

Future Highways Research Group

FHRG Waypoint Meeting: Q1, 2024

Virtual Meeting: MS Teams

ADEPT / Proving Research Partnership



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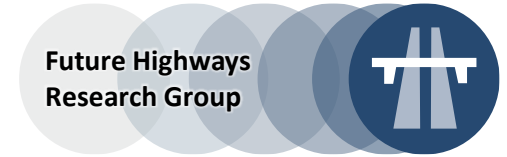
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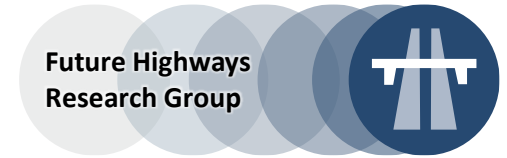
Agenda



- **Welcome, Introductions and ADEPT Update** (Hannah Bartram, CEO, ADEPT)
- **Highways Magazine** (Chris Ames, Deputy Editor, Highways Magazine)
- **FHRG Activities Update** (Andy Perrin, Simon Wilson, Proving)
 - Live Labs update.
 - VFM Benchmarking Club.
 - Refreshed factor set and scoring guide.
 - Opportunities to join the peer reviewer pool.
 - Scheduling a VFM assessment.
- **FHRG Members Open Discussion**
 - Critical current challenges.
 - Sharing innovations and best practice.

Agenda

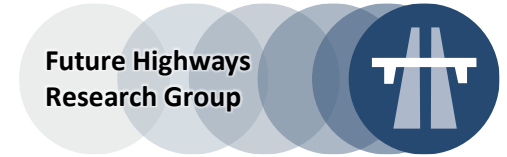
Continued...



- **Norfolk Highways: Mixed Economy Operations** (Nick Haverson, Norfolk CC & Jason Glasspool, Norse Group)
 - Key features and success factors.
- **Highways Climate Resilience** (Dr Hugh Deeming)
 - Preparing for and tackling the impacts of climate change in the highways.
- **Comfort Break**
- **In Situ Recycling** (Daniel Morgan, Paul Acock, Colas)
 - Using the road as a quarry for in-situ resurfacing.
- **AI Robot for Pothole Identification and Repair** (Chris Faires, Chris Allen- Smith, Hertfordshire CC)
 - Using AI to improve defect identification and repair.
- **Reimagining Integrated Services Delivery** (Phil Horton, Ringway Jacobs)
 - A new way to deliver services in partnership.

Agenda

Continued...



- **Circular Limestone (Total Aggregates & Jon Evans, Lincolnshire CC)**
 - Using incinerator waste to create construction-grade limestone.
- **Carbon Analyser Rollout**
 - Assessing options and support for broad deployment.
- **Date of Next Meeting**
- **AOB & Close**



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Welcome & ADEPT News

Hannah Bartram



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Sector News: Highways Magazine

Chris Ames, Deputy Editor



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Programme Updates

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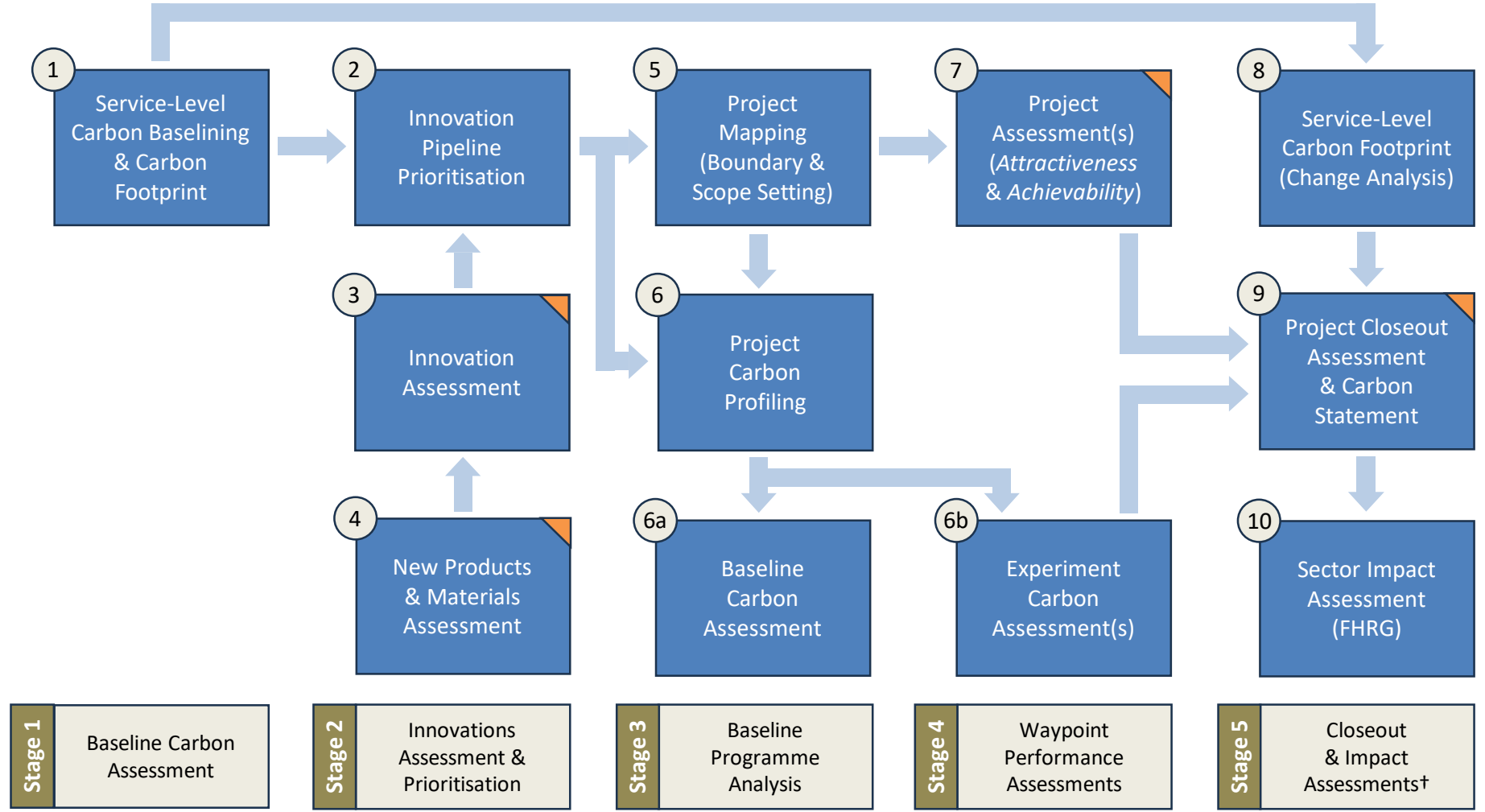
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Live Labs II Update

Future Highways Research Group

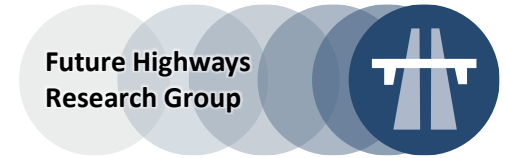
Live Labs II: Support Programme



†Enhanced Support Programme Only

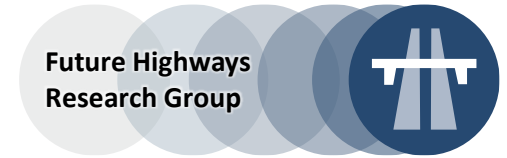
▴ Assessment Scorecards (Carbon Analyser)

Scope of Engagements



- **Wessex (Somerset, Cornwall & Hampshire)**
 - Multi-innovation corridor-based carbon reduction trials.
- **Liverpool**
 - Scheme options analysis and designing out carbon.
- **West Sussex & South Gloucestershire**
 - Biochar for highways construction and maintenance (carbon sequestration).
- **North Lanarkshire & Transport for West Midlands**
 - Including eight west-midlands authorities (TBC).
 - Centre of Excellence for new materials and methods.

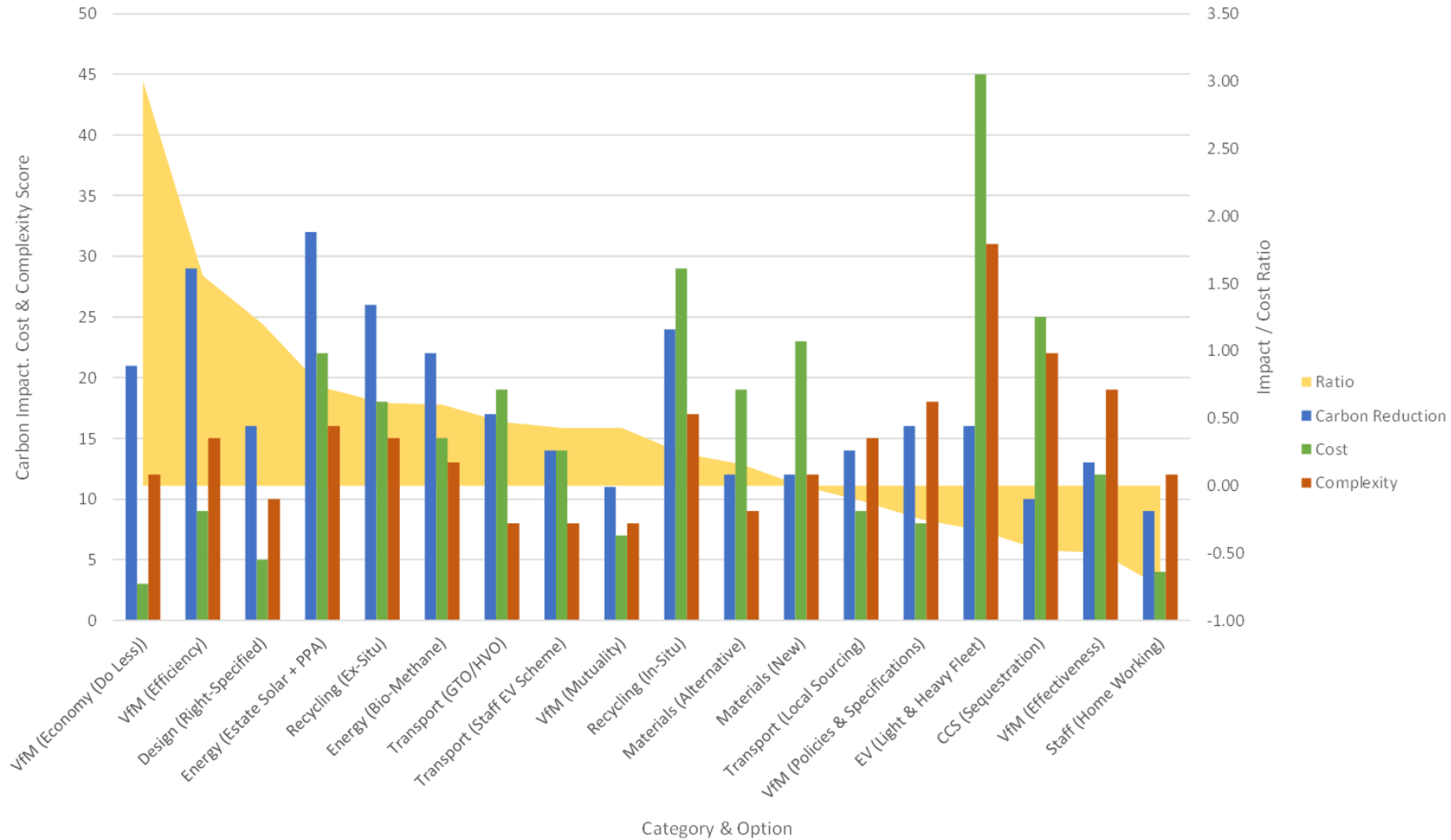
Scope of Innovations



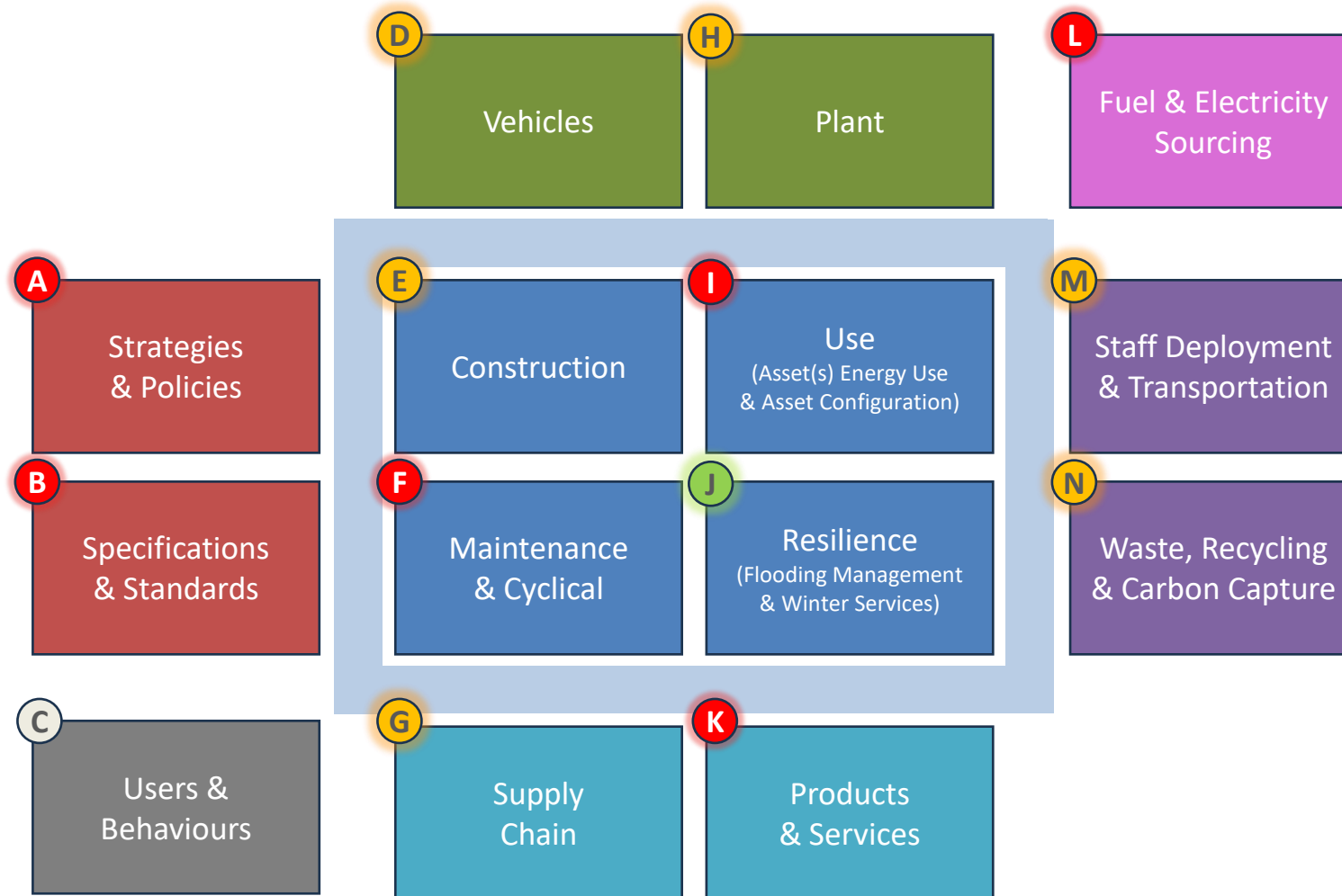
- **CCS (Biochar Sequestration)**
- **Design (Right-Specified, Lower Carbon)**
- **Energy (Bio-Methane)**
- **Energy (Estate Solar + PPA)**
- **EV (Light Fleet, Inspection Vehicles)**
- **Solar Street & Signs Lighting**
- **EV (Heavy Fleet)**
- **New Materials (CofE)**
- **Alternative Materials (CofE)**
- **Recycling (Ex-Situ)**
- **Recycling (In-Situ)**
- **Staff Locations (Home / Work / Remote)**
- **Transport (GTO/HVO)**
- **Transport (Hydrogen)**
- **Transport (Local Sourcing)**
- **Transport (Staff EV Scheme)**
- **Solar Road Studs**
- **VfM (Economy (Do Less))**
- **VfM (Effectiveness)**
- **VfM (Efficiency)**
- **VfM (Mutuality)**
- **VfM (Policies & Specifications)**

Innovations Prioritisation

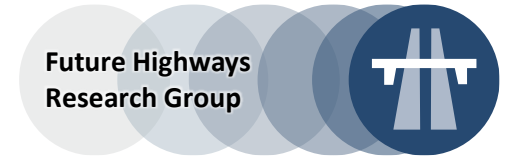
Strategic Carbon Reduction Options (Innovations Scoring): NFS Q1, 2024



Loci of Innovations



Benefits to FHRG Members



- **All tools developed for Live Labs II are available to FHRG members.**
 - Innovations Prioritisation Scorecards
 - Materials & Vendors Assessment Scorecards
 - Projects & Schemes Assessment Scorecards
 - ...the list will grow as the programme matures.
- **All innovations with compelling cases will be presented to the FHRG.**
 - New policies and specifications.
 - New materials and processes.
 - New fuels and transport methods.
 - New technologies.
- **Data from trials will be shared to assist in innovations rollout.**



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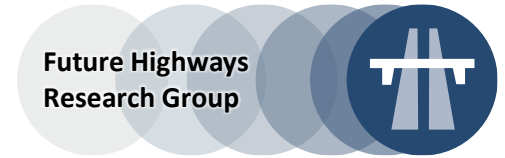
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Value for Money Assessments

Future Highways Research Group

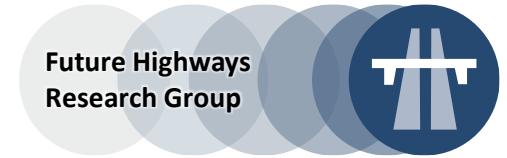
Highways VFM Factor Set and Scoring Guide



- **Factor set and scoring guide updated for contemporary challenges and language.**
- **Minor additions/deletions/amendments to factors in most dimensions.**
- **More significant changes to the *effectiveness* dimension.**
 - Recognising the increasing importance of environmental and social value factors.
- **We will continue to calibrate and refine the scoring guidance.**
 - Especially the descriptors of performance (as we undertake assessments).

Factor Set

Economy



ID	Dimension	Factor Name	Weighting
100	Economy	Commissioned / Outsourced Service Contract	
101	Economy	Management Staff	60
102	Economy	Professional Staff	80
103	Economy	Front Line Operative Staff	100
104	Economy	Sub-Contractors	100
105	Economy	Other Significant External Contracts	60
106	Economy	Internal Costs	
107	Economy	Management	60
108	Economy	Staff	100
109	Economy	Corporate Support Services	60
110	Economy	Professional / Consultancy Services	50
111	Economy	IT / IS Equipment & Software	50
112	Economy	Materials & Consumables	60
113	Economy	Vehicles / Equipment	60
114	Economy	Depots / Offices	60
115	Economy	Other Operating Costs	25
116	Economy	Cost of Risk (Where Applicable)	
117	Economy	Cost of Compensation (Including CEs / Functional FTP Events)	60
118	Economy	Cost of Risk (Anticipated & Emergent)	60
119	Economy	Revenue Generation (Where Applicable)	
120	Economy	Income / Services Trading	100
121	Economy	Grant / Investment Winning	80
122	Economy	Economy Improvement Plan (Savings Plan)	80
123	Economy	Delivery of Service Within Budget	100

Factor weightings are indicative and can be adjusted for each specific service.

Factors that are not relevant to a specific service are simply weighted to zero.

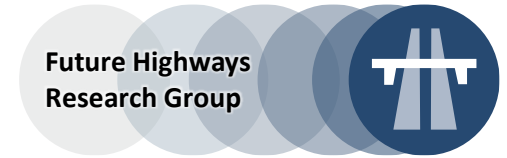
Factor Set

Efficiency

ID	Dimension	Factor Name	Weighting
200	Efficiency	External Resource Efficiency (Commissioned / Outsourced Service Contract)	
201	Efficiency	Productivity of Management	100
202	Efficiency	Productivity of Professional Staff	100
203	Efficiency	Productivity of Frontline Operatives	100
204	Efficiency	Productivity of Sub-Contractors	100
205	Efficiency	Productivity of Other Significant External Contracts	100
206	Efficiency	Internal Resource Efficiency	
207	Efficiency	Productivity of Management	100
208	Efficiency	Productivity of Staff	100
209	Efficiency	Productivity of Corporate Support Services	80
210	Efficiency	Efficiency Performance Management	
211	Efficiency	Service Productivity & Throughput	100
212	Efficiency	Service Optimisation	100
213	Efficiency	Service Utilisation	100
214	Efficiency	Service Sustainability	100
215	Efficiency	Stakeholder Management (Internal & External)	100
216	Efficiency	Service Agility (Scope & Scale of Operations: Demand Matching)	80
217	Efficiency	IT / IS Management	100
218	Efficiency	Information Analysis & Reporting Management	80
219	Efficiency	Staff Travel	60

Factor Set

Effectiveness

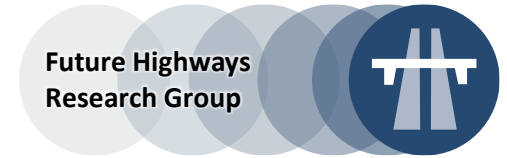


ID	Dimension	Factor Name	Weighting
300	Effectiveness	Effectiveness Management	
301	Effectiveness	Scope and Scale of Service	100
302	Effectiveness	Asset Management Plan Delivery	100
303	Effectiveness	Quality of Service	100
304	Effectiveness	Environmental Value (Air Quality / Biodiversity / Carbon)	100
305	Effectiveness	Social Value	100
306	Effectiveness	Resilience of Service	90
307	Effectiveness	Service Development and Innovation	80
308	Effectiveness	Serious Events (Public Protection / Safety / Regulatory Compliance)	75
309	Effectiveness	Overall Customer Satisfaction	100
310	Effectiveness	Service Improvement Plan	80
311	Effectiveness	Transactional Performance	
312	Effectiveness	% of On-Budget Transactions	90
313	Effectiveness	% of Error-Free Transactions	90
314	Effectiveness	% of On-Time Transactions	90
315	Effectiveness	% of Reworked / Discarded Outputs	75

The factor set now recognises Environmental Value and Social Value as core objectives for a service.

These were previously classified as Added Value factors with a lower weighting.

Promoting the Status of Environmental and Social Value



- **For Environmental Value, the Scoring Guide descriptor for ‘Good’ is:**

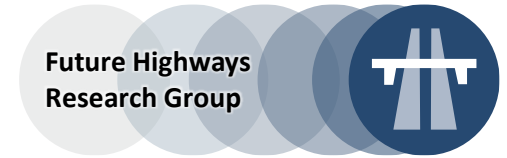
- The service has clearly defined medium term strategies in place in respect of air quality, biodiversity, and carbon. These strategies are fully aligned to corporate priorities and ambitions. The means by which these strategies will be funded has been determined and documented.
- The strategies encompass a portfolio of initiatives and are underpinned by quantitative and qualitative SMART measures that are applied across both internal and externally commissioned services.
- Milestones and targets are all being met or exceeded, and the service can demonstrate tangible and visible success from environmental initiatives.

- **For Social Value, the Scoring Guide descriptor for ‘Good’ is:**

- The service has a clearly defined medium-term strategy in place in respect of social value. This strategy is fully aligned to corporate priorities and ambitions. The means by which the strategy will be funded has been determined and documented.
- The strategy encompasses a portfolio of initiatives and is underpinned by quantitative and qualitative SMART measures that are applied across both internal and externally commissioned services. These measures demonstrate the value added to both the authority and recipient.
- Milestones and targets are all being met or exceeded, and the service can demonstrate tangible and visible success from social value initiatives.

Factor Set

Strategic Value



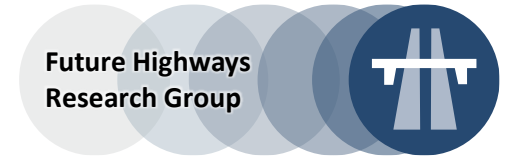
ID	Dimension	Factor Name	Weighting
400	Strategic Value	Support initiatives that deliver carbon neutral services, schemes and incentives.	100
401	Strategic Value	Optimise and improve network access and performance for all users under all conditions.	100
402	Strategic Value	Enhance the local economy through network expansion and improvement to meet the growth agenda.	100
403	Strategic Value	Sustain a financially resilient service that delivers best value with the resources available.	100
404	Strategic Value	Engage effectively to understand and meet the needs of our citizens and communities.	100
405	Strategic Value	Embrace best practice, innovations and new technologies enabling the service to continuously evolve.	100
406	Strategic Value	Develop and sustain collaborative partnerships that deliver the objectives of all partners.	100
407	Strategic Value	Attract, develop, empower and retain the best people capable of driving a dynamic and agile service.	100

The template is pre-populated with the strategic objectives adopted by the majority of FHRG members.

Where relevant, these should be overwritten with any specific strategic objectives adopted by the service being assessed.

Factor Set

Stakeholder Value



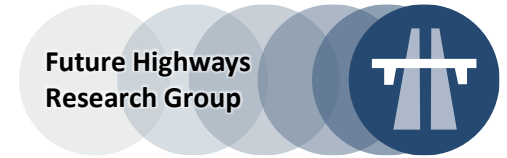
ID	Dimension	Factor Name	Weighting
500	Stakeholder Value	Politicians (Leader)	90
501	Stakeholder Value	Portfolio Holder	100
502	Stakeholder Value	Politicians (Cabinet & Scrutiny)	90
503	Stakeholder Value	Politicians (Other)	80
504	Stakeholder Value	Other Councils	
505	Stakeholder Value	Districts	60
506	Stakeholder Value	Parishes and Town Councils	80
507	Stakeholder Value	Neighbouring Authorities	60
508	Stakeholder Value	Officers	
509	Stakeholder Value	CEO & Corporate Team Management	100
510	Stakeholder Value	In-Function	100
511	Stakeholder Value	In Other Dependent Functions	80
512	Stakeholder Value	Partners (Delivery / Value Chain)	80
513	Stakeholder Value	Utilities Organisations	50
514	Stakeholder Value	Developers	60
515	Stakeholder Value	DfT	50
516	Stakeholder Value	National Highways	50
517	Stakeholder Value	Other Transport-related Organisations / Agencies	60
518	Stakeholder Value	Regional Highways Alliance	80
519	Stakeholder Value	General Public	100
520	Stakeholder Value	Regulators	80
521	Stakeholder Value	Special Interest Groups	80

The template is pre-populated with a typical set of key stakeholders for a highways service.

For each individual service, these can be amended, added to or deleted.

Factor Set

Mutuality



ID	Dimension	Factor Name	Weighting
600	Mutuality	Joint Objectives	100
601	Mutuality	Joint Governance Structure	80
602	Mutuality	Behaviours and Trust Indicators	100
603	Mutuality	Joint Executive Sponsorship	80
604	Mutuality	Operational Leadership	80
605	Mutuality	Joint Management Framework	80
606	Mutuality	Joint Communications Strategy	80
607	Mutuality	Joint Knowledge Management Strategy	80
608	Mutuality	Joint Risk Management Strategy	80
609	Mutuality	Joint Issue Resolution Process	80
610	Mutuality	Value Creation and Continuous Improvement	80
611	Mutuality	Utilisation of Learning From Experience	80
612	Mutuality	Measurement of Delivery and Performance	80
613	Mutuality	Joint Exit Strategy	80
614	Mutuality	Joint Relationship Management Plan	80

The factor set for Mutuality mirrors the requirements of ISO4001 – *Collaborative business relationship management systems*.

This dimension is not included in a core VfM assessment but can be helpful where relationships are new or fractious.



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Member Updates: Open Discussion

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Norfolk Highways: Mixed Economy Operations

Nick Haverson, Norfolk CC & Jason Glasspool, Norse Group

Summary:

- Mixed economy/best fit by option contract model.
- Work & Construction, Professional Services & Traffic Signals contracts run until 31st March 2026
- Norse Highways existing Service Level Agreement due to extend beyond 1st October 2024

Works & Construction
£42m per year

Traffic Signals
£1.2m per year

Professional Services
£7m per year

Norse Highways
£11.5m per year on maintenance
£2.6m Winter Services in 2022/3

The Current Norfolk Highway Delivery Model

Highway Maintenance	Term Maintenance & Works Contract	Professional Services	Traffic Signals & Digital Innovation
Norse Highways	Tarmac	WSP	Swarco
<ul style="list-style-type: none"> • <u>Highway works</u> (routine maintenance e.g. pothole repairs, drainage works, sign repairs & winter services); • <u>Norfolk Partnership Laboratory</u>; • <u>Norse Highway Fleet Services</u> (including Norfolk Fire & Rescue Service fleet); • <u>Fast Lane Training Services</u>. • <u>Typical scheme delivery lending itself to a routine maintenance approach.</u> 	<ul style="list-style-type: none"> • <u>Highway Works</u> (routine maintenance e.g. grass cutting, weed treatment, drainage works, bridges, VRS, CW & FW patching) • <u>Surface Dressing</u>; • <u>Delivery of large schemes</u> (e.g., footway, drainage, resurfacing, etc.); • <u>Major schemes & capital resurfacing programme</u>; • <u>Externally funded works</u> (including S278, Developer funded works and District Council works etc.); • <u>Road markings</u>. 	<ul style="list-style-type: none"> • Highways, Bridges & Structures; • Traffic assessment & modelling; • Environment (including EIA); • Archaeology & Heritage; • Landscape; • Transport Planning; • Civil Engineering; • Geotechnical; • Intelligent Transport Services; • Land, Property & Assets; • Planning. 	<ul style="list-style-type: none"> • Traffic signal repairs; • MESH communication & integration of LoRaWAN technology; • Annual replacement programme delivering minor upgrades (e.g. conversion of ELV with LEDs); • Integration of IOT technology to improve reporting of signal faults.
<p>The diagram at the bottom of the table illustrates the project phases across the four categories. It features four horizontal arrows:</p> <ul style="list-style-type: none"> Flexibility: A red arrow pointing left, spanning the Highway Maintenance and Term Maintenance & Works Contract columns. Contract Management Group: A green arrow pointing right, spanning the Term Maintenance & Works Contract, Professional Services, and Traffic Signals & Digital Innovation columns. Value Creation Team: A blue double-headed arrow spanning the Term Maintenance & Works Contract and Professional Services columns. Early Contractor Involvement: A dark blue arrow pointing right, spanning all four columns. 			

High Performing Contracts

**Awarded additional government funding
(Approx. £91m in 2023/4 Capital programme)**

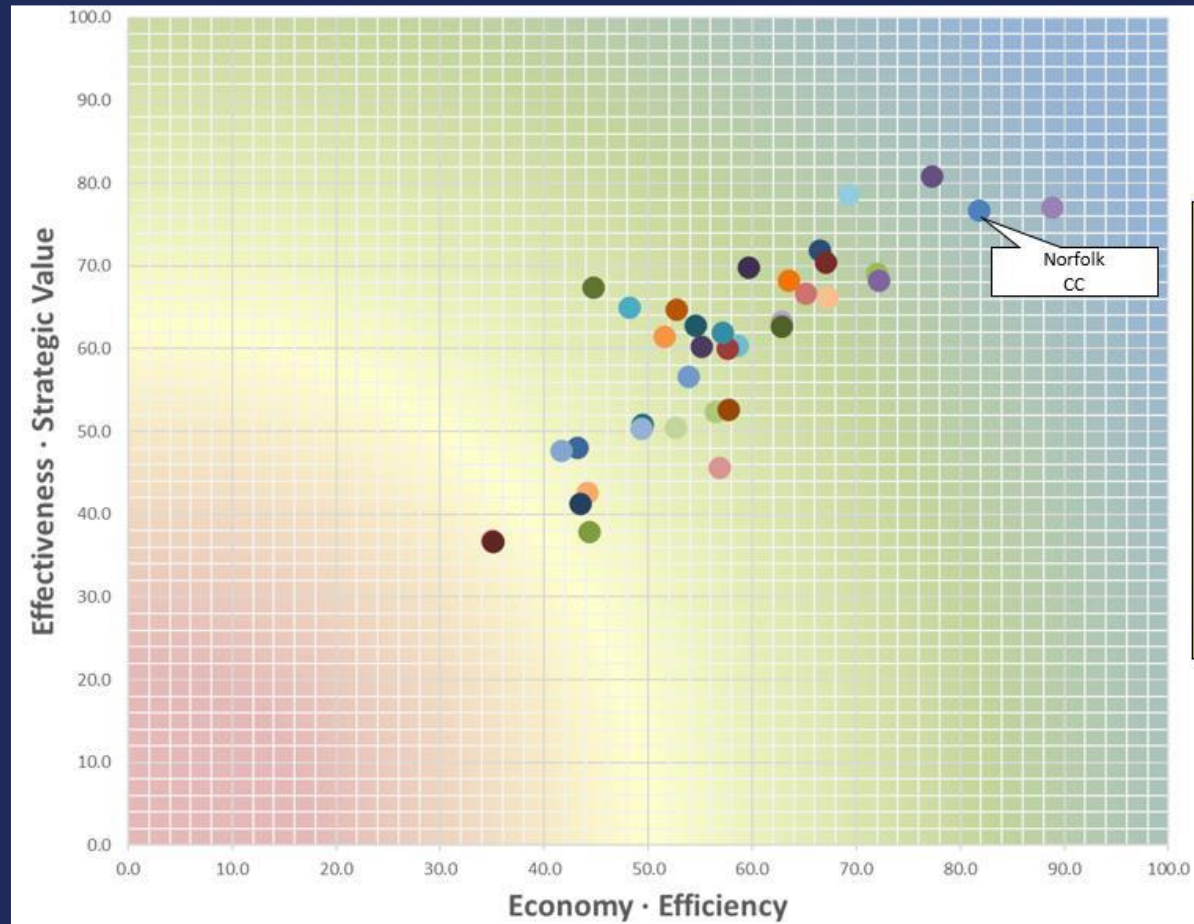
Continued delivery during Covid-19

A flexible & responsive approach

Excellent results in National Highways & Transport survey

Current Contract Performance

- Future Highway Research Group has shown NCC to be high value for money
- Norse & Tarmac contracts contribute to high performance & exceed KPIs



In terms of value for money, NCCHTS is amongst the strongest performers across the FHRG peer group currently.

National Highways & Transport Survey

- The survey shows NCC as the highest overall across peer groups.
- Above average on all key benchmark indicators.

Indicator	Score	Rank	High	Average	Low	Gap	Best Performer
Overall							
KBI 00 - Overall Satisfaction	47%	1	47	40	30	7	Norfolk
KBI 01 - Importance vs Satisfaction (local)	53%	1	53	48	45	5	Norfolk
KBI 02 - Importance vs Satisfaction (national)	53%	1	53	48	45	5	Norfolk

Norse Highways Contract

	Key Performance Indicator - December 2023	Result	Achieved
1.1	Percentage of notifiable works under S74 of the New Roads and Streetworks Act 1991 that did not incur a fixed penalty notice – Target 95% - December data	99.21%	Yes
1.2	Percentage of financial audits completed with no contractor actions identified – Target 90% - December - 0 Audits, 0 Actions	100.00%	Yes
1.3	Percentage of Priority B defects attended within response timescale (up to 4 days) should be completed – Target 95%	97.10%	Yes
1.4	Percentage of Priority C defects completed within response timescale (from date issued to the Company to date completed by the Company) taking into account agreed extensions of time. – Target 85%	98.34%	Yes
1.5	Percentage of Priority D defects completed within response timescale (from date issued to the Company to date completed by the Company) taking into account agreed extensions of time. – Target 85%	99.60%	Yes
1.6	Overall Completion of all Works - Audit review group, measures the proportion of sites that require a return visit to deal with Defects – Target 95% - December - 2 Audits, 0 Actions	100.00%	Yes



Tasks completed with a Target Date of December 31st 2023											
December 2023						December 2023 - Year to Date					
Priority	KPI target	no. tasks completed	no. tasks on-time	no. tasks over-due	% complete on-time	Priority	KPI target	no. tasks completed	no. tasks on-time	no. tasks over-due	% complete on-time
B	95%	518	503	15	97.10%	B	95%	3,383	3,324	59	98.3%
C	85%	902	887	15	98.34%	C	85%	9,451	9,272	179	98.1%
D	85%	504	502	2	99.60%	D	85%	4,815	4,767	48	99%

Tarmac Contract

- Consistent performance.
- High scoring service delivery.
- Strong customer service.
- Excellent health & safety record.

Year of the contract	Service Delivery (x /5.0)	Public Satisfaction (x /5.0)	Innovation score (x /5.0)	Annual Strategic Score (x /5.0)
Year 1 (2014-15)	3.8	4.0	3.0	3.6
Year 2 (2015-16)	4.9	4.0	1.0	4.2
Year 3 (2016-17)	4.9	4.0	3.0	4.3
Year 4 (2017-18)	4.9	3.0	1.0	4.2
Year 5 (2018-19)	4.4	4.0	5.0	4.5
Year 6 (2019-20)	4.5	4.0	5.0	4.4
Year 7 (2020-21)	4.5	4.0	5.0	4.5
Year 8 (2021-22)	4.5	4.0	5.0	4.4
Year 9 (2022-23)	4.5	4.6	5.0	4.5



WSP Contract

- **Integrated with NCC Design Team**
- **Expert reach back**
- **Help delivery of Major schemes (Herring Bridge, Norwich Western Link etc.)**
- **Responded to help support delivery of additional funding**

Year of the contract	Service Delivery (x /5.0)	Collaborative Working (x /5.0)	Innovation score (x /5.0)	Annual Strategic Score (x /5.0)
Year 1 (2014-15)	N/A	N/A	N/A	N/A
Year 2 (2015-16)	4.4	4.0	4.0	4.2
Year 3 (2016-17)	5.0	4.0	3.0	4.4
Year 4 (2017-18)	4.6	4.0	1.0	3.8
Year 5 (2018-19)	4.8	4.0	5.0	4.5
Year 6 (2019-20)	4.8	4.0	1.0	4.1
Year 7 (2020-21)	5.0	4.0	5.0	4.6
Year 8 (2021-22)	5.0	4.0	5.0	4.4
Year 9 (2022/23)	5.0	4.0	5.0	4.4



Swarco Contract

- Excellent performance
- Upgrade programme delivered
- Collaborative working with NCC Digital Services

Year of the contract	Service Delivery (x /5.0)	Public Satisfaction (x /5.0)	Innovation score (x /5.0)	Annual Strategic Score (x /5.0)
Year 1 (2014-15)	4.2	1.0	1.0	3.3
Year 2 (2015-16)	4.2	3.0	3.0	4.1
Year 3 (2016-17)	4.3	3.0	1.0	4.0
Year 4 (2017-18)	4.8	N/A	1.0	4.4
Year 5 (2018-19)	4.3	N/A	5.0	4.5
Year 6 (2019-20)	4.3	N/A	5.0	4.6
Year 7 (2020-21)	4.3	N/A	5.0	4.6
Year 8 (2021-22)	4.8	N/A	5.0	4.8
Year 9 (2022-23)	4.8	N/A	5.0	4.9



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Highways Climate Resilience

Dr Hugh Deeming



Network
Resilience

Preparing for and tackling the impacts of climate change in the highways

Dr Hugh Deeming

Future Highways Research Group (FHRG)

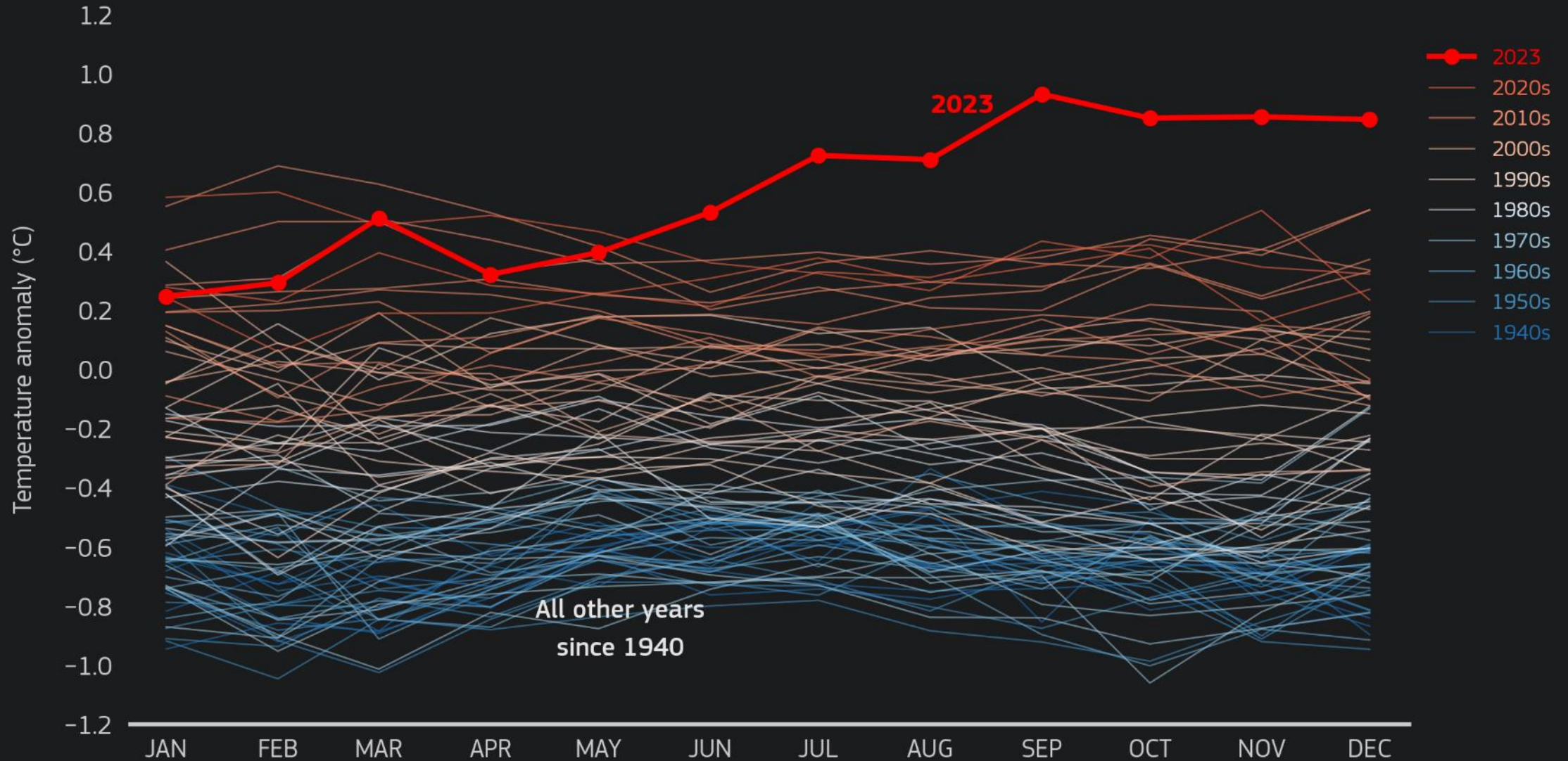
Thurs 8th Feb 2024



GLOBAL SURFACE AIR TEMPERATURE ANOMALIES



Data: ERA5 1940–2023 • Reference period: 1991–2020 • Credit: C3S/ECMWF



PROGRAMME OF THE
EUROPEAN UNION



IMPLEMENTED BY



Climate
Change Service
climate.copernicus.eu

Highways as 'Lifelines'



- “Lifelines are the most **fundamental services** in the community that, **when stabilized**, enable all other aspects of society to function
- Lifelines are the **integrated network** of assets, services, and capabilities that are used day-to-day to support the recurring needs of the community
- When disrupted, **decisive intervention** (e.g., rapid service re-establishment or employment of contingency response solutions) is required to stabilize the incident”

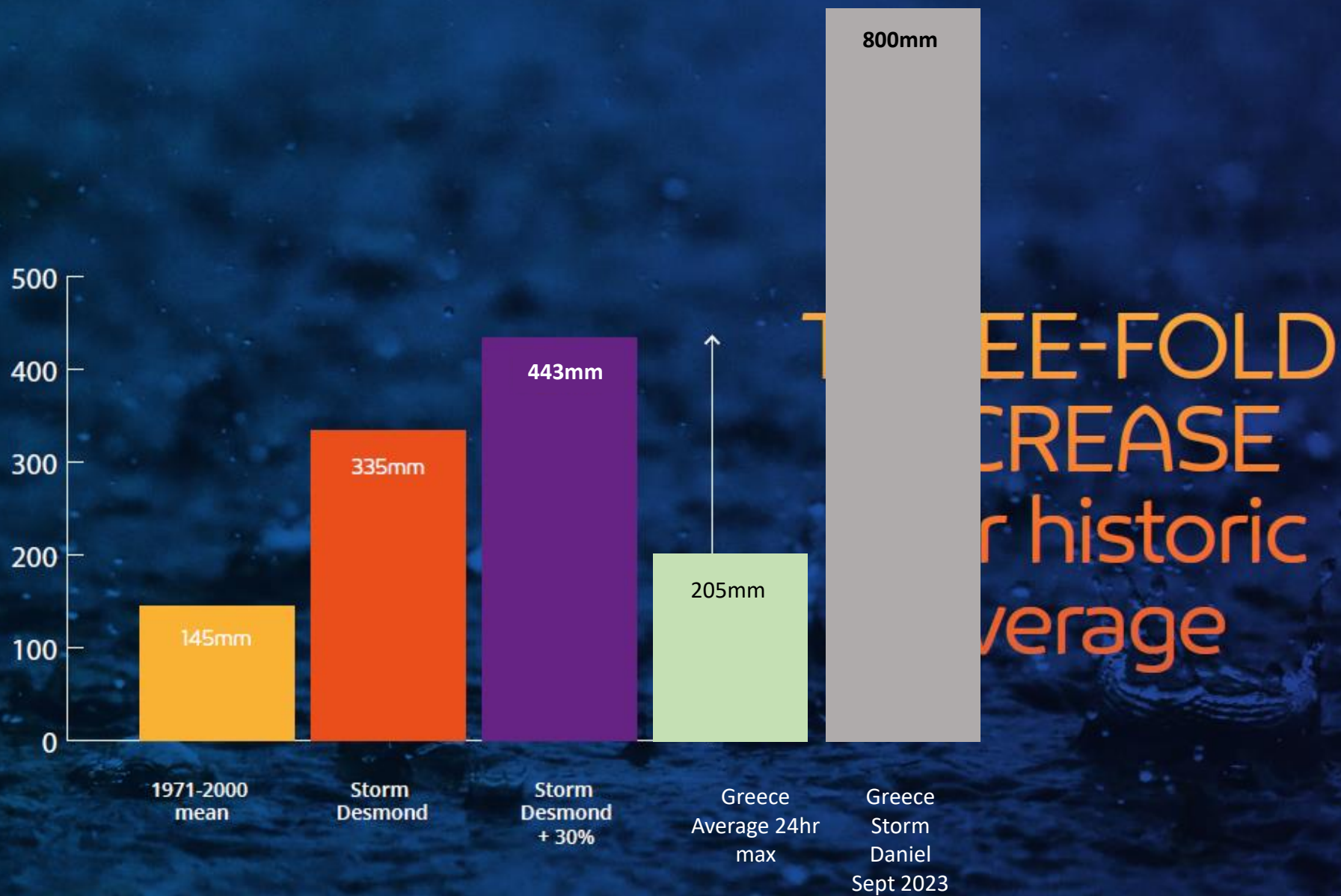
Emergency Preparedness, Response & Recovery:

**Identifying lessons learned by UK highway
sector from extreme-weather emergencies
(2015-2020)**



A report prepared for the Department for Transport and the Local Government
Technical Advisers Group by: HD Research, Benthams, N. Yorks, LA2 7DL





Data: Met Office (2022) and Marsh et al. (2016), HMG, Flood Resilience Review (2016)



13/02/2024

Future Highways Research Group, University of Exeter

Extreme weather contingencies need to become Business as Usual

Domains of Resilience

- 1 Robustness**
physical resistance, up to design standard (e.g. high-spec materials)
- 2 Reliability**
continuity under a variety of conditions
- 3 Redundancy**
substitution (e.g. safe diversion routes, fall-back options)
- 4 Resourcefulness**
the ability to apply material (i.e., monetary, physical, technological, and informational) and human resources to meet established priorities and achieve goals
- 5 Rapidity**
meet priorities and achieve goals in a timely manner
- 6 Recovery**
recover from disruption, 'build back better'



Iceland 2017



13/02/2024

Future Highways Research Group: Waypoint Meeting

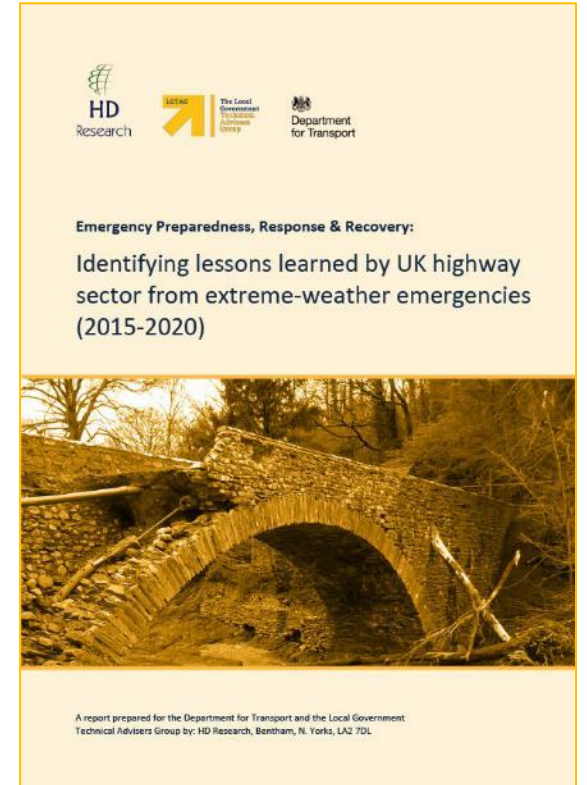
Iceland 2024

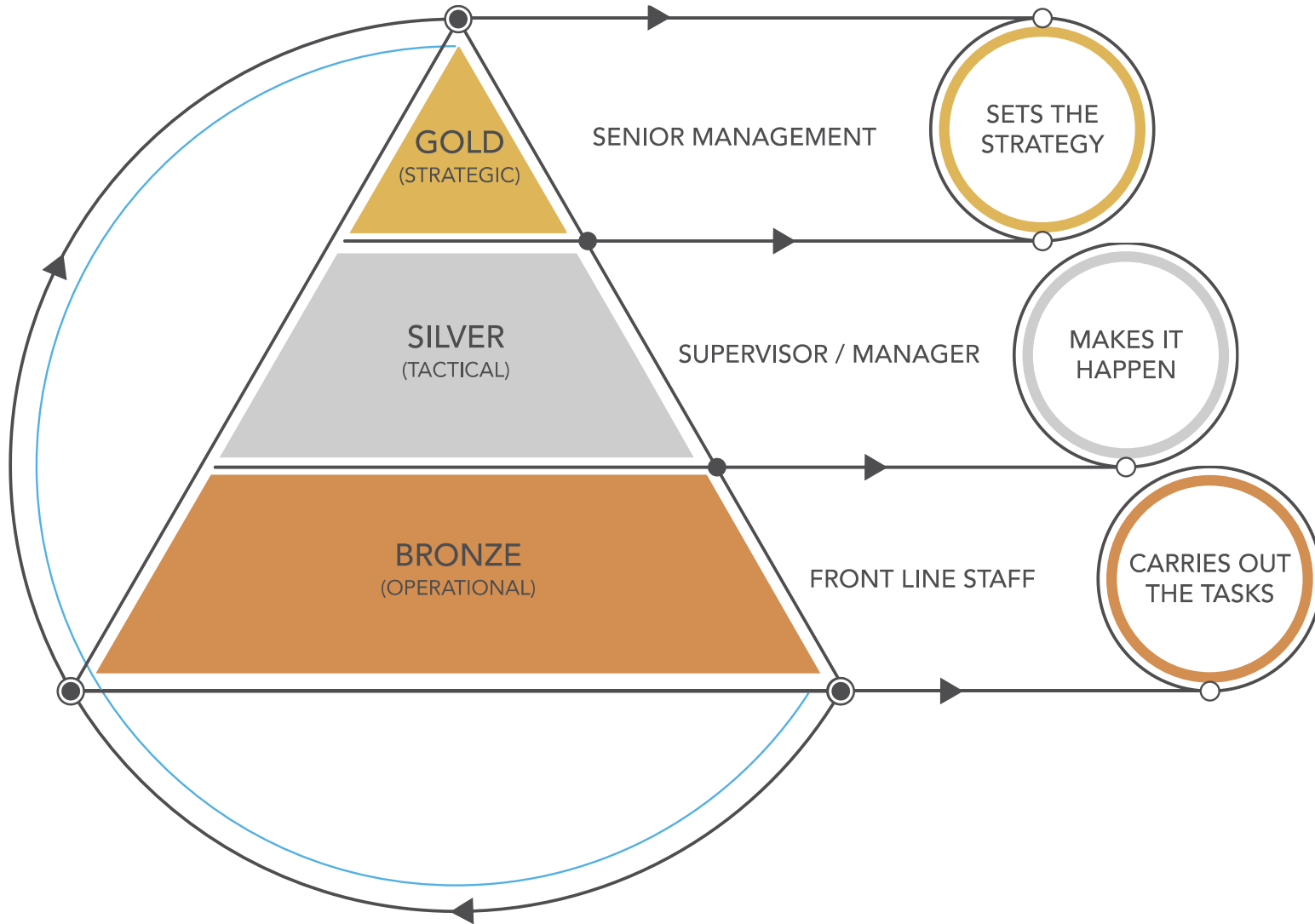


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Key recommendations from extreme-weather review

- The critical importance of **Suitably Qualified, Experienced and Empowered People** in delivering Highways emergency management.
- The need for consistent **Rapid Impact Assessment**
- For **Mutual Aid** contingencies to be developed **on a regional / national basis**, and in conjunction with the private sector.





INTEROPERABILITY



Interoperability: The extent to which organisations can work together coherently as a matter of routine.

JESIP (2021)

Interoperability: a shared system of technology and teamwork built upon trust, identification, goals, communication, and flexibility.

Power, *et al.* (2023)

INTEROPERABILITY

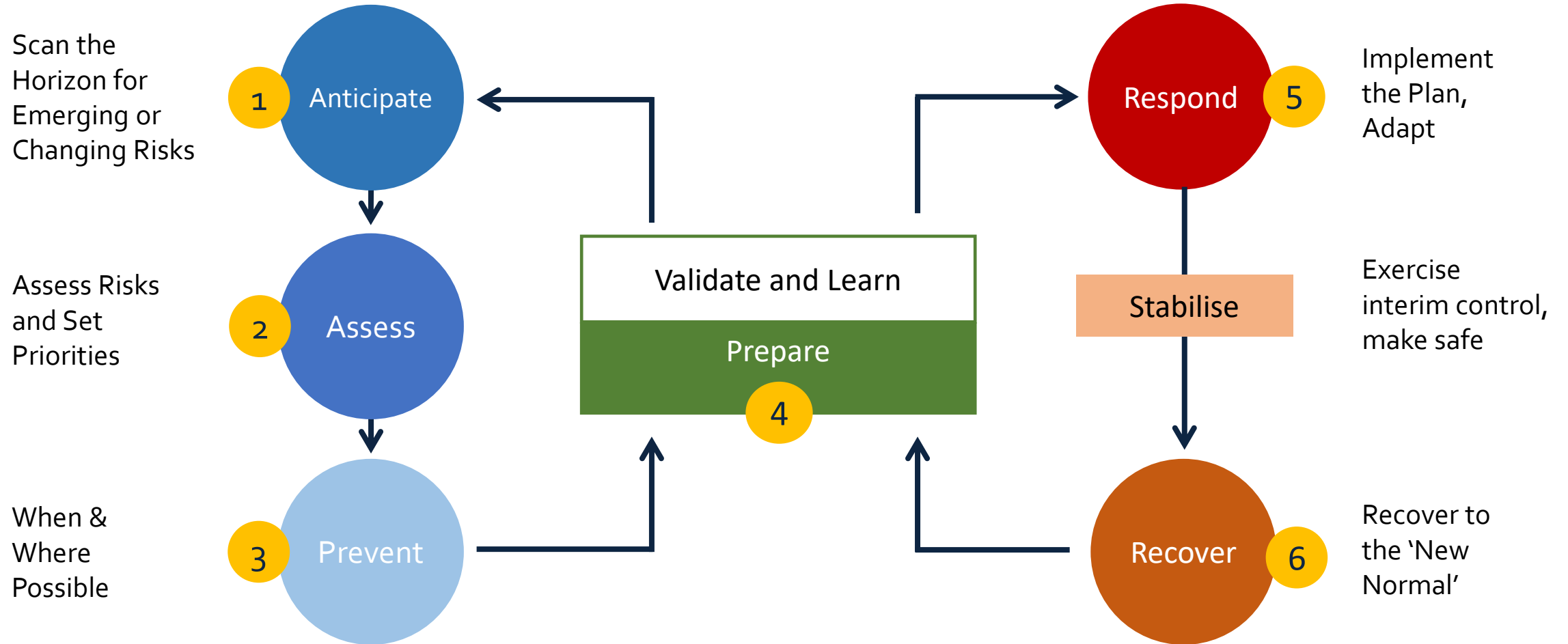
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Power, *et al.* (2023)

Integrated Emergency Management (IEM)



Stabilisation - definition

“The exercise of interim control following an incident in order to increase public safety, mitigate further damage and to reduce the likelihood of secondary consequences occurring”



13/02/2024



Future Highways Research Group: Waypoint Meeting

HD Research The Local Government Association Department for Transport

Emergency Preparedness, Response & Recovery:
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Situational Awareness (SA)

Perception

Getting / Gathering Information



Comprehension

Understand / Interpret



Projection

Think ahead / Anticipate future states

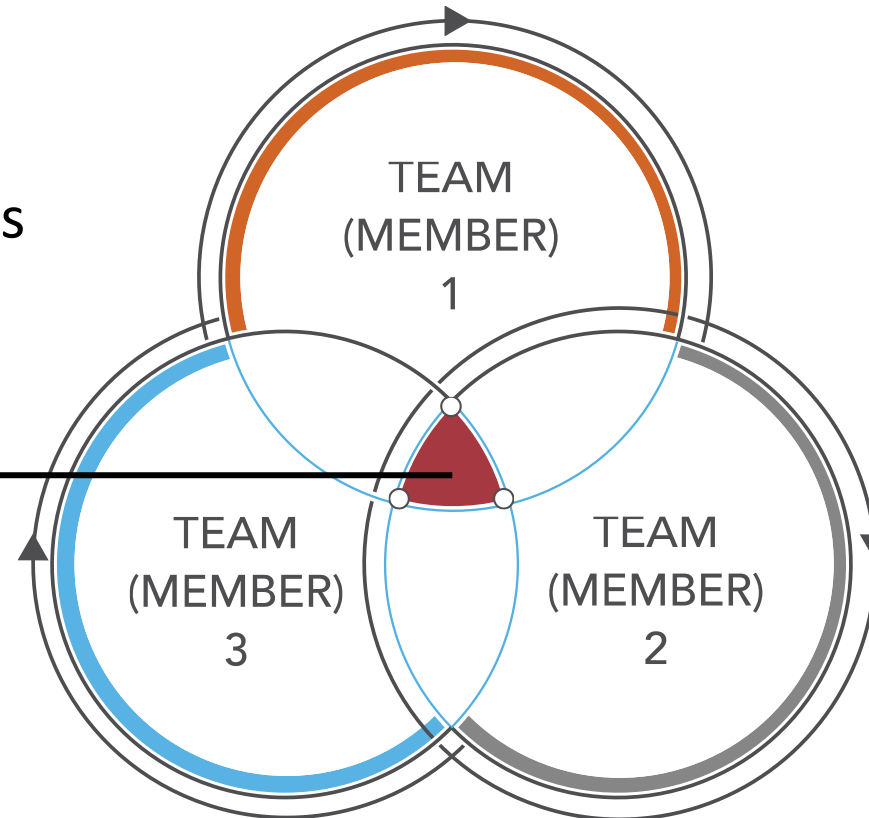
What?

So What?

What Might?

Situational Awareness (SA)

- Commanders **jointly assess risk** to achieve common Shared Situational Awareness (SSA) of threats and hazards
- This is the **Common Operating Picture**



Part of the purpose of the COP is to articulate the team's shared mental model of the situation; its SSA

Risk Matrix

Impact	Extreme					
	Significant					
	Moderate					
	Limited					
	Negligible					
		Rare	Unlikely	Moderate	Likely	Almost Certain
Likelihood						



Impact =



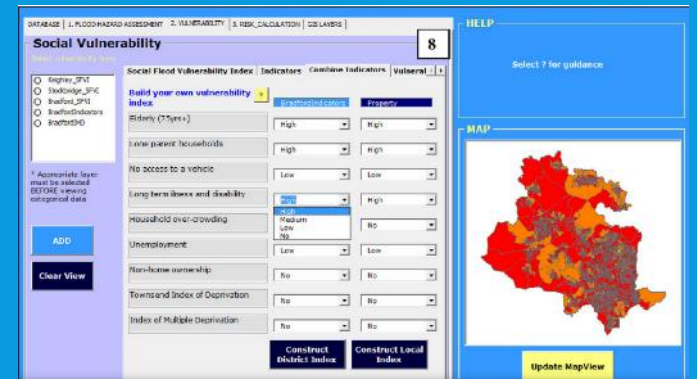
Damage

x



Consequences

+



Impact Matrix



		Red	Red	Red	Red	Red
		Yellow	Red	Red	Red	Red
		Green	Yellow	Yellow	Red	Red
		Green	Yellow	Yellow	Yellow	Yellow
		Green	Green	Green	Green	Green

Impact Matrix

		None-visible or suspected	Limited	Moderate	Severe	Total Failure
Damage to Asset						

Impact Matrix

Consequences for the community	Extreme					
	Significant					
	Moderate					
	Limited					
	Minor					
		None-visible or suspected	Limited	Moderate	Severe	Total Failure
Damage to Asset						

Impact Matrix

Consequences for the community	Extreme					
	Significant					
	Moderate					
	Limited					
	Minor					
		None-visible or suspected	Limited	Moderate	Severe	Total Failure
Damage to Asset						

Impact Rating Matrix

Consequences for the community	Extreme	x20	x25	x35	x45	x50
	Significant	x10	x20	x25	x40	x45
	Moderate	x3	x15	x15	x25	x30
	Limited	x2	x10	x10	x10	x10
	Minor	x1	x1	x1	x1	x1
		None-visible or suspected	Limited	Moderate	Severe	Total Failure
Damage to Asset						

Total Assets	0
Total Impact Score	0

Highways Resilience: Response Assumptions

- Highways are Lifeline Infrastructure
- Highway authorities are responsible for *leading* on the creation of shared situational awareness of, and decision making in respect to, the stabilisation and recovery from impacts on lifeline road networks
- Highway Operations and Traffic Managers need to be Suitably Qualified, Experienced and Empowered to declare and manage a **Major Incident**:

“An event or situation with a range of serious consequences which requires special arrangements to be implemented by one or more emergency responder agency.”