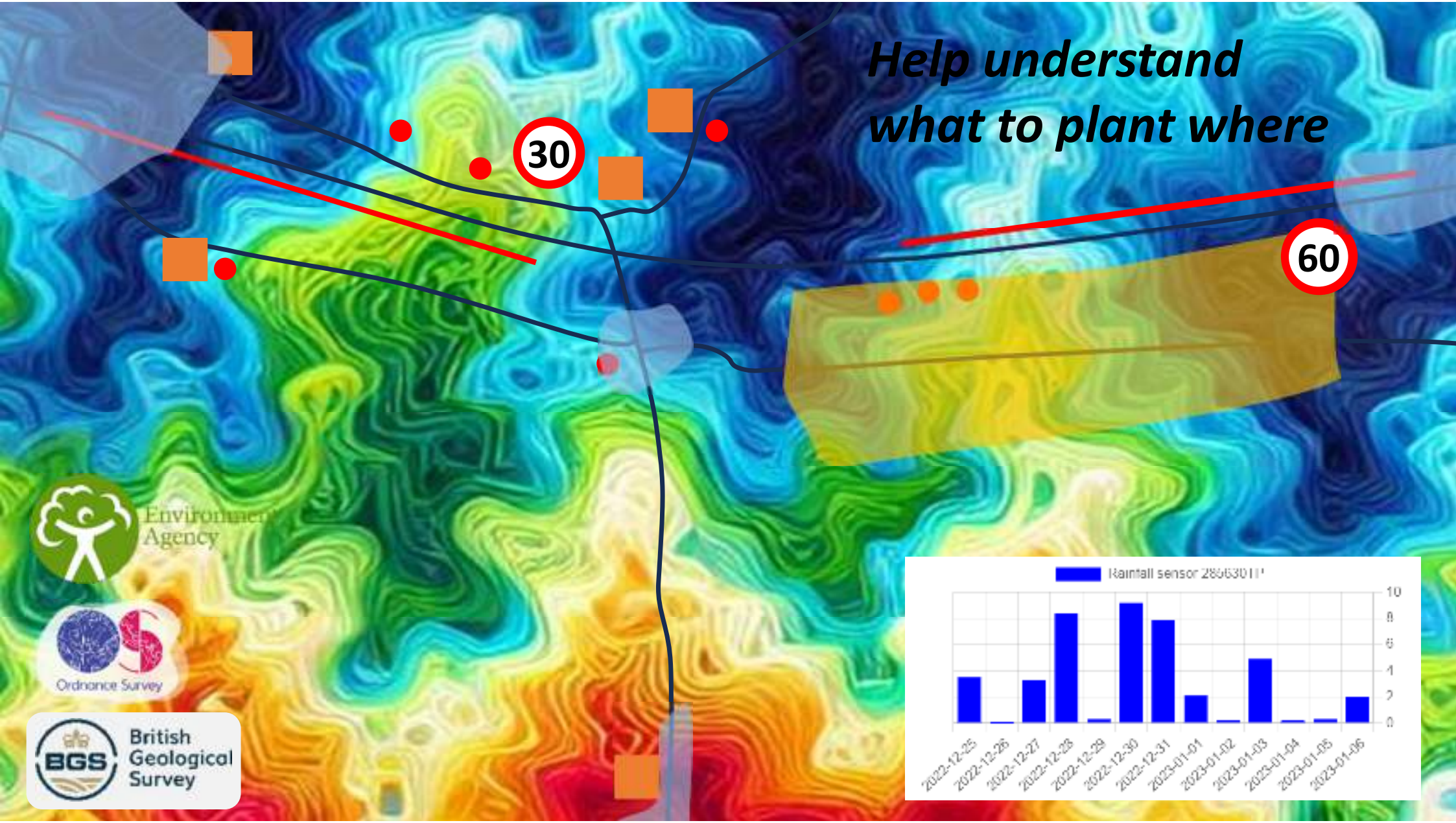
Conservation Areas

Improve tree planting success



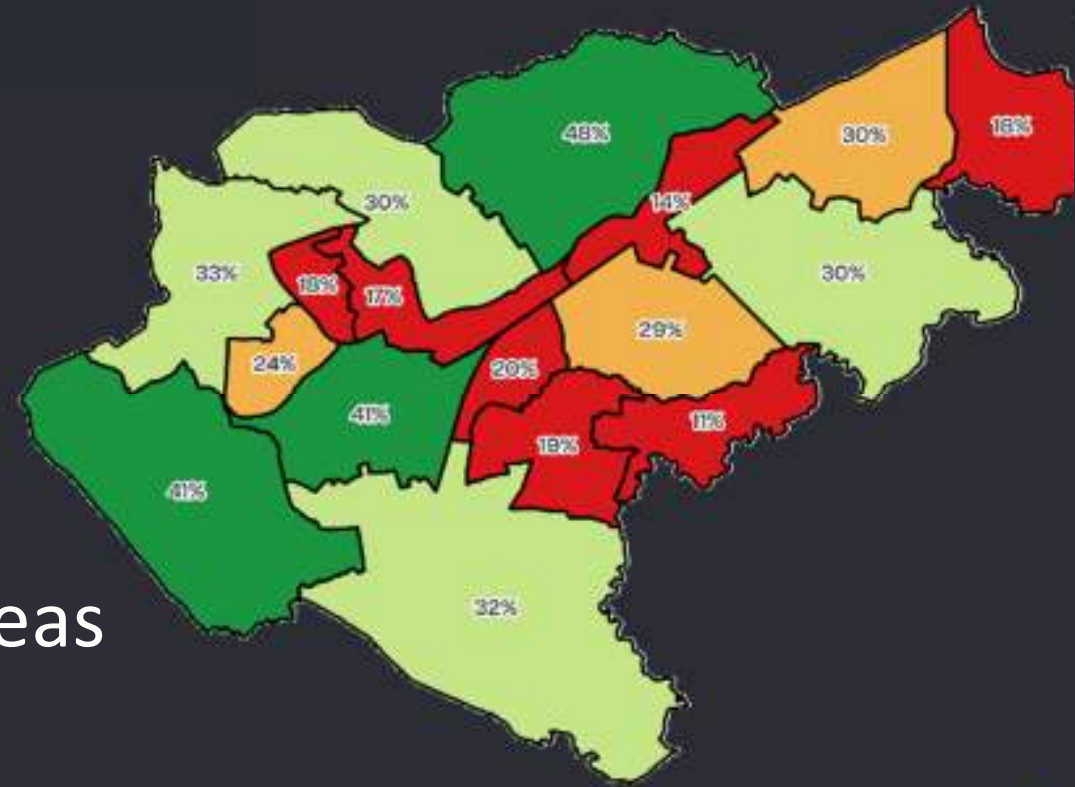


*Help understand
what to plant where*



Where to plant trees

- Need to increase trees by 50% by 2050
- UK govt target 14 - 17% canopy coverage
- How to identify suitable areas



Canopy coverage

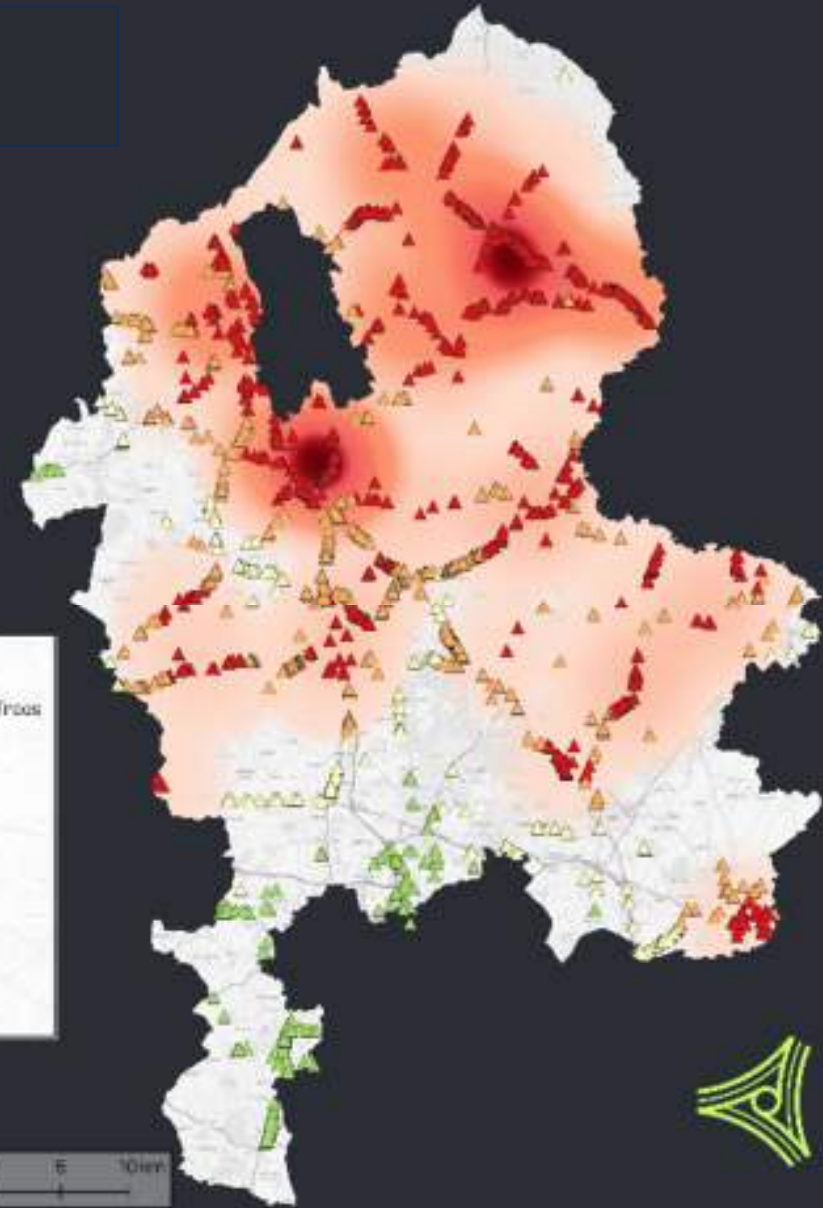
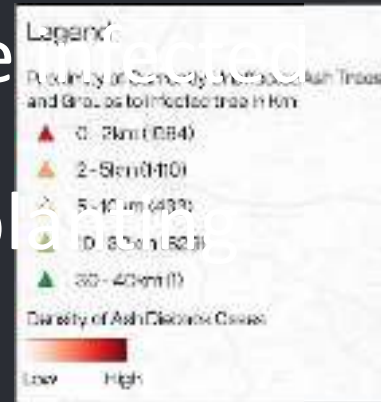
➤ Making best use of data

➤ Govt canopy coverage targets



The spread of ash die back

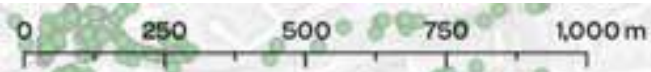
- 🔍 Inspectors identify diseased trees
- 🔍 Monitor disease over time
- 🔍 Healthy trees may become
- 🔍 Treatment, removal, & repl



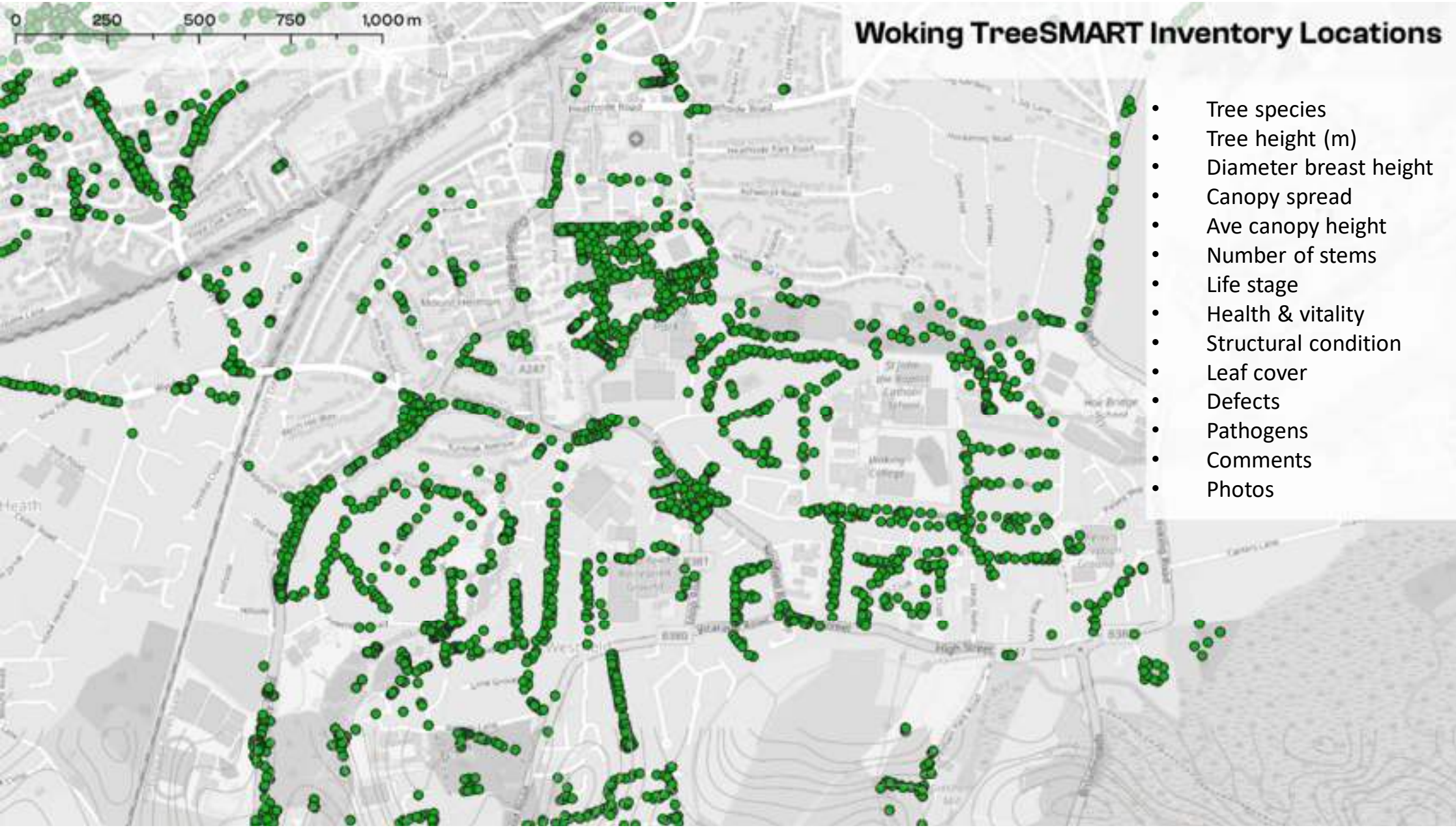
Identifying trees at risk of flooding

- Climate change has made flooding key issue
- Trees susceptible to root flooding and damage
- Need to understand what trees likely to survive where
- Correlation between sensitive trees & defect/failure rates





Woking TreeSMART Inventory Locations



- Tree species
- Tree height (m)
- Diameter breast height
- Canopy spread
- Ave canopy height
- Number of stems
- Life stage
- Health & vitality
- Structural condition
- Leaf cover
- Defects
- Pathogens
- Comments
- Photos



Tree Sensitivity to Waterlogging

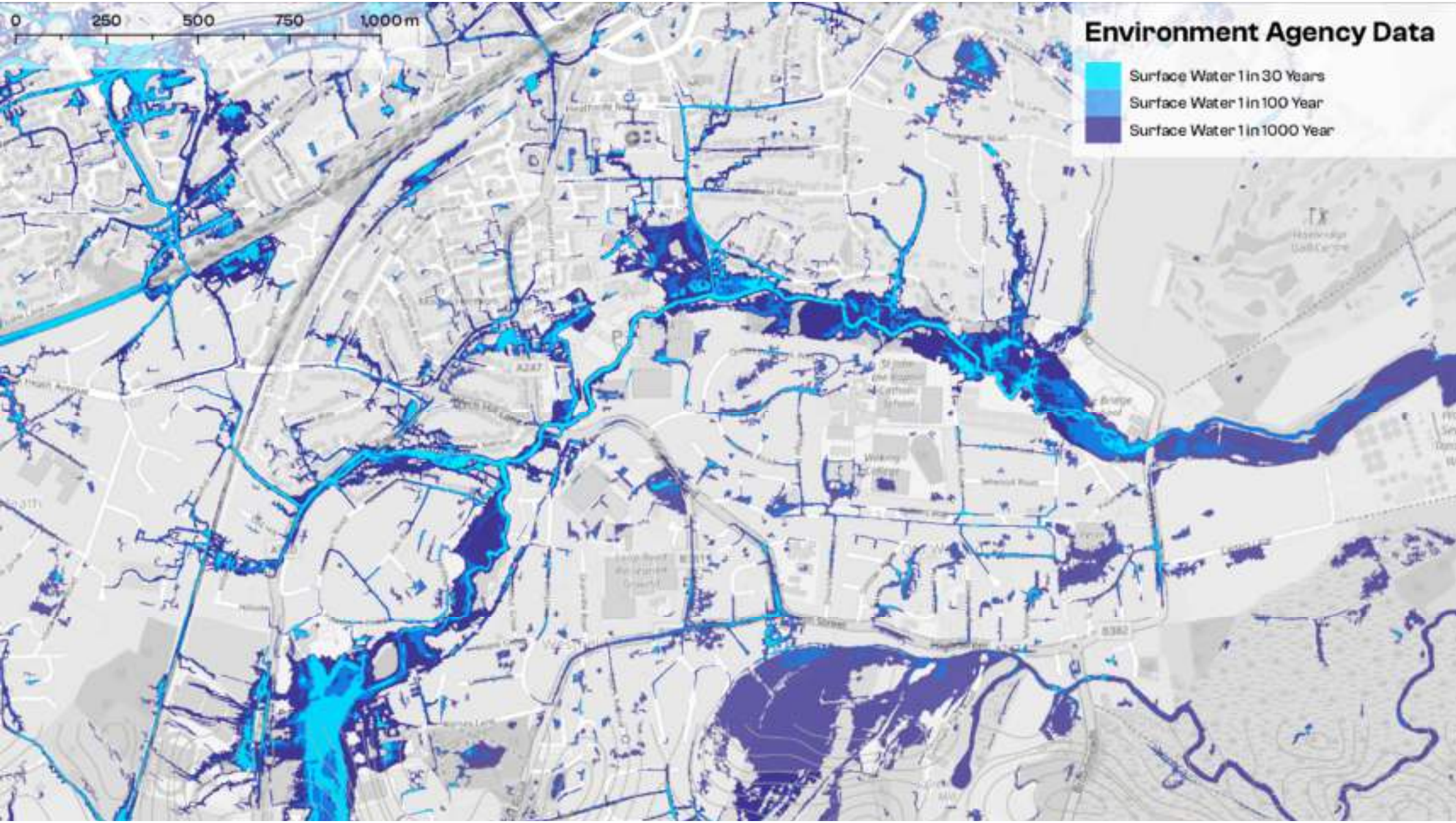
- Sensitive
- Moderately sensitive
- Moderately tolerant
- Tolerant



0 250 500 750 1000m

Environment Agency Data

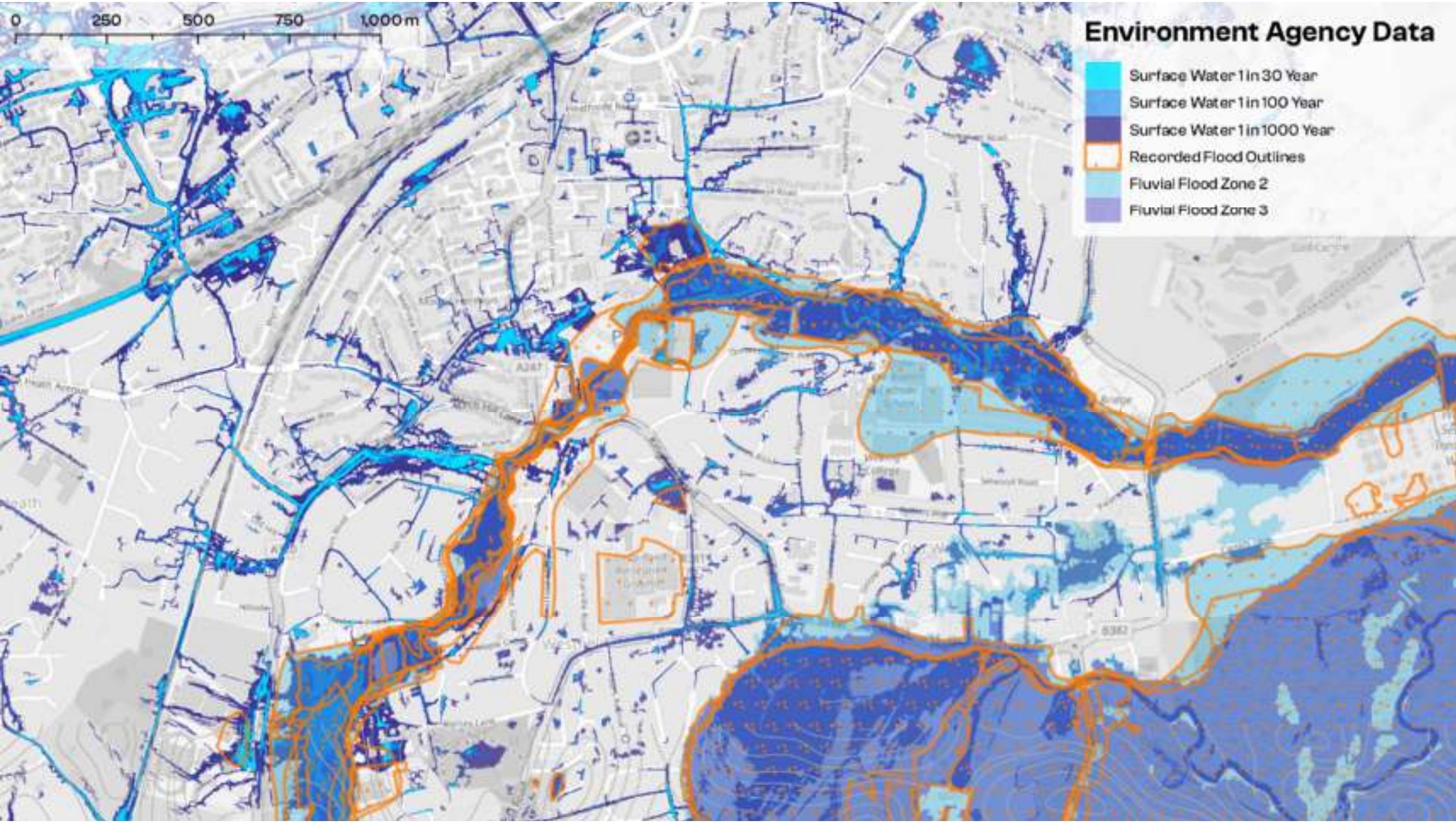
- Surface Water 1 in 30 Years
- Surface Water 1 in 100 Year
- Surface Water 1 in 1000 Year



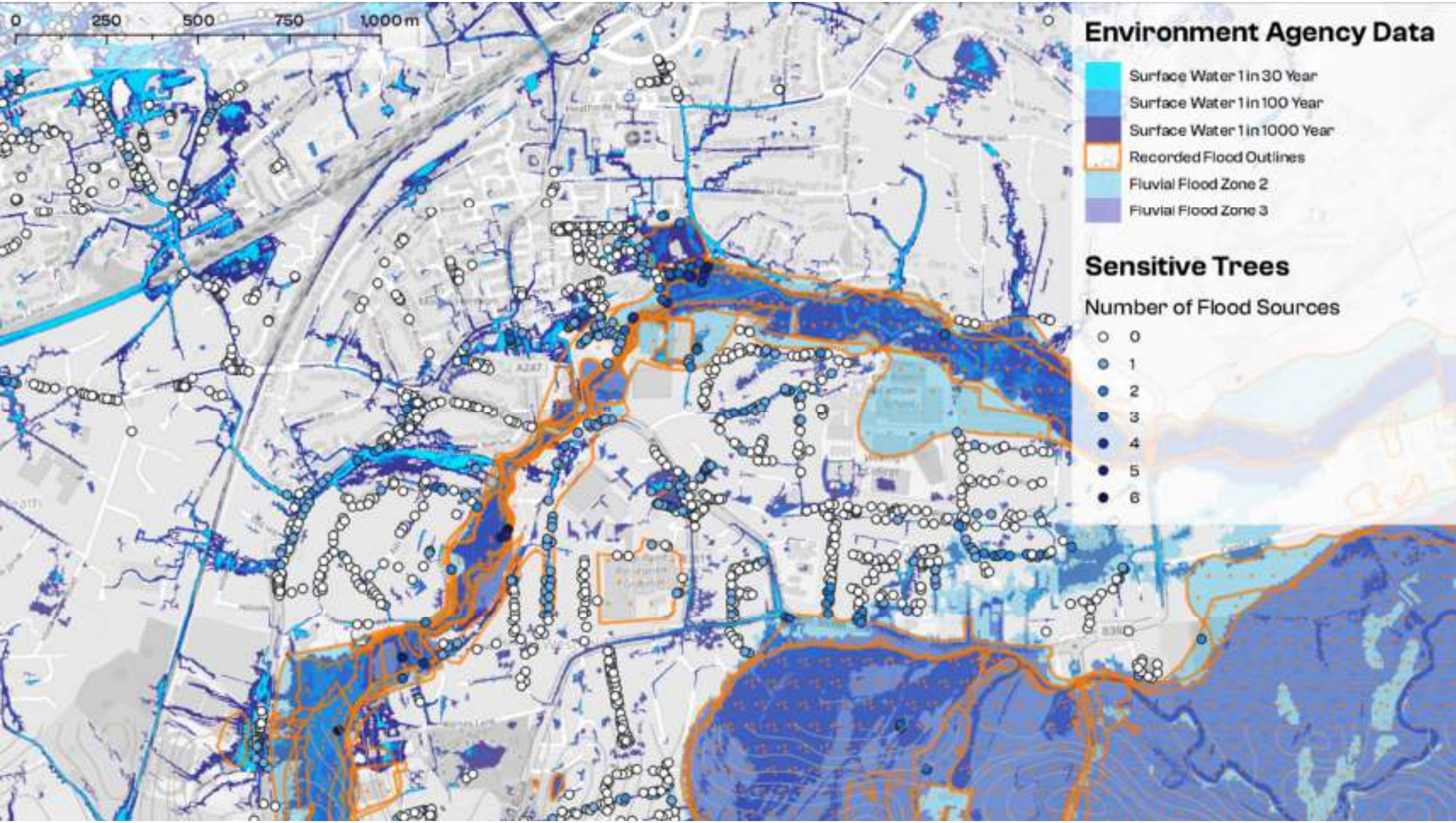
0 250 500 750 1000m

Environment Agency Data

- Surface Water 1 in 30 Year
- Surface Water 1 in 100 Year
- Surface Water 1 in 1000 Year
- Recorded Flood Outlines
- Fluvial Flood Zone 2
- Fluvial Flood Zone 3



0 250 500 750 1000m



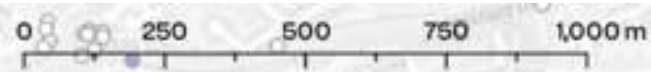
Environment Agency Data

- Surface Water 1 in 30 Year
- Surface Water 1 in 100 Year
- Surface Water 1 in 1000 Year
- Recorded Flood Outlines
- Fluvial Flood Zone 2
- Fluvial Flood Zone 3

Sensitive Trees

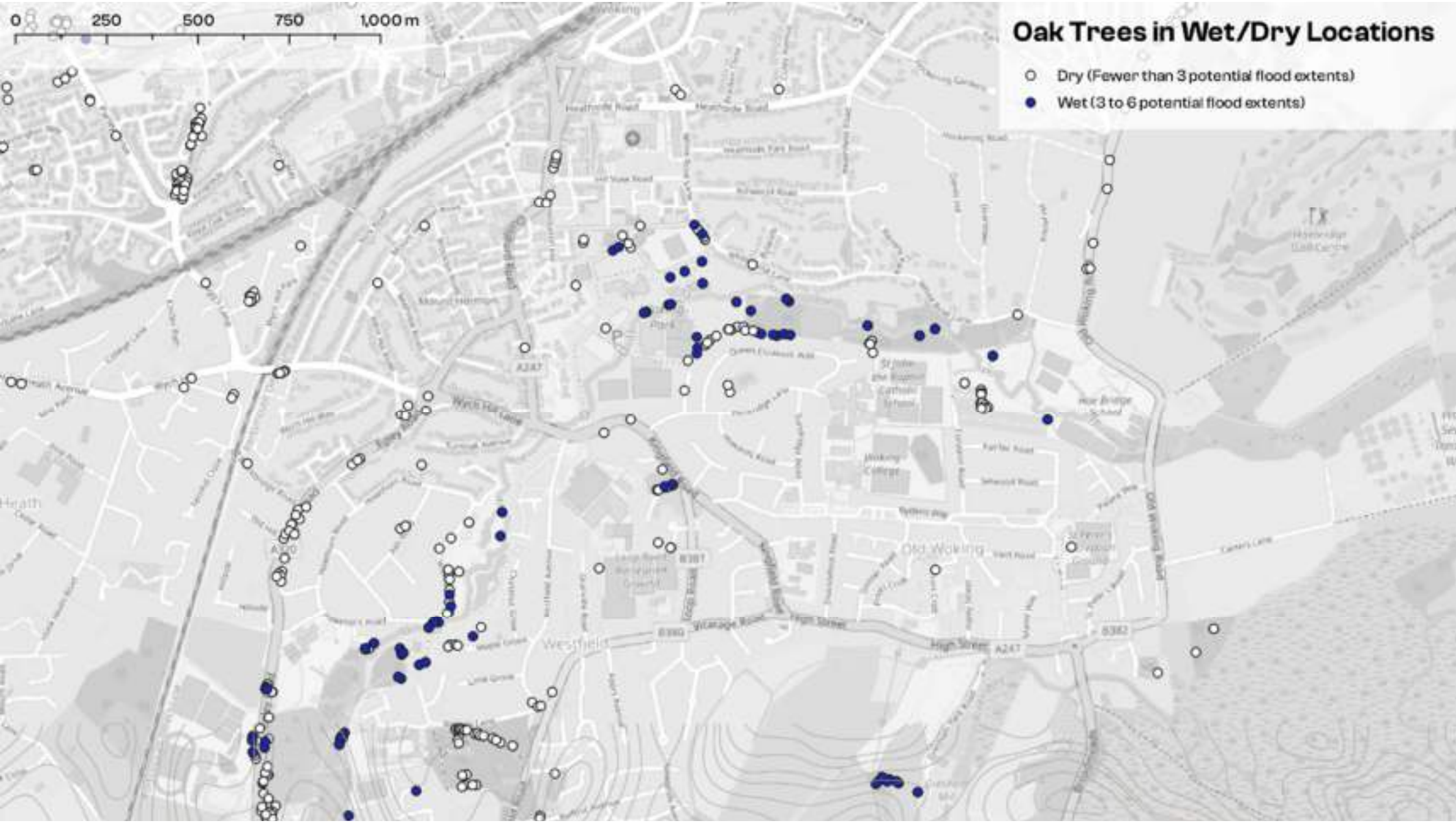
Number of Flood Sources

- 0
- 1
- 2
- 3
- 4
- 5
- 6



Oak Trees in Wet/Dry Locations

- Dry (Fewer than 3 potential flood extents)
- Wet (3 to 6 potential flood extents)



Future development & research

Future development & research

- ▶ Use of AR tools
 - ▶ Measure tree height, DBH, distance from buildings
- ▶ Use of AI tools
 - ▶ Species and pest identification



Future development & research

- ▶ Improvements to remote sensing

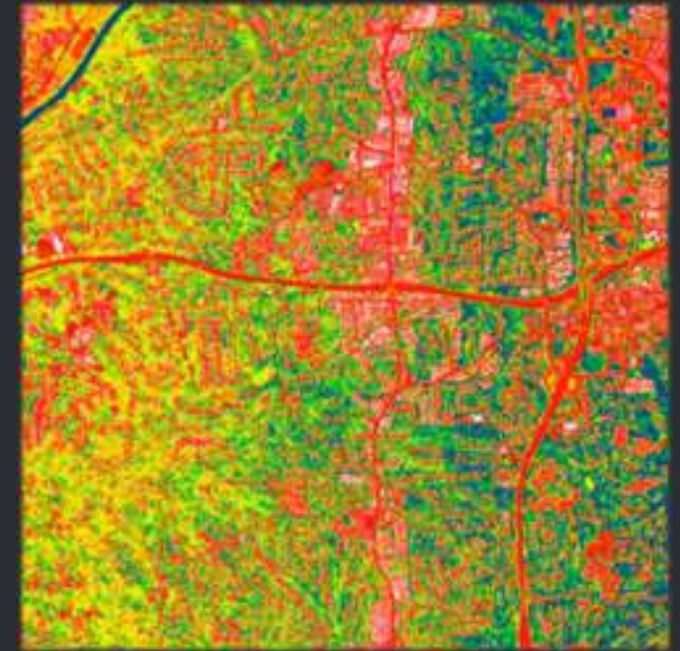
- ▶ Greater quantification of greenspace

- ▶ NDVI for greenspace health

monitoring

Vegetation health

Carbon sequestration



Biomass estimation

Land use changes

Nature recovery efforts





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LTICBT Benchmarks for Carbon Analysis

Department for Transport

(Raiad Shazad, Gowsaleya Sriskantharajah)

Local Transport Infrastructure Carbon Benchmark Tool

The Need

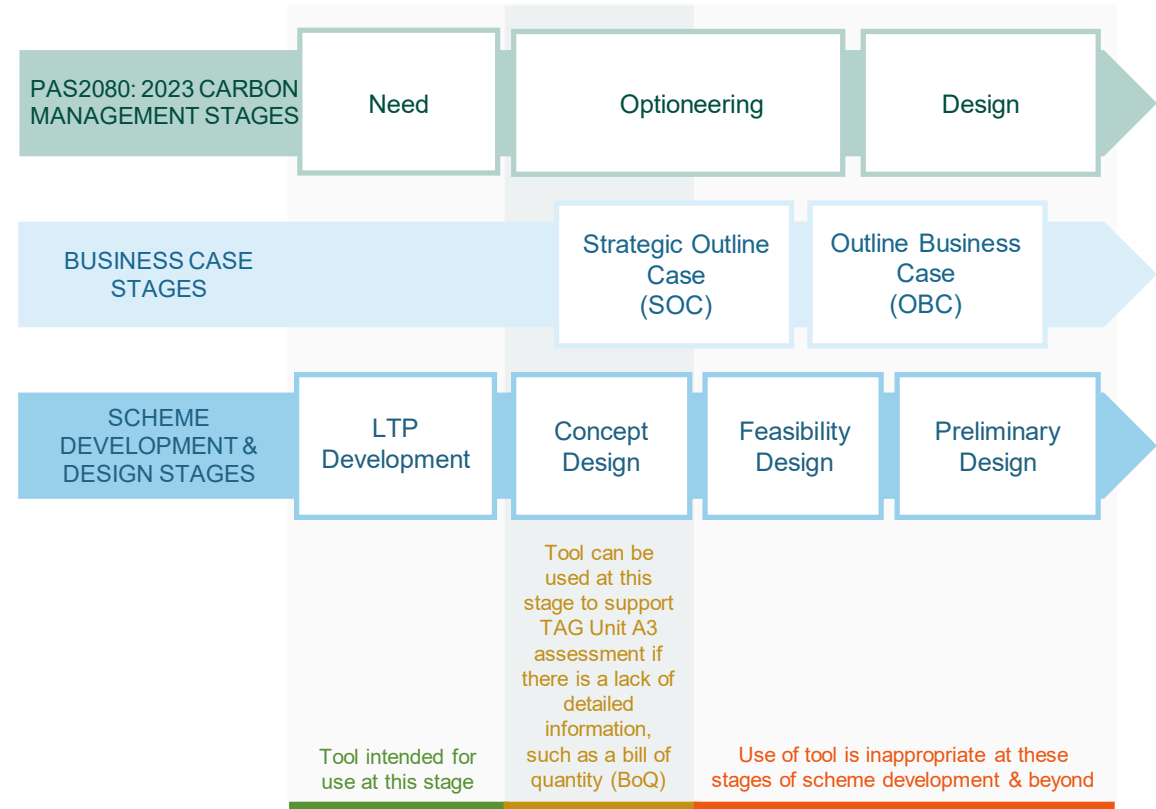
- Limited data availability and accuracy during early stages of project development.
- Absence of open-source tools for quantifying transport infrastructure carbon.
- Lack of proportionate methods for early-stage infrastructure carbon assessment.
- Inconsistent results due to lack of standardisation.
- Risk of developing programmes of interventions without understanding infrastructure carbon impacts.
- TAG Unit A3 now requires quantification of capital carbon.

“The built environment is responsible for almost 40% of global carbon emissions, including buildings and infrastructure assets, and embodied and operational carbon (UNEP, 2022). In the UK, the UK Green Building Council (UKGBC) considers the built environment to be directly responsible for some 25% of the UK’s consumption-based GHG emissions (Arup & UKGBC, 2021).”

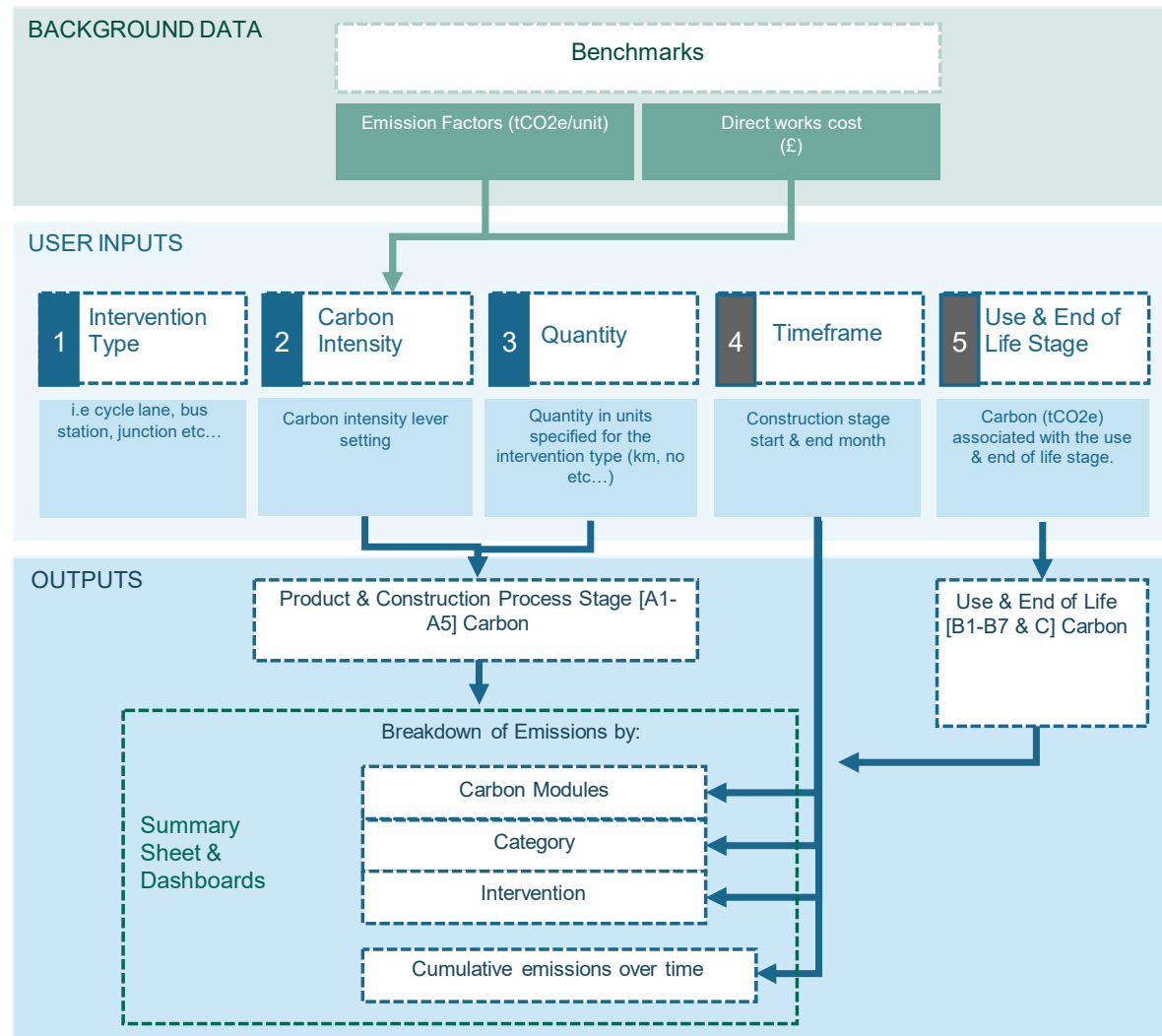
RICS Whole Life Carbon Assessment 2023

Tool Introduction

- The tool aids Authorities in estimating infrastructure carbon impacts of transport interventions.
- It uses a **benchmarking approach** suitable for strategic and early concept stages of scheme development, when schemes lack detailed design information.
- Primarily intended for schemes like Local Transport Plans (LTPs) and initial business cases & appraisals.
- Ensures that decision making at early stages of scheme development can be well-informed of, and influenced by, infrastructure carbon impacts.
- Users can compare proposed interventions with examples of similar schemes, or typical design specifications embedded within the tool.



Tool Structure



Benchmark Development

Two Methods:

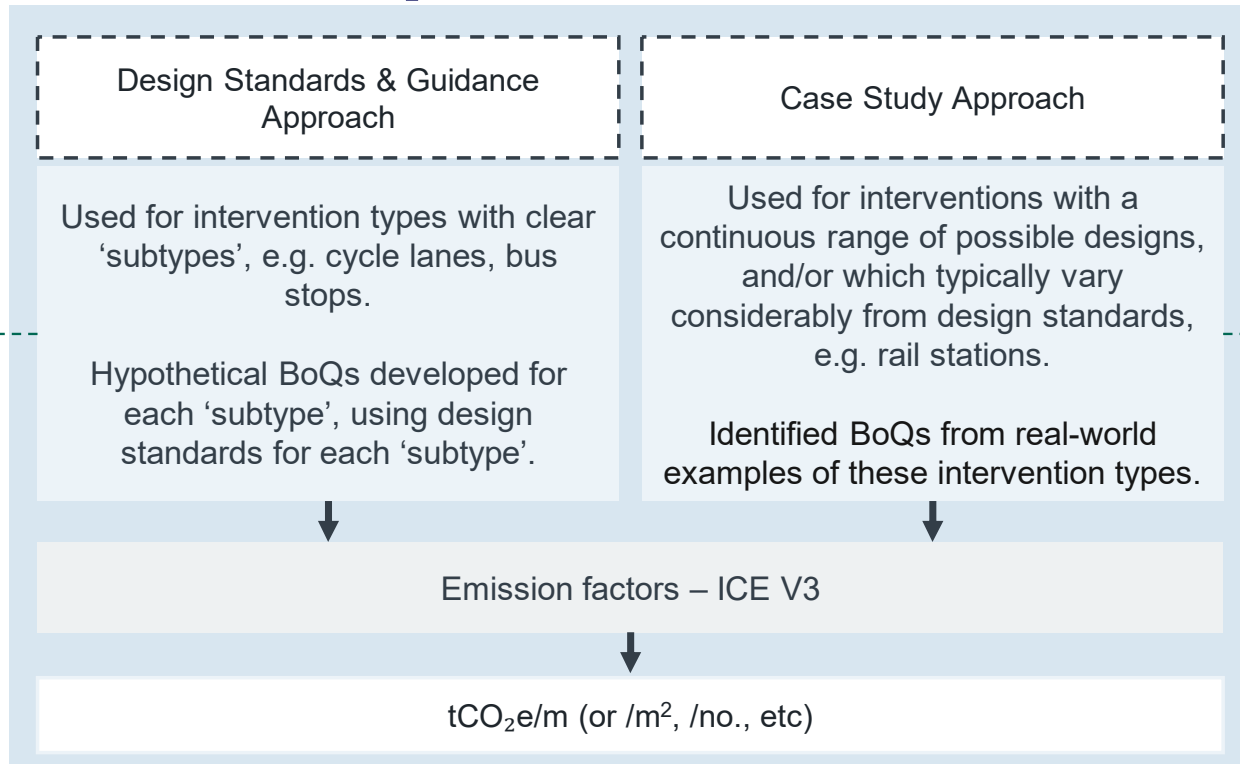
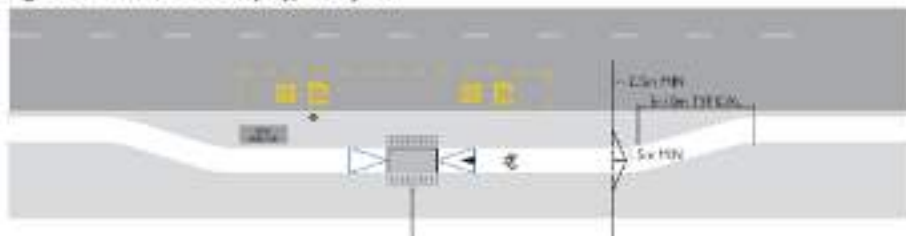


Figure 23: Indicative bus stop bypass layout



Strengths

User-friendly interface

All inputs are made on one worksheet, and the step-by-step process is **intuitive** and easy to follow.

Little-to-no background in carbon quantification is needed to use the tool, making it accessible to as many potential users as possible.

Rapid assessment

The top-down benchmarking approach to carbon assessment is significantly faster than bottom-up approaches, **enabling assessments to be done even with limited time or budget.**

Fills the gap

The tool **enables carbon assessments to be completed at these early stages of scheme development, and only very high-level design detail is needed.**

Limitations

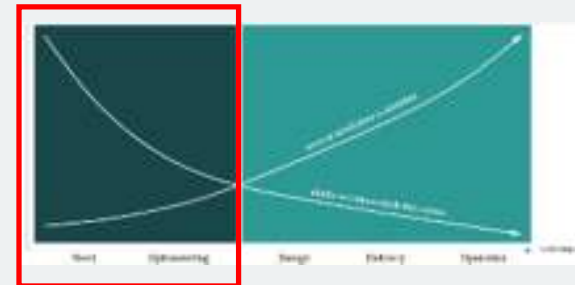
Scope

Assessments undertaken in the tool comprise **part of a whole life carbon assessment**. User carbon is not considered and should be assessed separately.

The tool is primarily designed to assess **product (A1-A3) & construction process (A4-A5) stage** impacts.

Accuracy of Benchmarks

Some of the benchmarks are based on early-stage designs and won't fully include waste or earthworks.



Carbon quantification will be least accurate at the early stages, but this is where there is the greatest ability to reduce whole-life carbon

Next Steps

Do you have data we could use?

We're looking to expand the number of benchmarks in the tool – the more benchmarks for each intervention type, the more accurate assessments will be.

Get in touch:

- Gowsaleya Sriskantharajah (DfT) – Gowsaleya.Sriskantharajah@dft.gov.uk
- Raiad Shahzad (DfT) – Raiad.Shahzad@dft.gov.uk

Local Transport Infrastructure Carbon Benchmark Tool (LTICBT)

Q&A



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AI: Enquiry Handling

Future Highways Research Club

(Simon Wilson)



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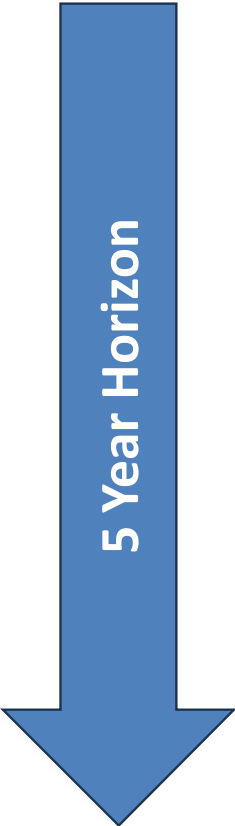
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A brief reminder...

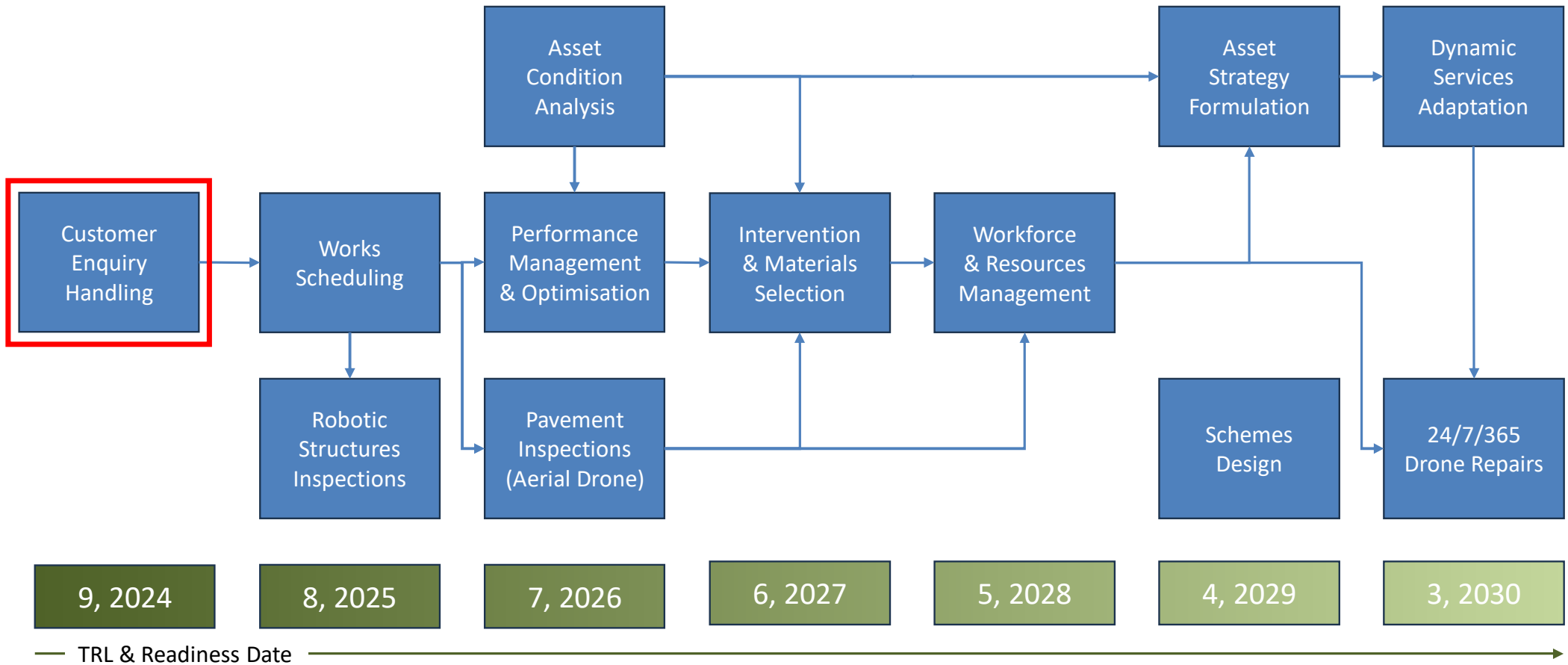
Future Highways Research Club

AI Technology Readiness Levels (TRL)

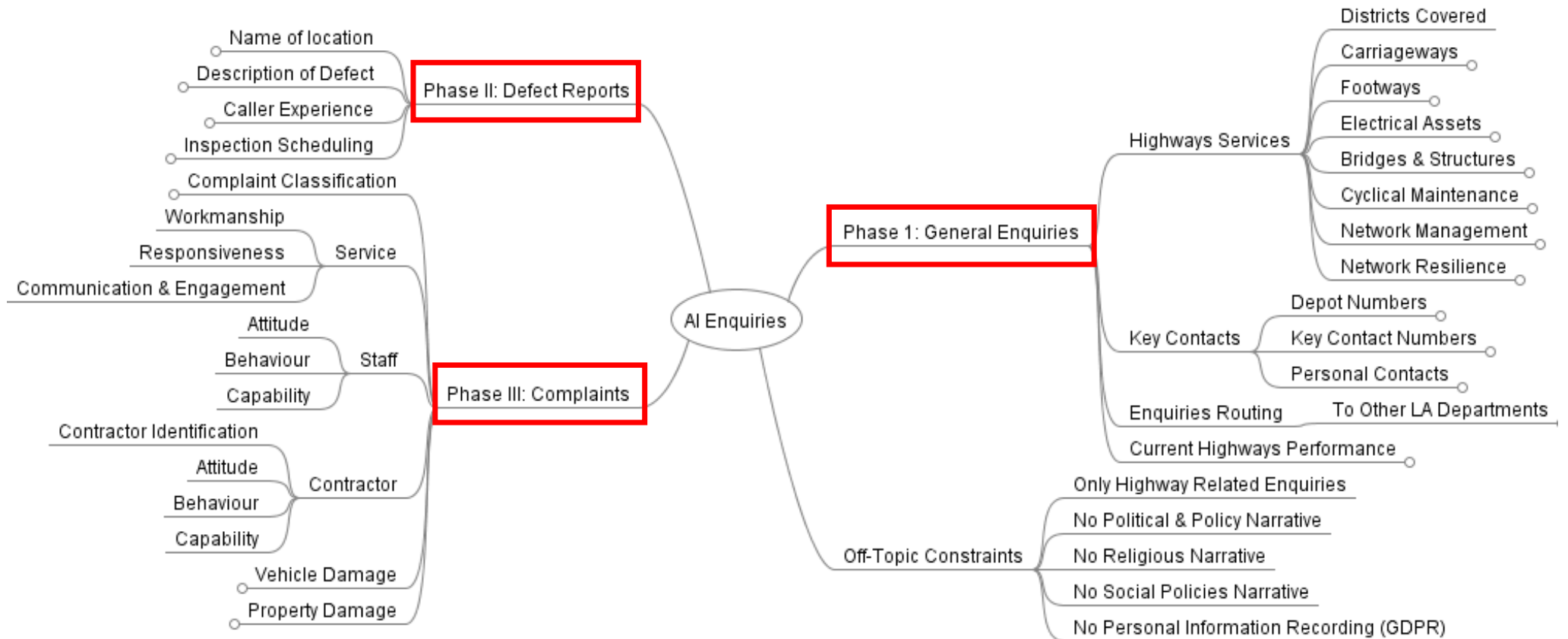


TRL	Description
3	Experimental proof of concept.
4	Technology validated in lab.
5	Technology validated in relevant environment.
6	Technology demonstrated in relevant environment.
7	System prototype demonstration in operational environment.
8	System complete and qualified.
9	Actual system proven in operational environment.

AI/Robotics TRL Timeline



AI Enquiry Handling Applications Map





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AI: Workshops Summary

Future Highways Research Club

Summary of Workshops



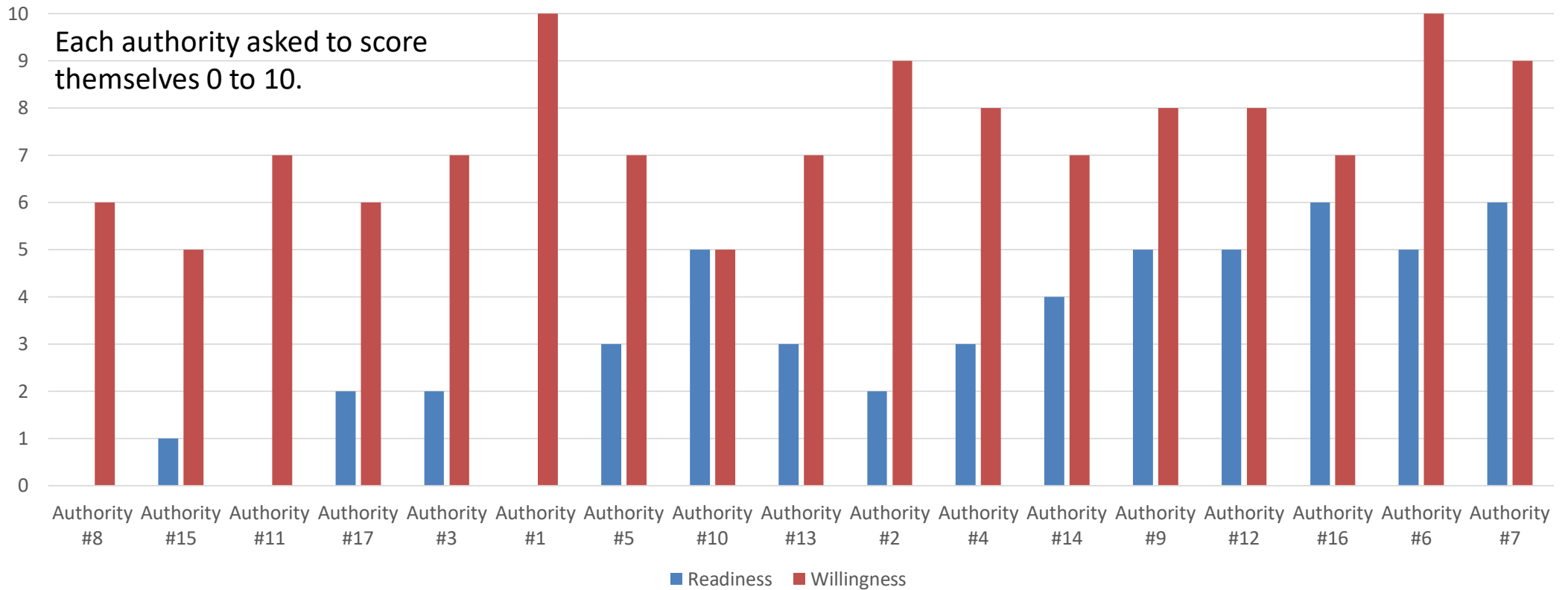
- **The AI workshops were exceptionally well attended.**
 - AI is clearly an important topic for FHRG members.
 - FHRG members were enthusiastic and vocal participants.
- **The workshops were used to shape the AI Enquiry Handling research theme.**
 - The scope and operational priorities.
 - The willingness and readiness of LHAs / authorities.
 - The prioritised target benefits.
 - The scale of likely investment.

Summary Charts

Willingness & Readiness



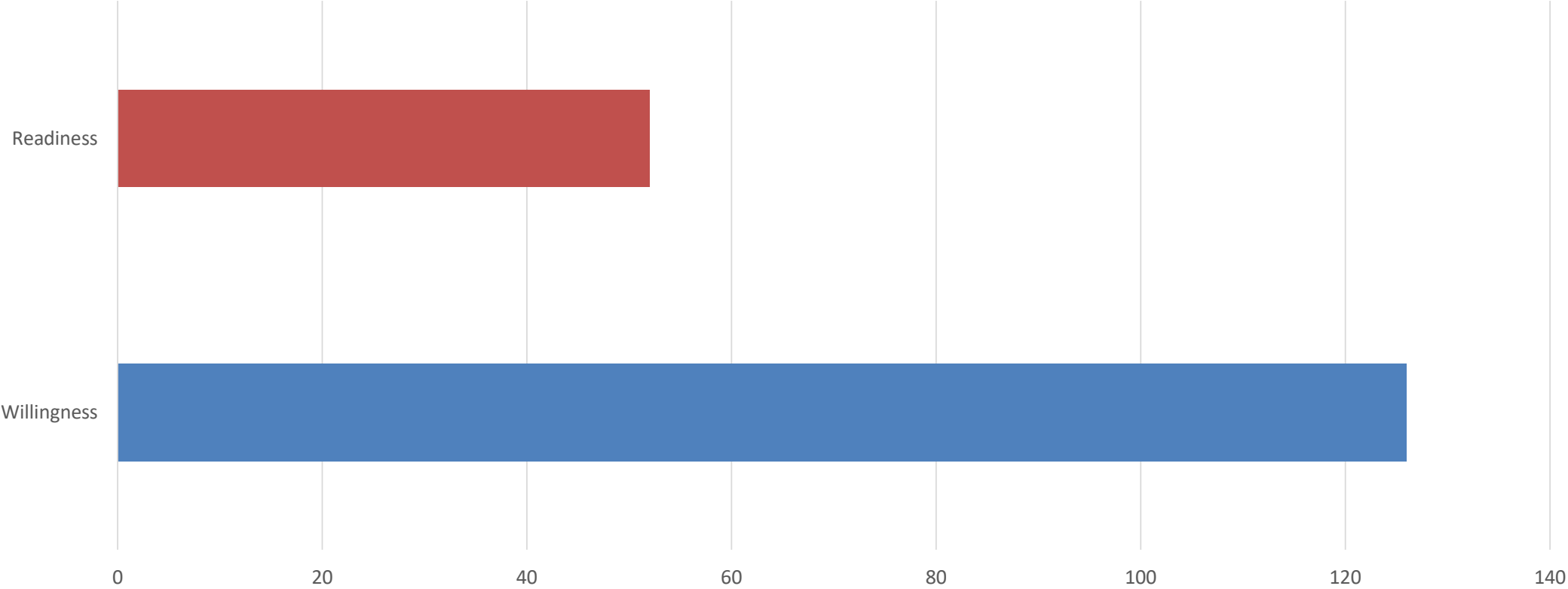
Readiness & Willingness (Self Declared)



Total Willingness & Readiness

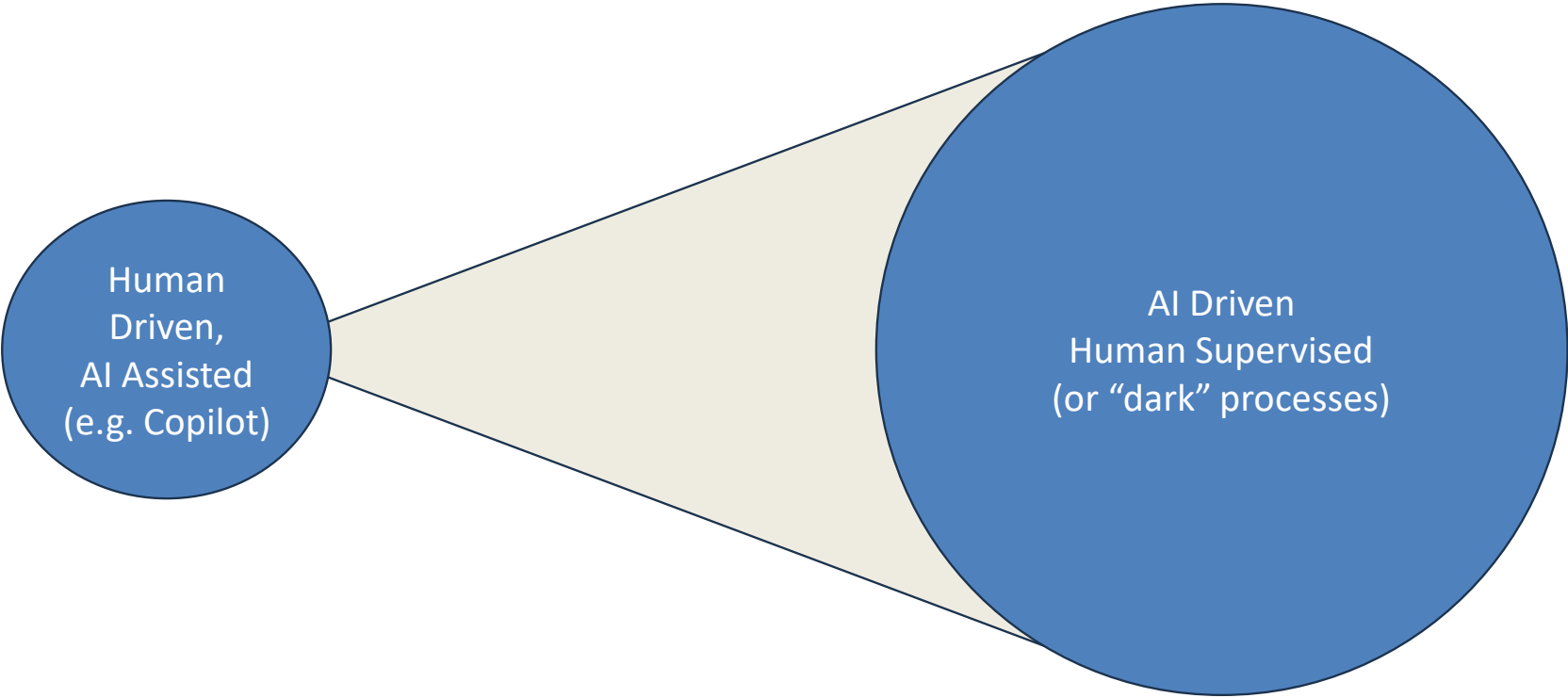


Self-Declare Totals



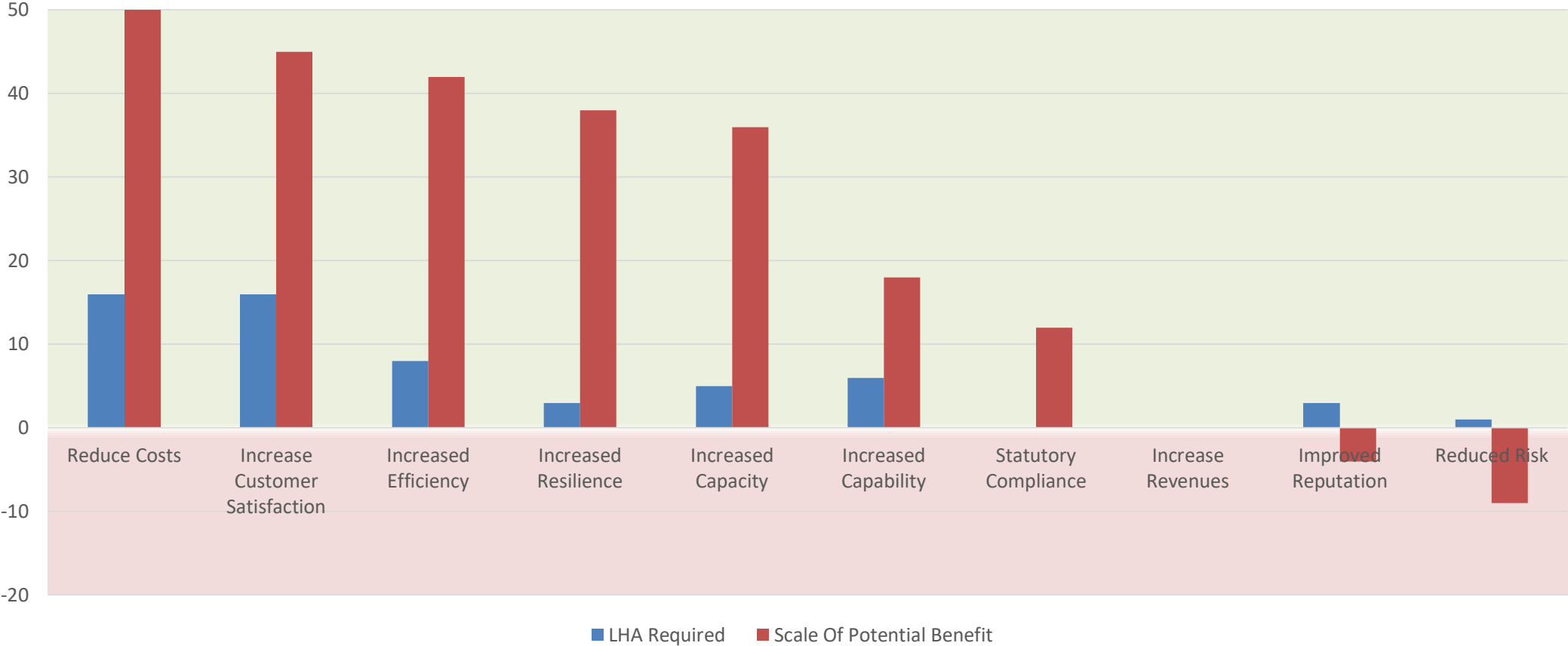
Scale Of Risk Considerations

Who's In Charge?



Target Benefits

Analysis of Benefits Classes





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AI: Deepseek The Elephant In The Room

Future Highways Research Group

ChatGPT vs Deepseek



ChatGPT 4o



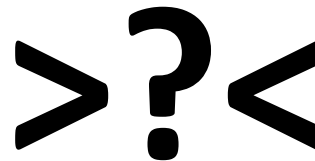
**High-Powered Rack Server
(106 TOPS, 380 TPS)**

£ 9,715 – £85,400 each



**Raspberry Pi 5 + Hailo AI HAT
(26 TOPS, 88 TPS)**

£ 154 each



Let's ask ChatGPT... and Deepseek...



How effective would deepseek running on a Raspberry Pi 5 with an AI HAT be at managing telephone enquiries?

“That setup should perform decently. A Raspberry Pi 5 with an AI HAT can be quite effective for handling telephone inquiries. It can manage speech recognition and natural language processing tasks. While it may not match the power of larger servers, it's a cost-effective and compact solution for most tasks. If your application isn't too demanding, it should be quite effective”.

ChatGPT

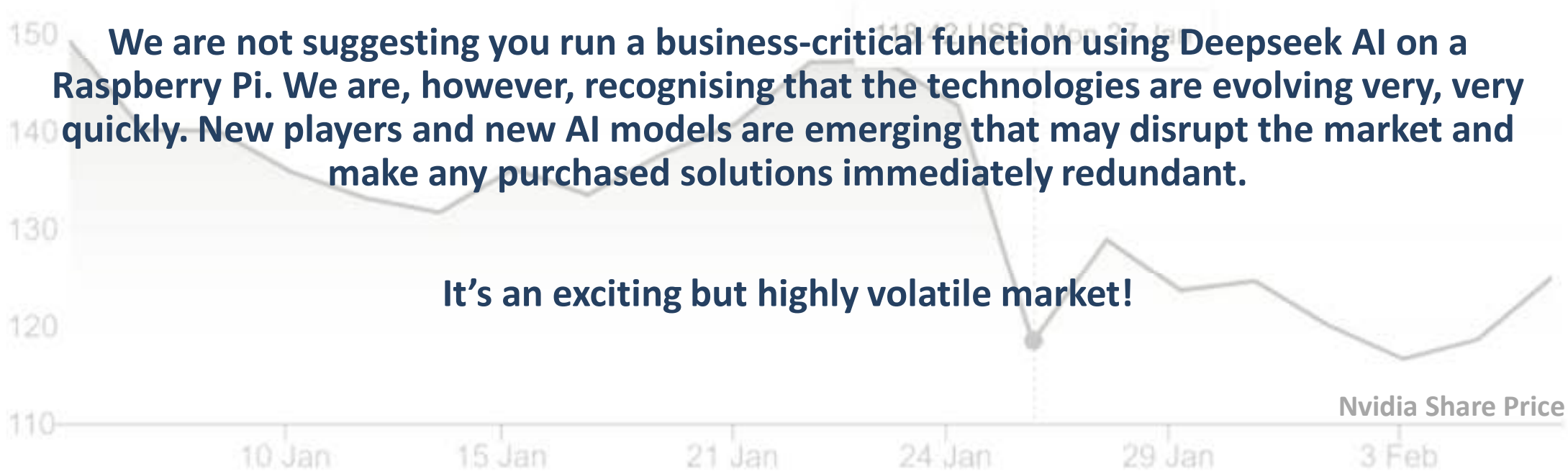
“An 8GB Raspberry Pi 5 should work well for most tasks. Use the minimum AI model required for your application and only install the languages you will be using”.

Deepseek

Conclusion



1D | 5D | 1M | 6M | YTD | 1Y | 5Y | Max





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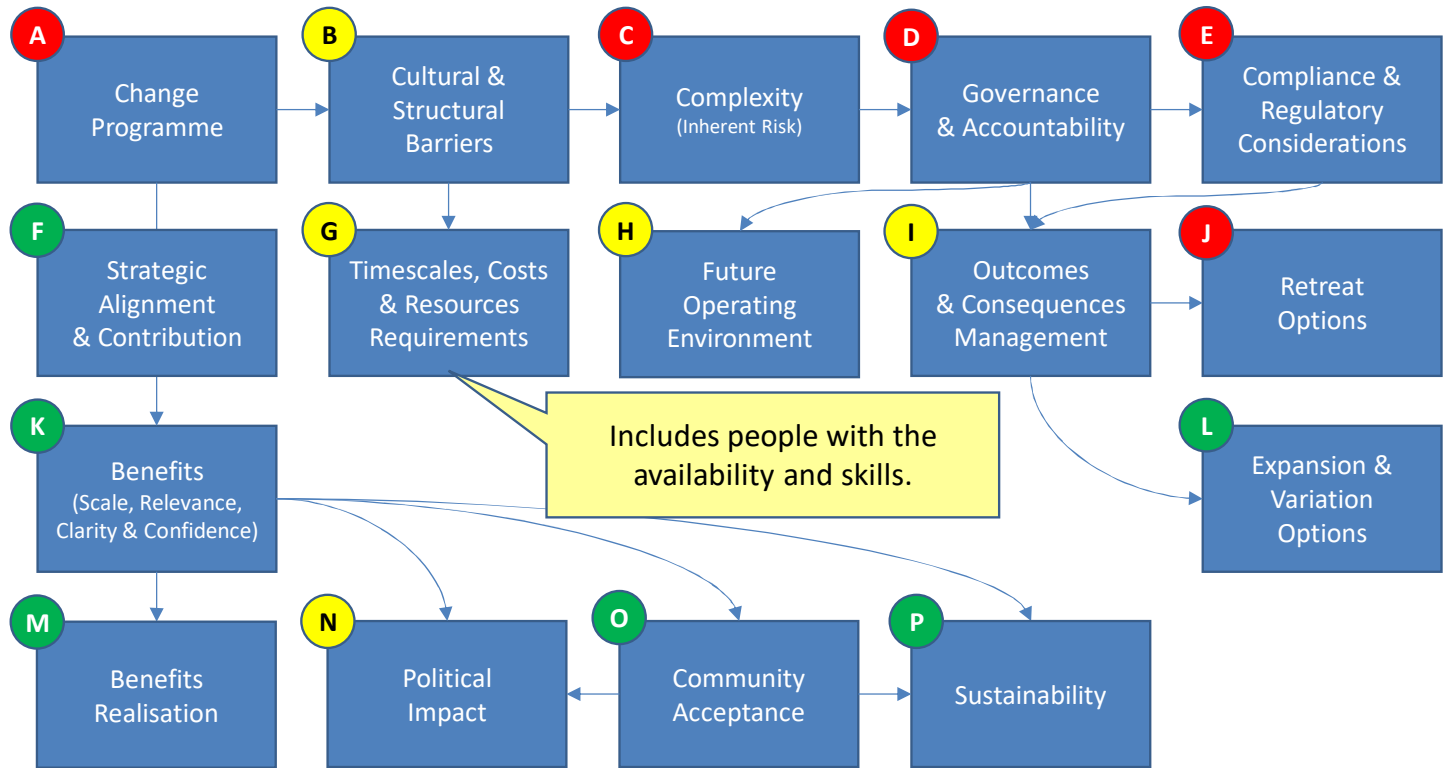
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AI Enquiry Handling: Risk Analysis

Future Highways Research Group

Risk Assessment Framework

Initial Risks RAG Report



Risk & Issues Evaluation Framework v5.1 ©Proving 2017.

● Minor Issues (Or Concerns)
 ● Some Issues (Resolvable)
 ● Major Issues (Potentially Critical)

Initial Risk Assessment

By Project Phase



Project Phase	Complexity					Risk Probability	Risk Mitigation & Retreat	Risk Score	Impact							
	Scale	Novelty	Diversity	Interdependencies	Volatility				Reputation	Costs Escalation	Benefits Realisation	Staff Safety	Public Safety	Operational Effectiveness	Operational Efficiency	Impact Score
Phase 0: Enquiry Qualification & Calls Forwarding	50	50	25	25	25	75	75	26.1	50	75	75	100	75	75	50	71.4
Phase 1: General Enquiries Handling	25	50	75	25	75	50	25	5.8	25	75	75	100	75	75	50	67.9
Phase 2: Defects Reporting	75	75	50	25	50	25	25	2.9	0	25	25	50	0	0	50	21.4
Phase 3: Complaints Handling	75	25	25	25	25	25	25	2.0	0	50	25	50	25	25	25	28.6
Phase 4: Internal Advisory Service (Out-Of-Scope)																
Totals	225	200	175	100	175	175	150	37	75	225	200	300	175	175	175	47

Risk Assessment Descriptions



- **Complexity (Inherent Risk)**
 - Scale: the larger the business change, the more risk.
 - Novelty: the more novel the change or technology, the more risk.
 - Diversity: the wider the diversity of stakeholders, processes, etc, the more risk.
 - Interdependencies: the more dependencies on other functions, the more risk.
 - Volatility: the more change of business change, political change funding change, the more risk.
- **Risk Probability**
 - Refers to the likelihood or chance that the state risks will actually happen.
- **Risk Mitigation & Retreat**
 - Refers to the ability of the organisation to manage a negative risk outcome or reverse the business change that gave rise to the risk.
- **Impact**
 - Reputation: potential damage to the reputation of organisation or the political administration.
 - Costs escalation: the risk results in additional operational, mitigation or retreat costs.
 - Benefits realisation: the risks result in reduced or reversed benefits and / or strategic outcomes.
 - Staff safety: the risks result in a threat to staff safety.
 - Public safety: the risks result in a threat to public safety.
 - Operational effectiveness: the risks undermine or reduce the primary operational purposes of a function.
 - Operational efficiency: the risks undermine or reduce the responsiveness and / or efficiency of a function.

Scoring Ranges

Notes Regarding Scoring



- **Scoring Ranges**

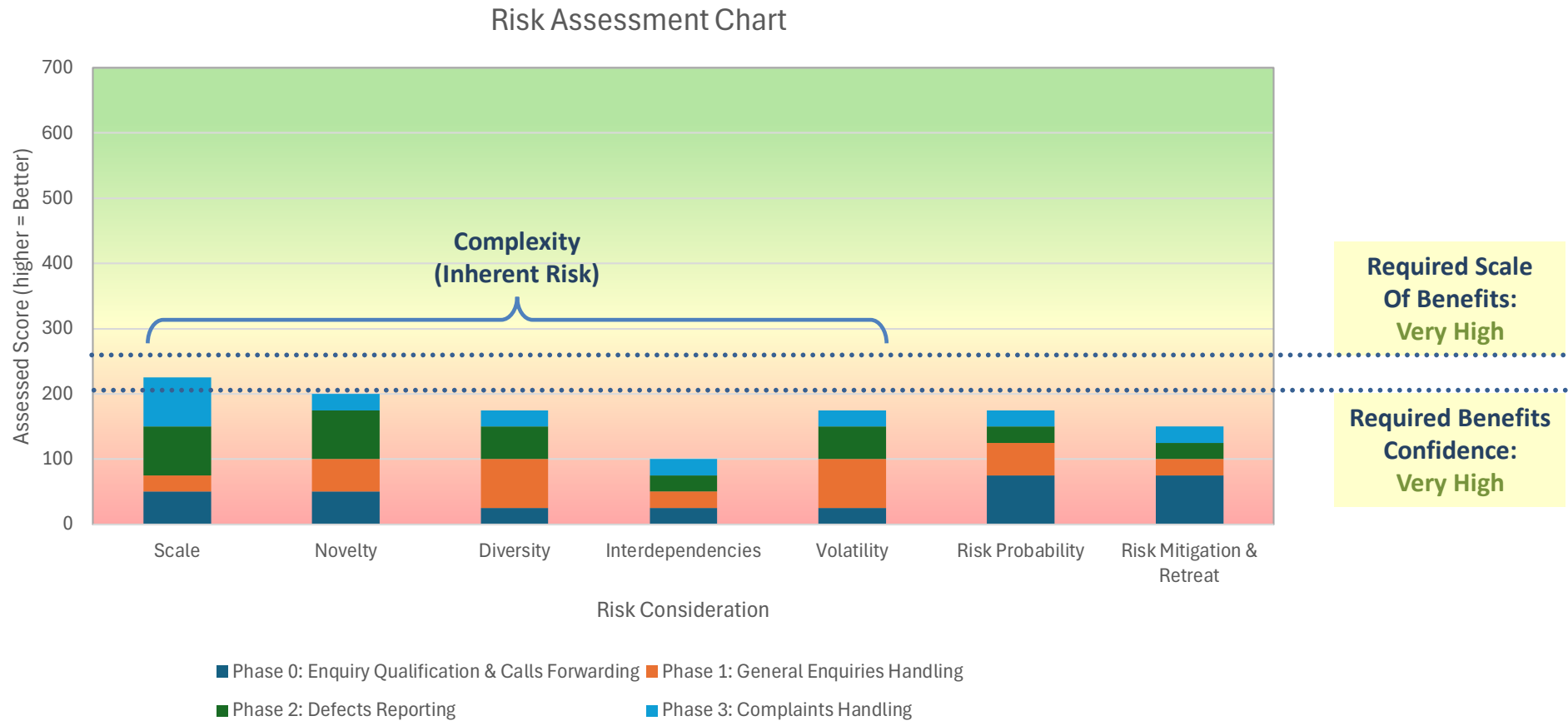
- No score: not applicable.
- 100: **High**; low risk and / or low impact.
- 75: **Medium-High**; potentially manageable risks or impacts with limited consequences.
- 50: **Medium**; potential risks (“emergent” risks) with unknown consequences.
- 25: **Medium-Low**; higher risks, or risks with higher probabilities, with unknown consequences.
- 0: **Low**; Significant risks, with higher probabilities, with significant business or customer impacts.

- **Scoring Notes**

- Scoring was undertaken by Proving as an abstract exercise to create initial risk and impact scores. Scoring should be repeated by each FHRG member to ensure that the scores reflect the local environment.

Risk Charts

Risk Assessment Chart

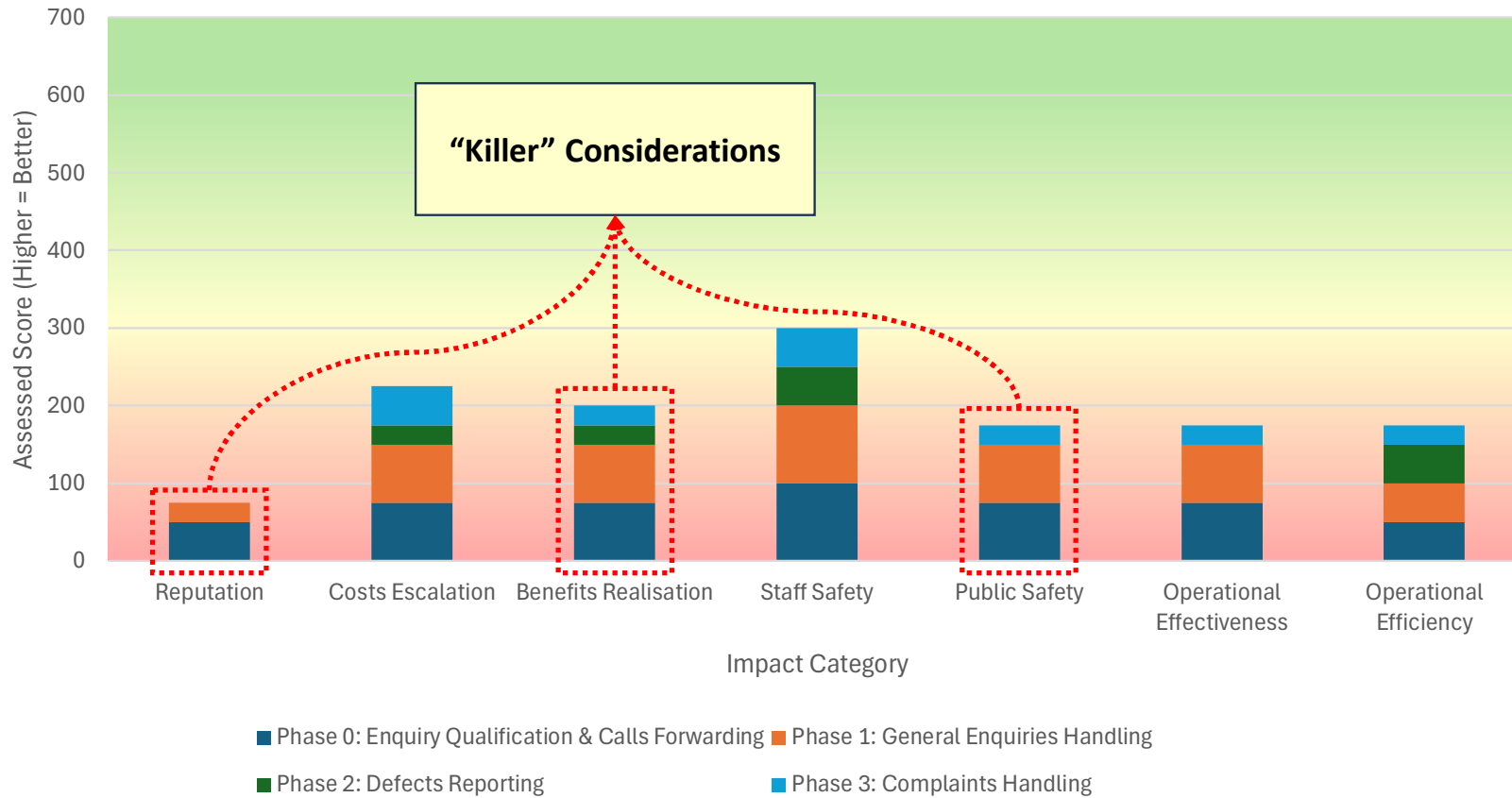


Risk Charts

Risks Impact Chart



Risk Impact Chart



Heads Of Risk

Key Considerations



- **Immature AI technologies.**
 - Rapidly changing and evolving with many “forks”.
 - High cost of replacement where invested in a dead-end.
- **Competing technologies and architectures.**
 - With many specialist applications.
- **Compelling, but unproven business cases.**
 - Few highways-specific case studies.
 - Limited investment in AI within the sector.
- **High switching barriers.**
 - Resulting in cost escalation, especially where heavily invested in a low market share technology.
- **Data ownership considerations.**
 - Many organisations “sell” client and AI data.
- **Data security.**
 - AI is proven to be highly “hackable” (IBM).
- **Highly skilled IS/IT/AI team required.**
 - For development and on-going maintenance.
- **High staff redundancy / redeployment costs.**
 - With little hope of reacquisition, should the project fail.
- **Difficult to monitor and manage in real time.**
 - Especially out-of-hours.
- **“Wild West” emergent market.**
 - With many players, intense competition, and many unsubstantiated claims.
 - Including from the “Big Four”.
- **Conflicts with customer preferences.**
 - Customers want to speak to real people.
- **Reversed policies cause confusion.**
 - Reversing modal shift.
 - Terminating fix my street contracts.
- **Back office and wider services integration.**
 - Potentially expensive integration required to realise the benefits.
- **Loss of in-house capability and capacity.**
 - Removal of skilled enquiries handling teams.
 - Significantly undermining any retreat strategy.
- **Loss of executive and political confidence.**
 - If the technology proves unreliable.
- **Impossible to ignore / avoid the AI drive.**
 - Forcing LHAs to adopt an immature technology.
- **Failure to meet public expectations.**
 - As an enhanced interface with the public is not reflected in network condition improvements.

Summary of Findings



- **The risk scores are very low (poor).**
 - The probability of project failure is, therefore, very high.
- **The risks increase exponentially based on the complexity of the AI driven tasks.**
 - Especially the safety-critical tasks such as defects reporting.
- **The risks are currently assessed in abstract.**
 - ...and will need to be reassessed for each pioneer group member.
- **Therefore, the project focus will be minimising risks and costs.**
 - Ensuring the business benefits are fully realised at each stage.
- **The project must realise any benefits within a short timeframe.**
 - ...as the technology will have a fleeting operational life.
 - This is very possible.
- **This transformation is inevitable – driven by the scale of the business benefits.**
 - If these can be confirmed in Stage III of the case development.



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FHRG Members' Experiences & Shared Learning



- **Are there opportunities to capture and share members' learning?**
- **What role, if any, should the FHRG take?**



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Next Meeting Date

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