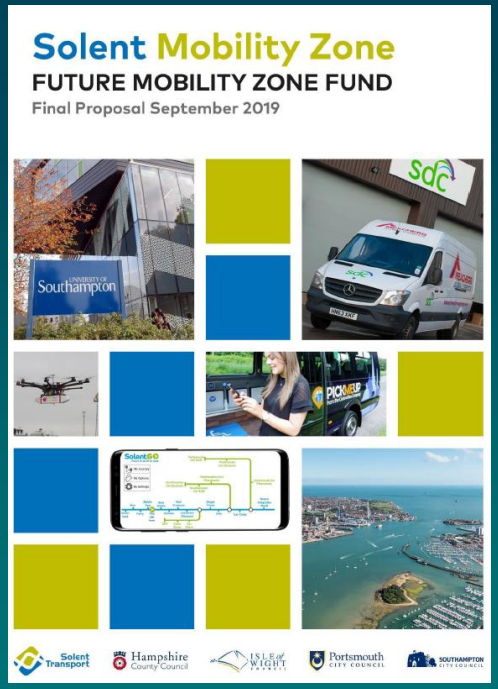
The Solent Future Transport Zone Research Programme

UNIVERSITY OF Southampton

10th June 2021
SIS CDT Seminar

Professor John Preston
Transportation Research Group (TRG)
jpreston@soton.ac.uk



Contents

- What is the Solent Future Transport Zone (FTZ) (research) programme?
- Programme Level Monitoring and Evaluation (M&E)
- Mobility as a Service (MaaS)
    - User Requirements
    - Human Factors
- Conclusions

Funding Success

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New transport tech to be tested in biggest shake-up of laws in a generation

Making journeys easier, smarter and greener with new technology.

Published 16 March 2020
From: Department for Transport, Department for Business, Energy & Industrial Strategy, The Rt Hon Grant Shapps MP, and The Rt Hon Alok Sharma MP

The government has today (16 March 2020) launched a consultation to make journeys easier, smarter and greener through new technology as part of the Future of Transport regulatory review.

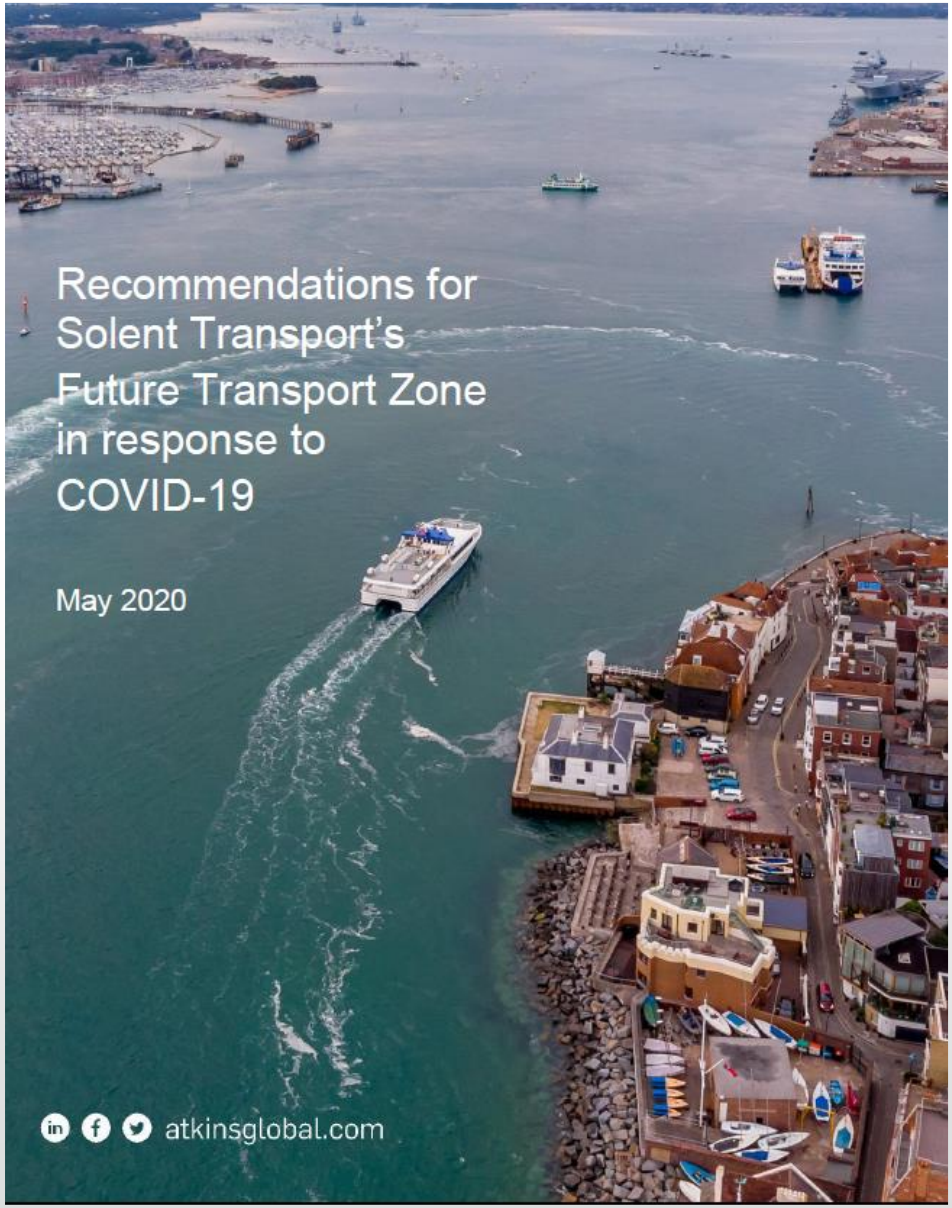
The review will consider how we make small changes to our everyday travel decisions and whether we could choose to walk, cycle, bus or one day scoot instead of take the car.

Alongside the review, a £90 million funding boost will lead to trials of new transport innovation in 3 new 'future transport zones'. The zones will provide real-world testing for experts, allowing them to work with a range of local bodies such as councils, hospitals, airports and universities to test innovative ways to transport people and goods.

The 3 new zones set to receive a share of the funding are in Portsmouth and Southampton, the West of England Combined Authority, and Derby and Nottingham - they will all join the existing West Midlands future of transport zone.

One of the projects tested will see drones carrying medical supplies from clinics on the Isle of Wight to hospitals on the mainland. This will help speed up diagnoses by cutting out time spent journeying on ferries and roads. Once trials are complete, the drones could eventually be used to transport chemotherapy kits to save time and potentially lives.

But then came COVID



Scope of the Solent FTZ (I)

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Context for Solent FTZ

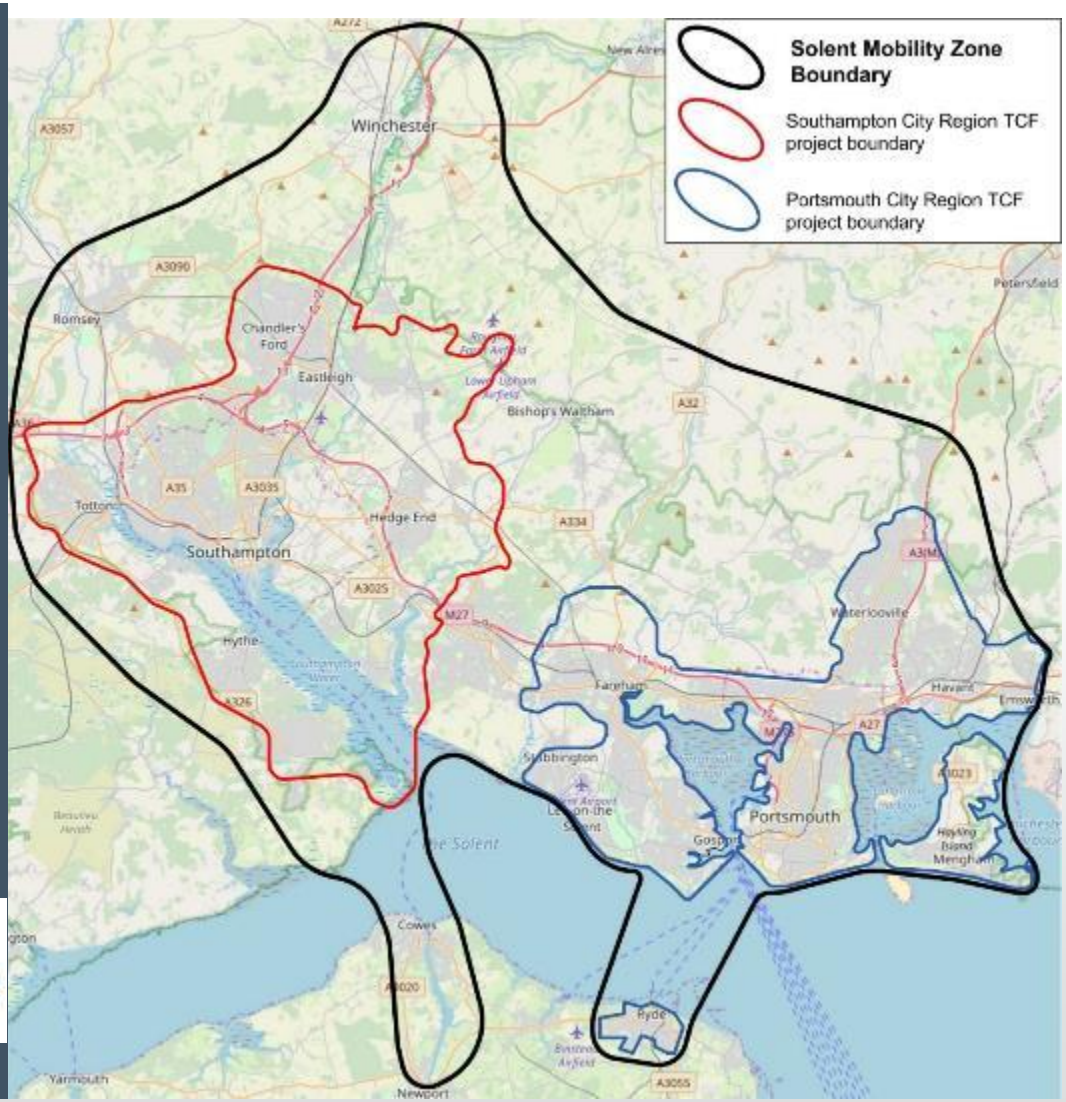
SOUTHAMPTON CITY COUNCIL

Portsmouth CITY COUNCIL

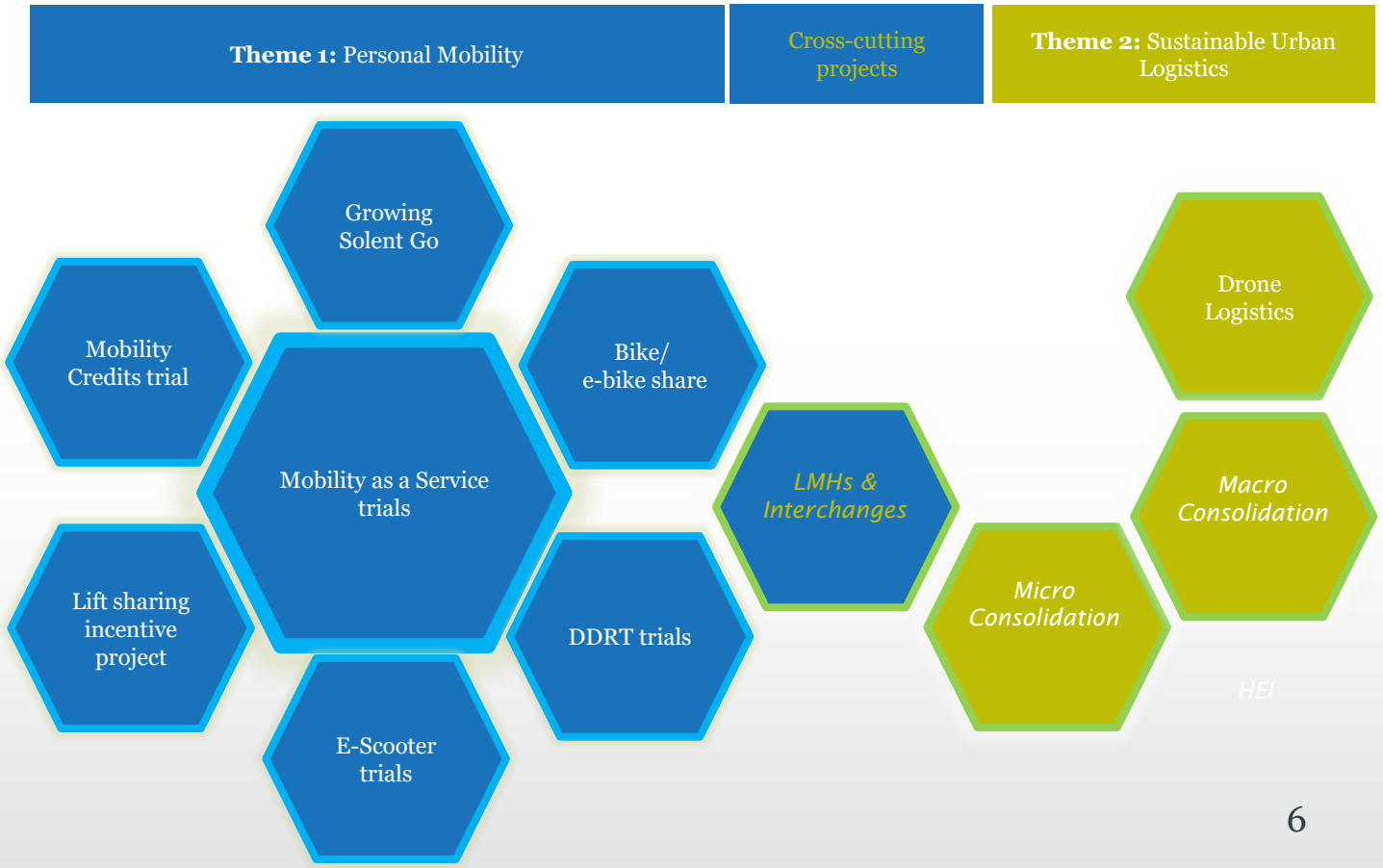
Hampshire County Council

ISLE of WIGHT COUNCIL

Solent Transport



Scope of the Solent FTZ (II)



Note: LMHs part of TCF

National Level FTZs

- No one intervention nor one *type* of intervention
- Interventions that appear similar can in fact be quite different

West Midlands	WECA	Solent	Derby & Nottingham
MaaS	MaaS	MaaS	MaaS
Data projects	Data hub		Data hub
Mobility Credits	Mobility Credits	[Mobility Credits]	
DDRT trial	DDRT trial	[DDRT trial]	
Ticketing enhancement		Ticketing enhancement	
	Mobility Hubs		Mobility Hubs
Warwick Uni showcase	E-cargo bikes	Bike share	Depot of the future
CAV trials	CAV trials	Drone logistics	
		Delivery consolidation	
		[Lift sharing]	

[denotes scheme on hold]

Projects

- Theme 1, 1st phase: MaaS*#, Solent Go, Bike Share, eScooters (Beryl since November 2020, Voi since March 2021).
- Theme 1, 2nd phase: Mobility Credits, Liftshare, DRT.
- Theme 2: Micro-consolidation*#, Macro-consolidation*#, Drones*.
- Cross Cutting: Programme Level Monitoring & Evaluation *, Marketing & Comms (MarComms), Local Mobility Hubs (LMHs).

* Signifies major TRG input. # Working with the University of Portsmouth. Contract for Theme 1 signed 31/12/20. Theme 2 contract pending (expected 01/07/21).

Fast Track Funding: Covid Response trials

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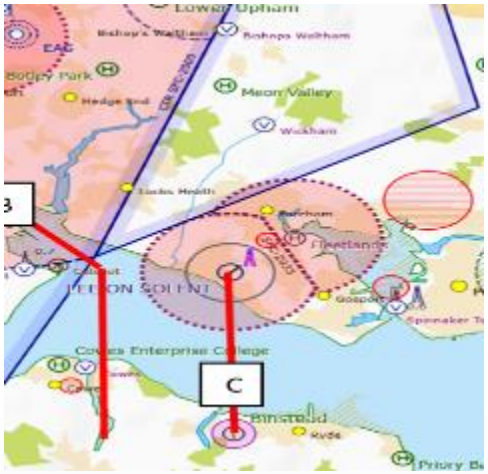
Solent Transport/University of Southampton/Windracers

- UK Aviation Firsts:
  - “point to point” BVLOS flight of a fixed wing UAV in the UK between airfields
  - BVLOS flight close to high population density
  - BVLOS at an airport with concurrent operation of manned aircraft
- Following Covid-19 related trials in May 2020, the programme has been reviewed to take account of lessons learnt in 3 key areas:
  - Safety related elements concerning airworthiness certification, dangerous goods licensing and packaging crash protection
  - The operational requirements resulting from drone design and integration of drone and traditional logistics activity
  - The complexity of NHS Procurement activity by separate departments and surgeries



Programme Level Monitoring & Evaluation

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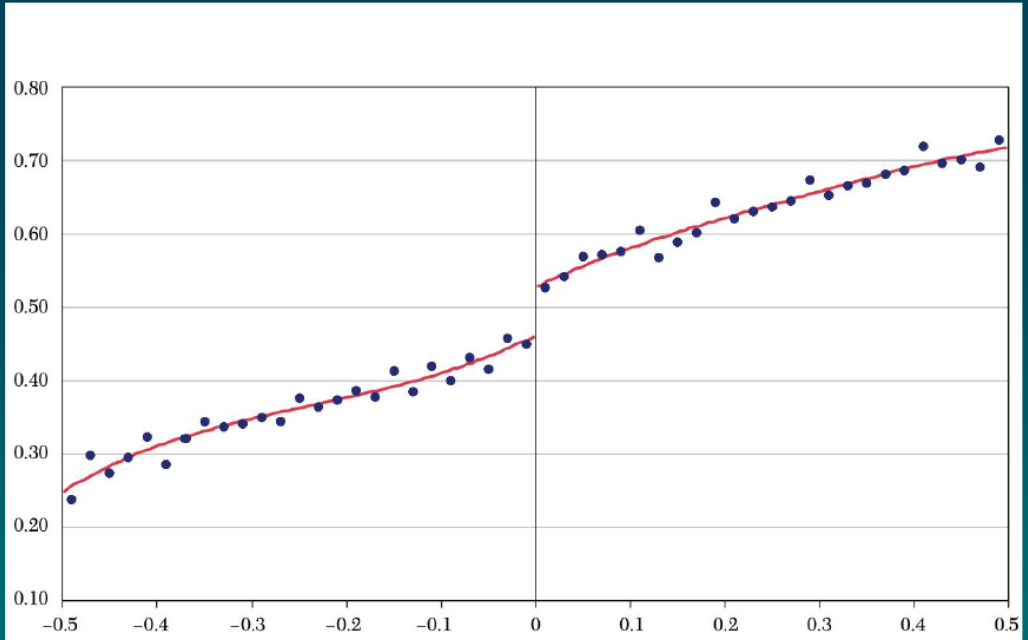

Lee, D. S., & Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of economic literature*, 48(2), 281-355.

The Purpose of M&E

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- Determine what works, for whom (and where and when) and why.
- Links between context, mechanism and outcomes.
- Process (formative) evaluation: determine the nature and quality of the implementation of an intervention.
- Impact (summative) evaluation: determine the results of an intervention.
- See: https://www.betterevaluation.org

The role of logic mapping

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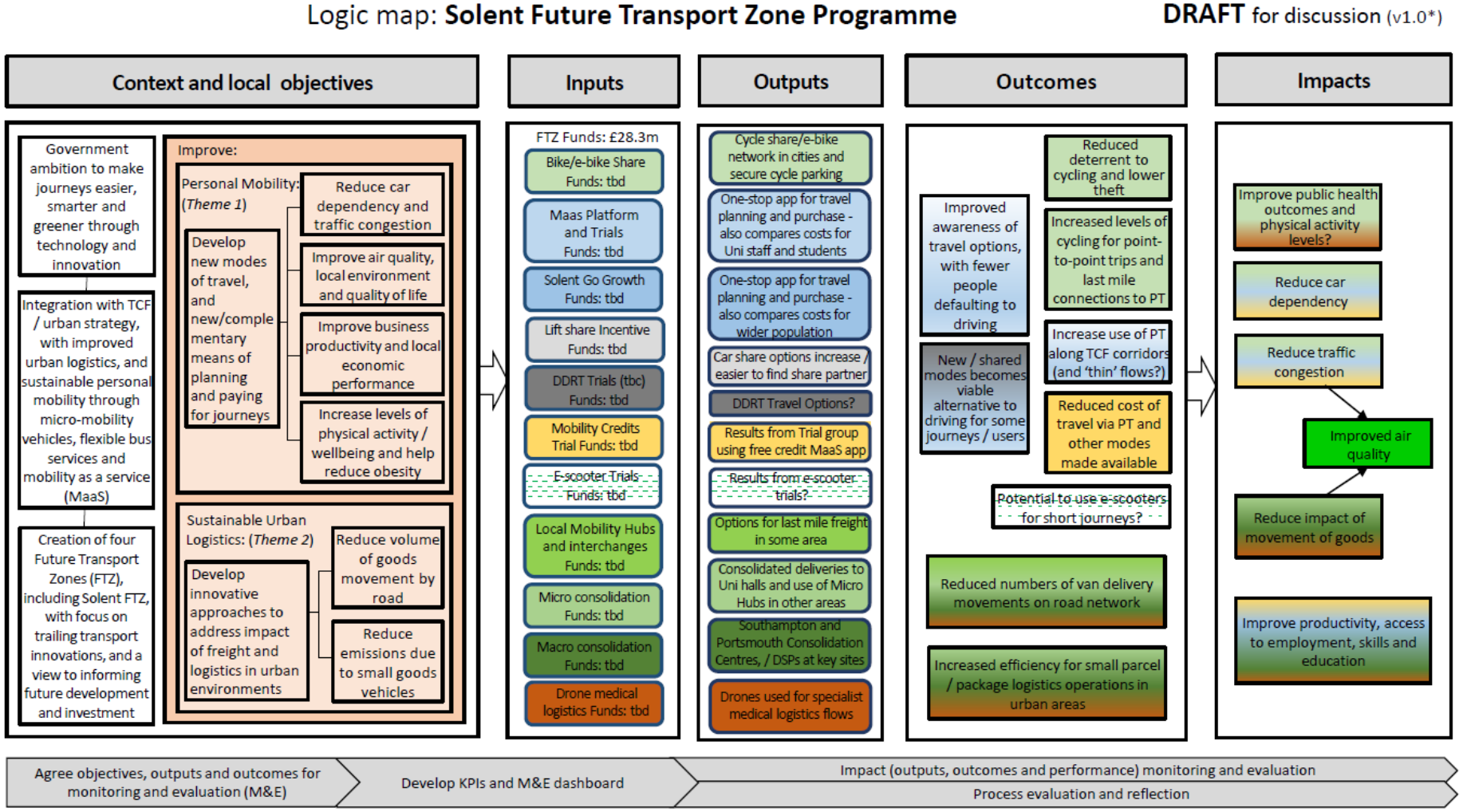

* Sourced from Solent FTZ project proposal

Evaluation: Levels of Robustness

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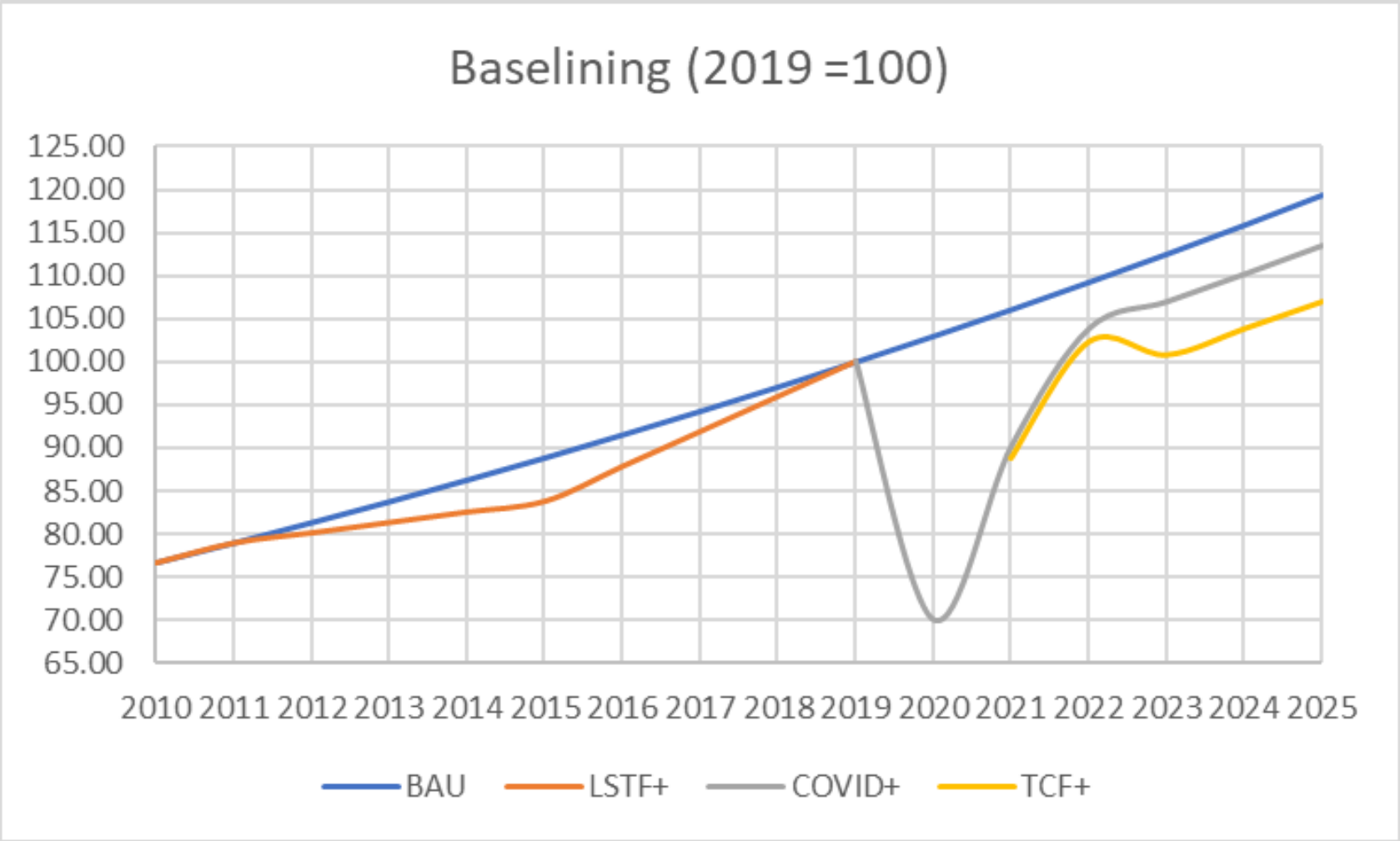
1. Naive before and after comparisons.
2. Before and after comparisons with control variables.
3. Before and after comparisons for a treated group and a comparison group and analysis of difference in differences.
4. Quasi random comparisons based on exposure rates for treated and control groups.
5. Randomised control trials with no contamination of the treatment and the control groups.

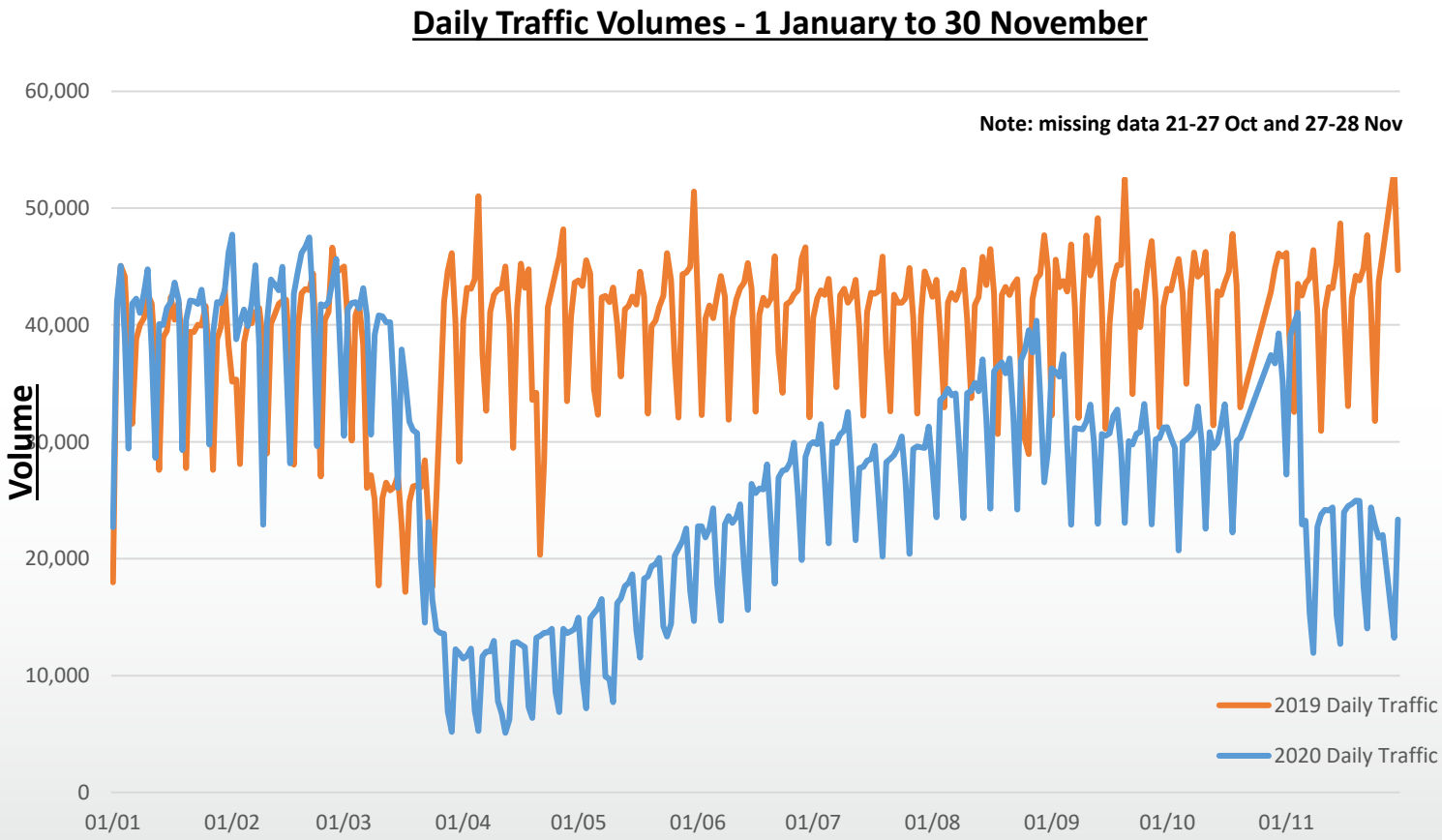
Adapted by the What Works Centre from the Maryland Scientific Methods Scale. Used to evaluate LSTF 2012-15.

Baselining



UoS to provide programme level base lines to assist in project evaluations.

Covid 19: Motorised Traffic



	1/1-15/3	16/3-30/4	1/5-30/6	1/7-31/8	1-30/9	1-31/10	1-30/11		16/3-31/8	1/1-30/9	1/1-30/11
2019	36,902	36,526	41,177	41,108	42,220	42,759	42,396		39,886	39,333	39,850
2020	39,889	13,997	19,754	30,616	30,549	30,592	23,234		22,172	27,900	27,697
% change	8.1%	-61.7%	-52.0%	-25.5%	-27.6%	-28.5%	-45.2%		-44.4%	-29.1%	-30.5%

Covid 19 – Cycle Traffic

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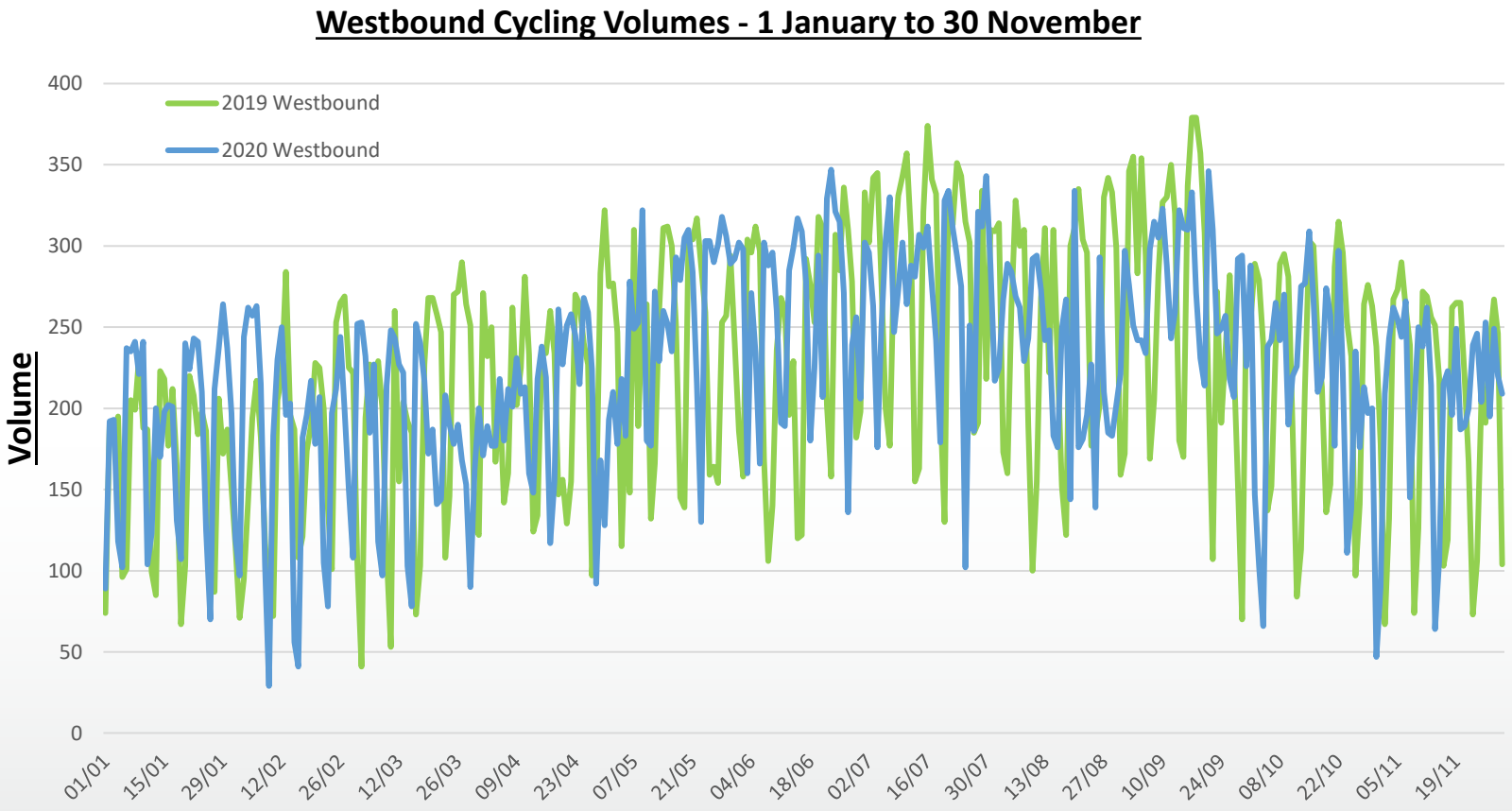

	1/1-15/3	16/3-30/4	1/5-30/6	1/7-31/8	1-30/9	1-31/10	1-30/11		16/3-31/8	1/1-30/9	1/1-30/11
2019	169	208	275	268	264	228	200		240	224	222
2020	183	194	193	254	274	213	211		239	227	225
% change	7.9%	-6.9%	-29.8%	-5.3%	3.8%	-6.6%	5.3%		-0.6%	1.7%	1.2%

A Better Connected South Hampshire

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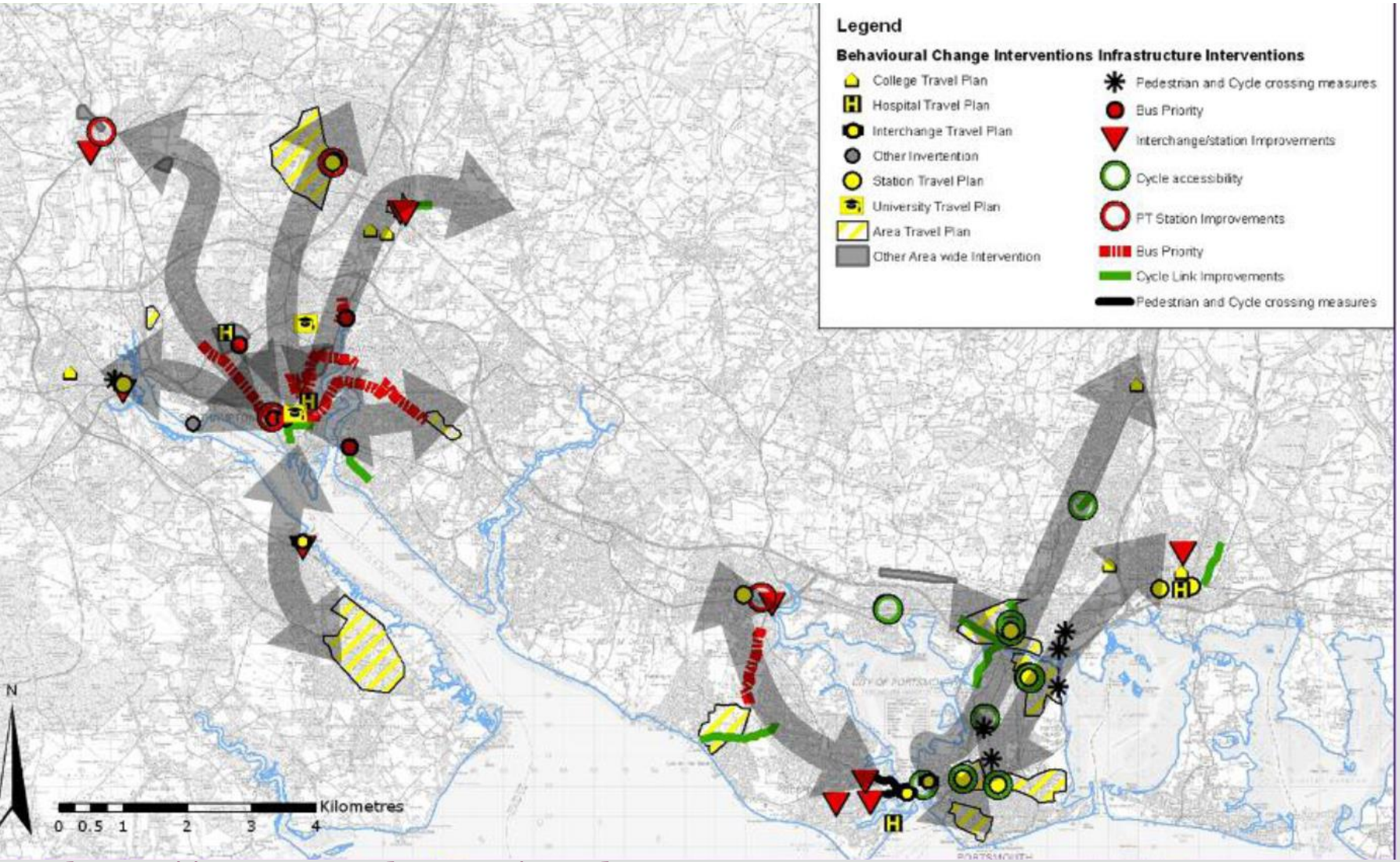
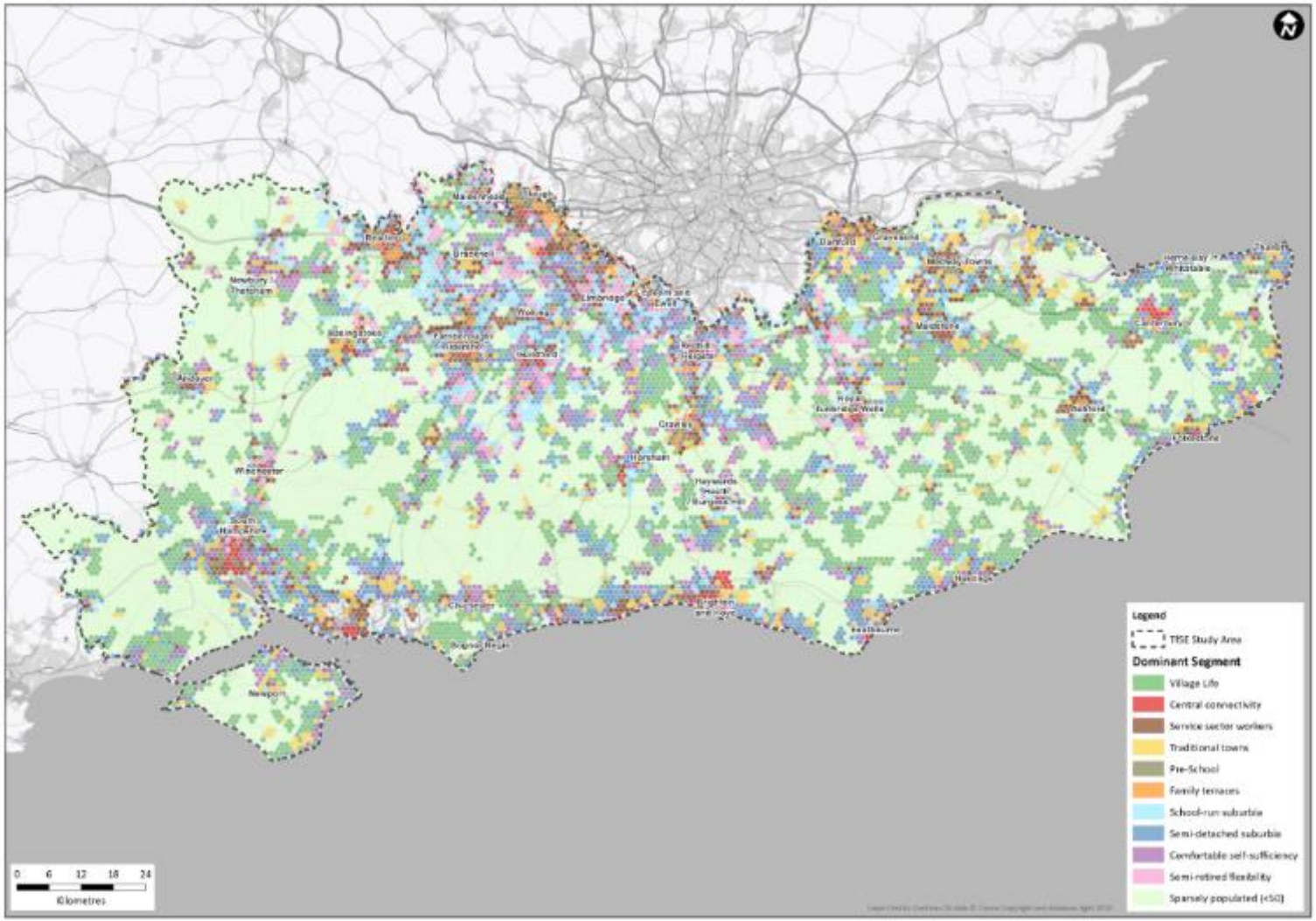


https://www.youtube.com/watch?v=z3e_E9eeYXM

Predicted relative use of future modes by segment

	Ride sharing	Ride sourcing (sole user)	Ride sourcing (shared)	Mobility Asset sharing	MaaS Platforms	Parking and kerb space management	Digital-as-a Mode	Consumer-focused Freight Models
Village Life	well below average	well below average	below average	well below average	below average	well below average	well above average	above average
Central connectivity	average	well above average	well above average	well above average	well above average	below average	above average	well above average
Family terraces	average	average	below average	average	above average	average	average	above average
Service sector workers	average	average	average	well above average	well above average	below average	above average	above average
Comfortable self-sufficiency	well below average	below average	below average	below average	average	average	below average	below average
Semi-detached suburbia	below average	below average	below average	average	below average	above average	above average	average
Traditional towns	above average	below average	average	below average	below average	average	well below average	average
Pre-school	above average	well above average	well above average	well above average	well above average	below average	above average	well above average
Semi-retired flexibility	below average	average	below average	below average	average	average	above average	well above average
School-run suburbia	above average	average	above average	average	average	above average	above average	above average



Future Mobility

‘Theoretical’ Framework

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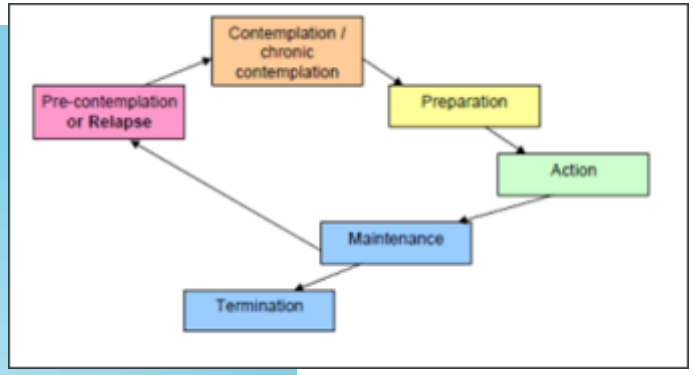

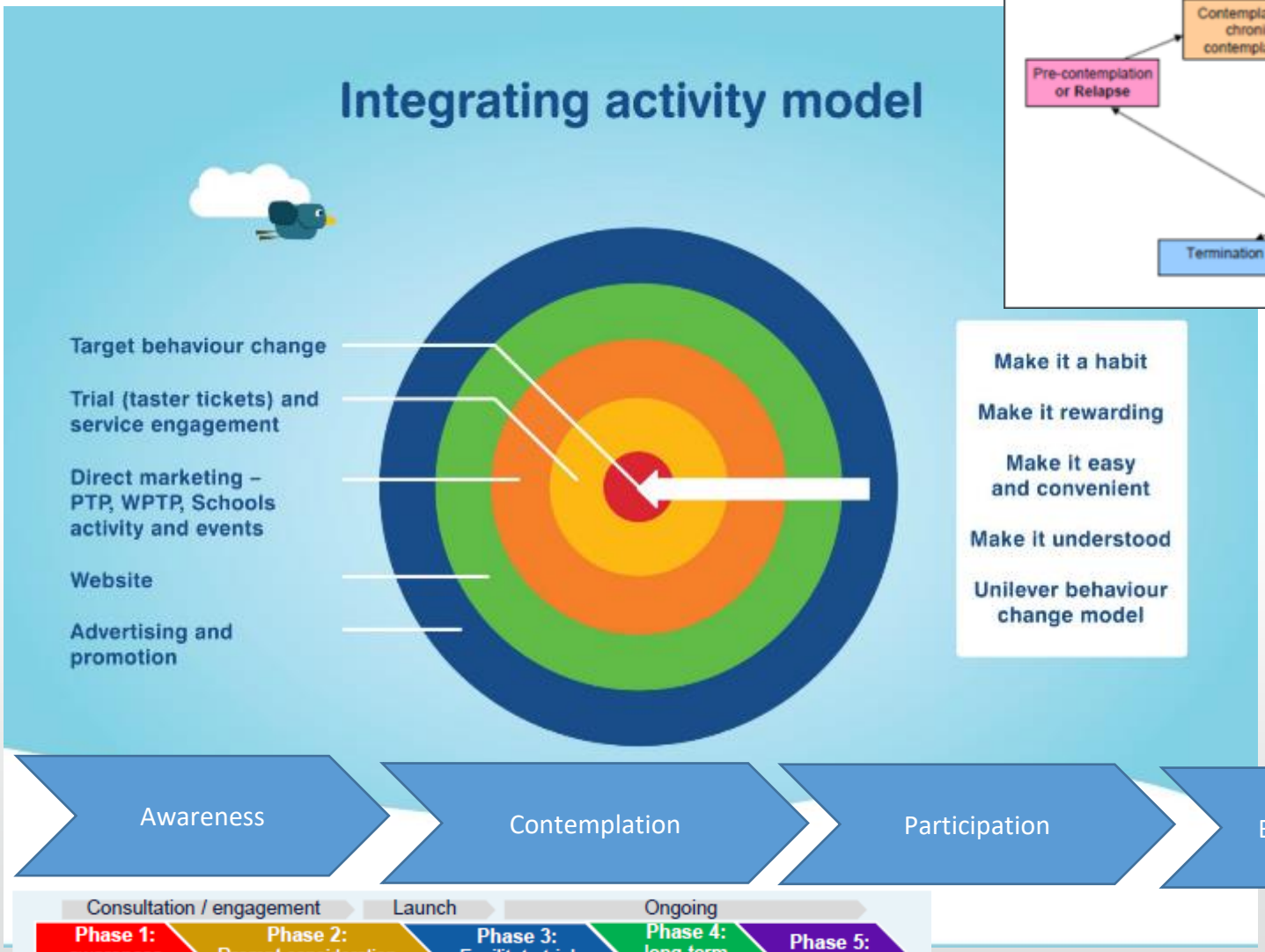

Awareness → Contemplation → Participation → Behaviour change

Data Capture Tracker

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FTZ Project Data Tracker

Data Sources SCC	Location	Contents	Format	Contact	Status	Data Quality[1]	Application[2]	Notes
		A substantial volume of data is stored on the SCC Server, much of it is historic for the purposes of FTZ, ie 2018 or						
12 hour classified traffic counts	\\corp\data\HI\TRANSPORT\Transport Policy\Data & Monitoring\Traffic Data	12 locations - Latest counts are Feb 2020	xls spreadsheet	Ian Steane	Data Available	****	***	Quality depends on the surveys employed, but generally very good. Seasonal data, so variable depending on location, and monitoring of all locations not started at the same time.
Modal Split		Periodic (annual) modal split surveys on a cordon around the city centre, latest - Oct 2019	xls Spreadsheet		Data Available	****	**	Timing of surveys can vary from year-to-year, with minor changes to count points.
Automatic Traffic and Cycle Counts	Drakewell software	Traffic and cycle counters that have for some time recorded vehicle numbers and classifications, up loaded data into Drakewell software and is available for dwonloading		Ian Steane	Data Available	****	****	Automatic counters provide very good quality data (when working). Accuracy depends on the sensors employed.
ANPR	UoS servers	2016 - 17 data, overview of specification of content available, conducted or analysed by Riccardo		Tom Cherrett	Data accessible, although conditions of use not known	****	***	Have not seen the data, but assumed collection is robust
	Ricardo-AEA and subcontractors? Loction not yet identified	Dec 2019 survey not available for alternative uses due to DPIA restricting use of the data to tha CAZ work	N/A	George O'Ferrall	Data Protection assessment does not allow use of the data by the FTZ	TBD	*	Data not available for wider use
	N/A	Q1 ANOR CAZ survey scheduled, FTZ collaboration is possible, this needs to be negociated.	N/A	George O'Ferrall		TBD	TBD	To be negotiated
Crowd Sourced Data - Bluetooth - Average Journey Time	BBLP	Bluetooth Journey time data, route by route by request. No opportunity to have retrospective data unless it is a route already studied, two main routes are regualrly reported on, sample data sets provided.	xls Spreadsheet	Iain Steane, Wade Holmes, Greg Churcher respsible for Highway Service Provider BBLP Balfour Beatty Living Places daniel.ward@balfourbeatty.com 07837093553 OR Tom Horrell 023 8079 8040, tom.horrell@balfourbeatty.com	Data Available	**	**	Limited data collected (from sample supplied). Seems to show journey times only. Data for other sites/time periods to be confirmed.
Mosaic Data	SCC	Detailed population data held by SCC Southampton Data Observatory	xls spreadsheet	Dan King, Rachel Bone and Catherine Mackenzie Southampton Data Observatory SCC	Data Available	****	***	Good data repository. Focus is limited to non-transport related data (which is excellent), apart from road safety. Population data requires expert intepretation, from a transport perspective (e.g. in analysing household travel patterns).
Department for Transport Road Transport Statistics Division, ATC	DfT	Data Capture on Main Routes, Motorway and some PRN, A33, A55 and a few others (24 hour AADF).		Not known		****	***	Very good, regular year-on-year data, based on DfT surveys or counters, with wide coverage of the Highways England network. However, it is published typically 6-9 months after the event (to reflect AADT from the previous November).
SCC PCN	SCC	PCN data is captured, however vehicle type is not recorded, analysis and reporting of specifics very time consuming		Richard Alderson +44 23 8083 2725	Data availability subject to justification of reporting resource required.	*	*	Text/paper-based system covering penalty notices, with no tie-in to vehicle details (and even the registration plate requires further lookup).
Bus data from operators	HCC	Real-time passenger information system is maintained by HCC on behalf of SCC. Data includes bus journey times based on live arrival and departure times.	Spreadsheet	Iain Steane/Emma Baker	Data Available	TBD	TBD	Requires exploration - local bus performance data used to be held on spreadsheets historically (last reviewed 2012).
Trafficmaster (now Teletrac)	\\corp\data\HI\TRANSPORT\Transport Policy\Data & Monitoring\GPS Travel Time Data	GPS and OD files from 2015 to 2019	Spreadsheet	Emma Baker	Data Available	TBD	TBD	Data owned by DfT, so a data sharing agreement is needed if sharing with external partner.
Accident data	BBLP	Accident data (stats 19) is collected by the Police at the time of an accident. This data set only includes information for reported accidents and does not include near-misses. Types of info include date/time, location, weather conditions, causation factors, etc.	PDF reports, but BBLP may be able to download in other formats.	Graham Muir / Dan Selby via Greg Churcher (SCC)	Data available. There is usually a three-month lag on the availability of info.	****	**	Data is available across all LAs.
Payment System	SCC	This dataset includes the number of vehicles crossing the Itchen Bridge, payment method and date/time.	Spreadsheet	Richard Alderson +44 23 8083 2725	Data Available	TBD	TBD	
School Travel Data (Southampton)	SCC	Cumulative weekly 'Travel Tracker' surveys of school pupils over course of academic year (covering modal splits), with 16 schools participated in 2018-19.	Online reporting and ad hoc downloads	School Travel Officers (under Neil Tuck)	Data Available	***	**	Includes 'Park and Stride', which is not explicitly defined between schools. Results uploaded typically 1-3 weeks retrospectively by teachers, based on pupils' assessments of their method of travel to (or from) school. Data reset annually before start of academic year.

M&E Dashboard

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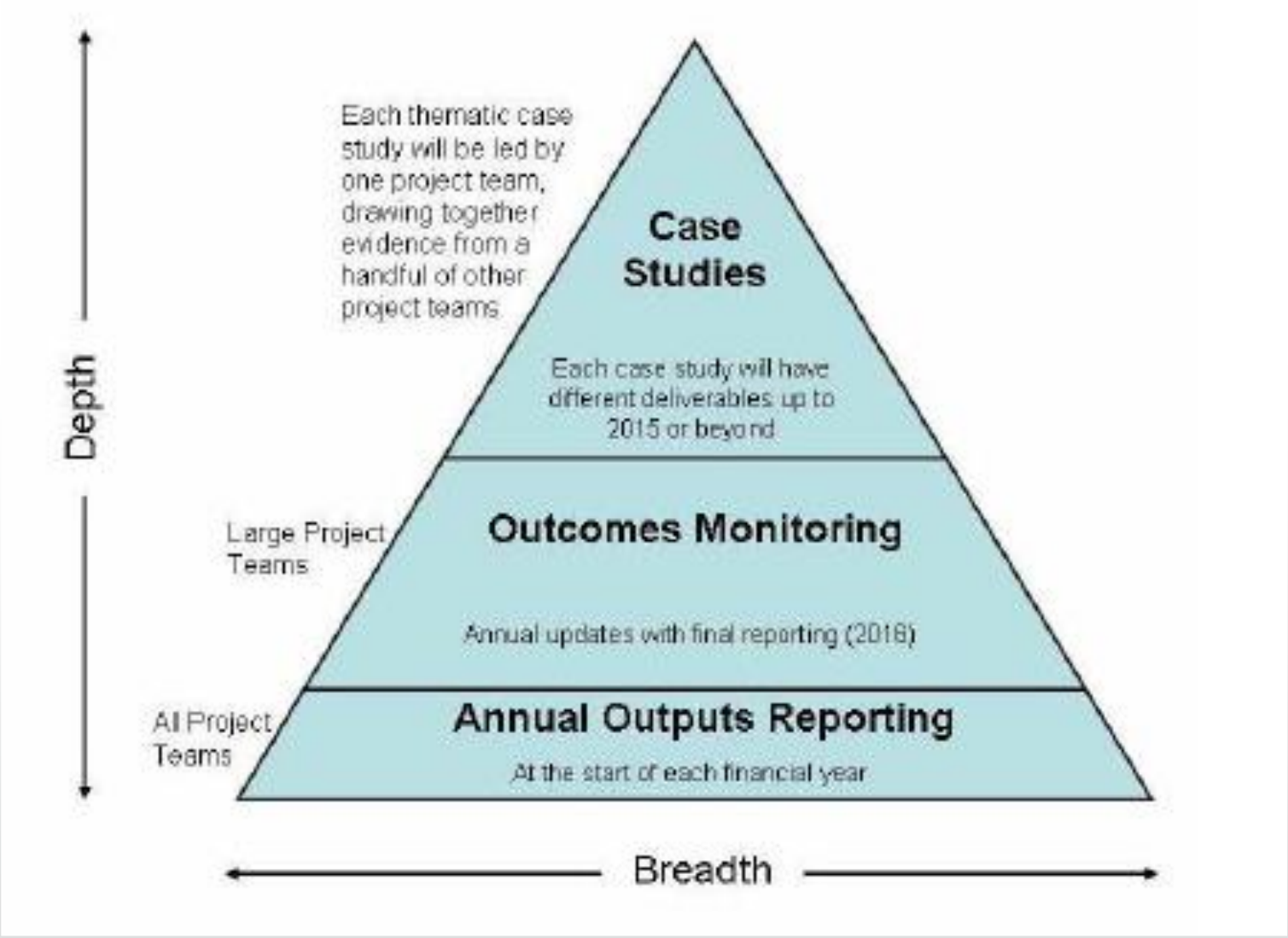
	Note - numbers are provisional, unless ratified by project team			Funding (and Reporting) Years:						As at:	19-Oct-18
No.	Indicator	Frequency (Proposed)	Method	Base Line (Year 0) 2016/17 (March 2017 or nearest)	Year 2 2018/19 Q1	Year 2 2018/19 Q2 (Current)	Year 2 2018/19 Forecast	Year 3 2019/20 Forecast	Target (by March 2020)	Work Strand	Target Type
	Programme Targets										
	Headline Indicators (for reporting to DfT) - see specific worksheets for project indicators			[] = Numbers in dashboard removed for illustration Purposes							
1.	**Double cycling mode share on key corridors from x% to y%**	Annually	Counts Primary cycle corridor counts and traffic counts [2] [iii]	7.2% [1]	8.20%	9.50%	13.50%	15.80%	15.0%	Project (i)	Output
	- 1a. Along the 3 corridors, this means an additional z stages			[]	[]	[]	[]	[]	additional z stages		
	- 1b. And resulting in 6.6m car miles to be saved annually by 2021			[]	[]	[]	[]	[]	6.6m car miles saved		
2.	**An additional x journeys to and from work by bike**	Annually	Workplace travel surveys/bike shed counts	[]	[]	[]	[]	[]	x journeys to work	Project (i) and (iii)	Output
3.	**Additional y miles walked to and from work by 2020**	Annually	Workplace travel surveys	[]	[]	[]	[]	[]	y miles walked by 2020	Project (i) and (ii)	Output
4.	An additional g regular cyclists on the network through the workplaces and schools schemes	Annually	Cycle corridor counts [2] [iii] School and workplace travel plans	[]	[]	[]	-	-	Additional g cyclists		Output
	- 4a. Additional cyclists on schools schemes	Annually		[]	(HCC Only 505)	[]	[]	[]		Schools Engagement	
	- 4b. Additional cyclists on workplace schemes	Annually		[]		[]	[]	[]		Work Engagement	
	- 4a+b. Additional cyclists on school and workplace schemes	Annually		[]	[]	[]	[]	[]	Extra h cyclists		
5.	**Completion of £m worth of cycling and walking infrastructure investment along the three corridors, totalling ykm**	Annually	From capital reports	[]	[]	[]	[]	-		Project (iv)	Output
	- 5a y km of walking/cycling infrastucture to be completed	Annually	From capital reports	[]	[]	[]	[]	Info to be supplied	y km infrastructure		
	- 5b £z m of investment spent	Annually	From capital reports	[]	[]	[]	[]	Info to be supplied	£z m spent		
7.	**Provide travel advice to h people [iv] to help them get back into work by sustainable means**	Annually	Count of engagements	[]	[]	[]	-	-	h+ People	Work Engagement	Output / Outcom
8.	Support j new members of staff getting employed at Watermark West Quay	Annually	Count of engagements	[]	[]	[]	[]	[]	k New staff	Work Engagement	Outcome
9.	Doubling the number of businesses and employees engaged through an expanded Travel Plan Network from a current base of 53 businesses	Quarterly	Count of engagement	[]	[]	[]	-	-	l Businesses in TPN	Work Engagement	Output
10.	**Engaging with over m students at n schools to increase mode share for the number of pupils cyling, walkinga and scooting to y%:**	Termly/ Annually	School surveys	[]	[]	[]	[]	[]	p% and q pupils @r schools	Schools Engagement	Output

Headline | Project (i)

READY

Flexible Approach



Discussion Point

Only expect small changes at the population level.

For example in the DfT LSTF National Case Study (2013-15):

- Reduction in local car driving in treatment area compared to control areas around 5% (Source: YoY Travel Diaries).
- Reductions in traffic around 1-4% (rebound effect on non-local, non-car traffic) (Source: DfT, LA Counts).
- Around one third of traffic reductions could be ascribed to LSTF (Source: PJP, WTP surveys) – typically less than 1% YoY.

Survey method was able to detect these small changes but not demonstrate they were statistically significant.

M&E Research

- WP ME 1: Logic Mapping and Evaluation Framework
- WP ME2 High-level Programme Monitoring and Evaluation

  Task 2.1 Top-down data collection and analysis

  Task 2.2: Exploring and mitigating the influences of other programmes and external influences
- WP ME3 Project level Monitoring and Evaluation
- WP ME4 Stakeholder Engagement (including NatCen and TRL).

National Level Evaluation: Overarching Theory of Change

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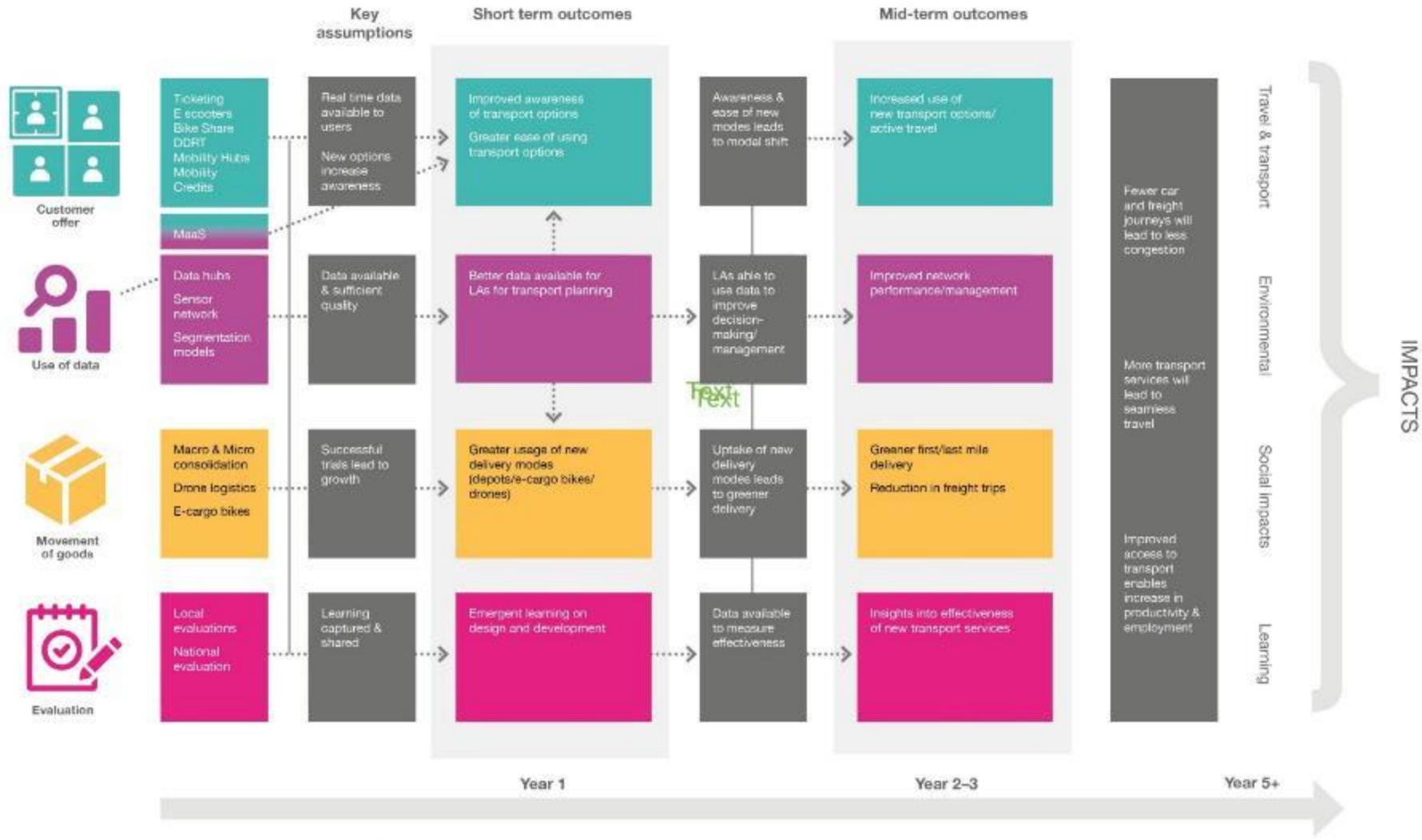

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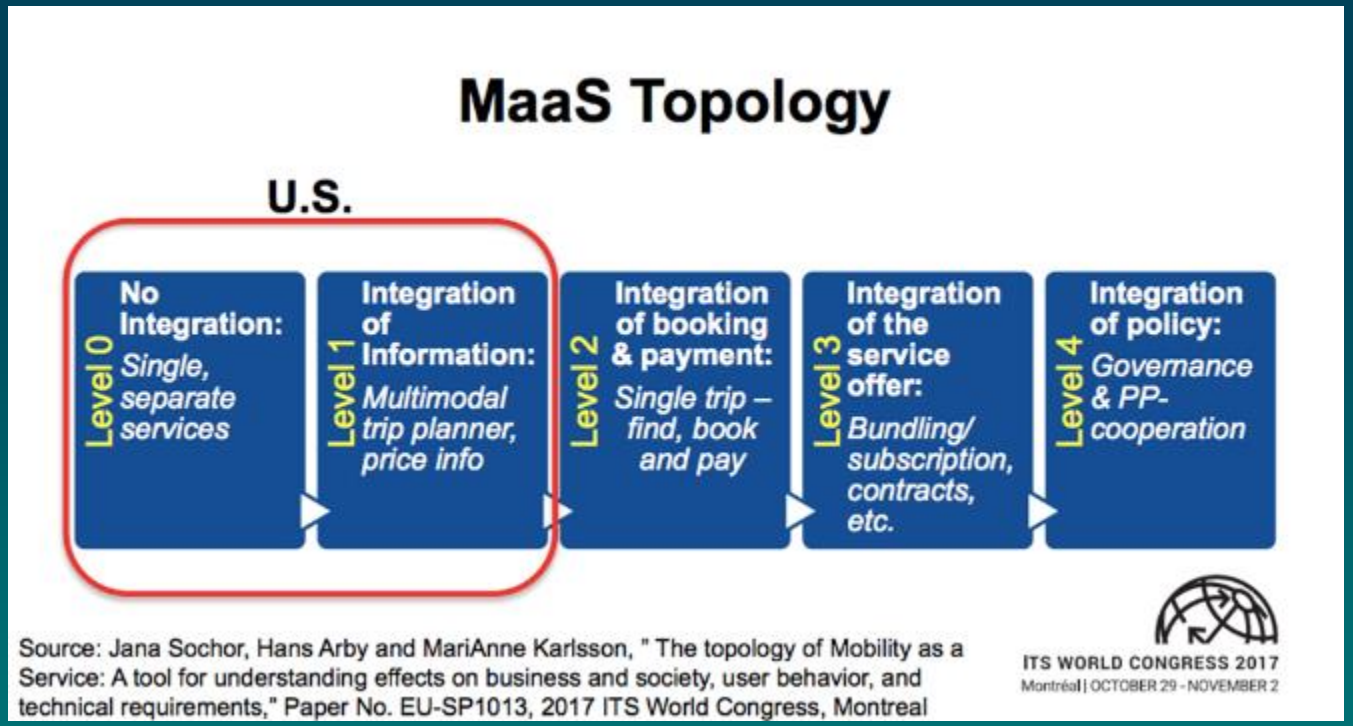
Mobility as a Service (MaaS)



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Logic Map: Mobility as a Service

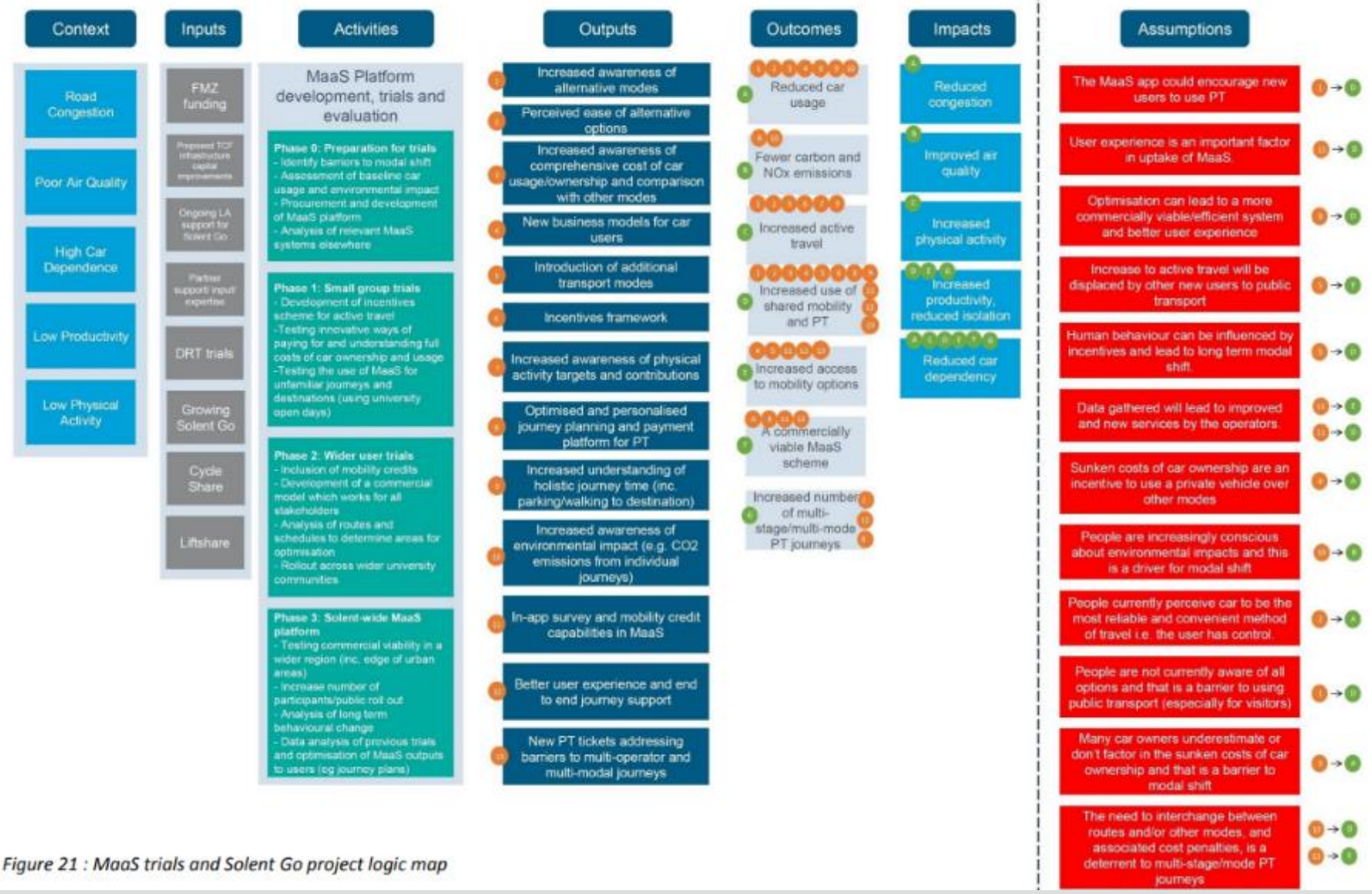


Figure 21 : MaaS trials and Solent Go project logic map

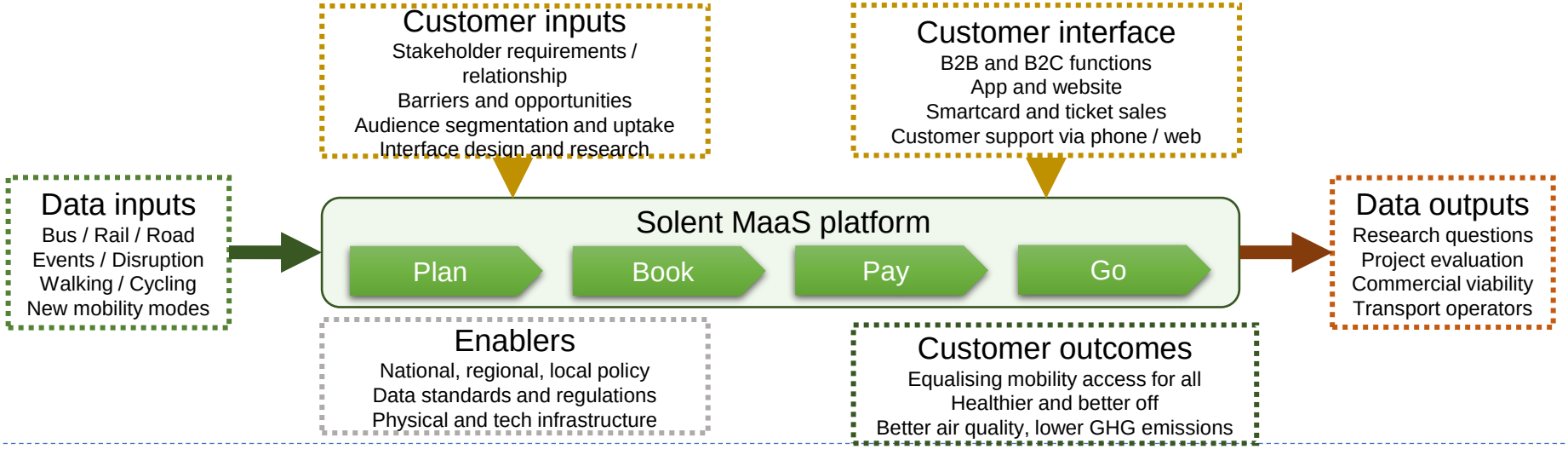
Solent Transport Mobility as a Service (MaaS)

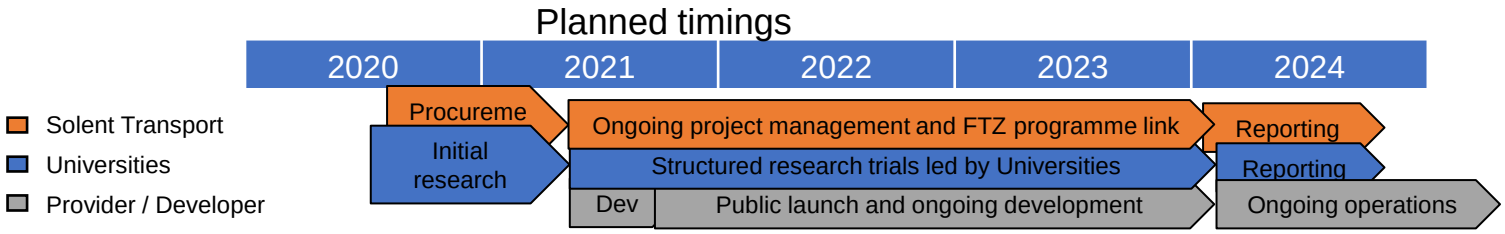
A partnership between Solent Transport, Universities, existing and new transport operators and tech providers

Responding to challenges of congestion, car dependence and splintered public transport networks across the Solent

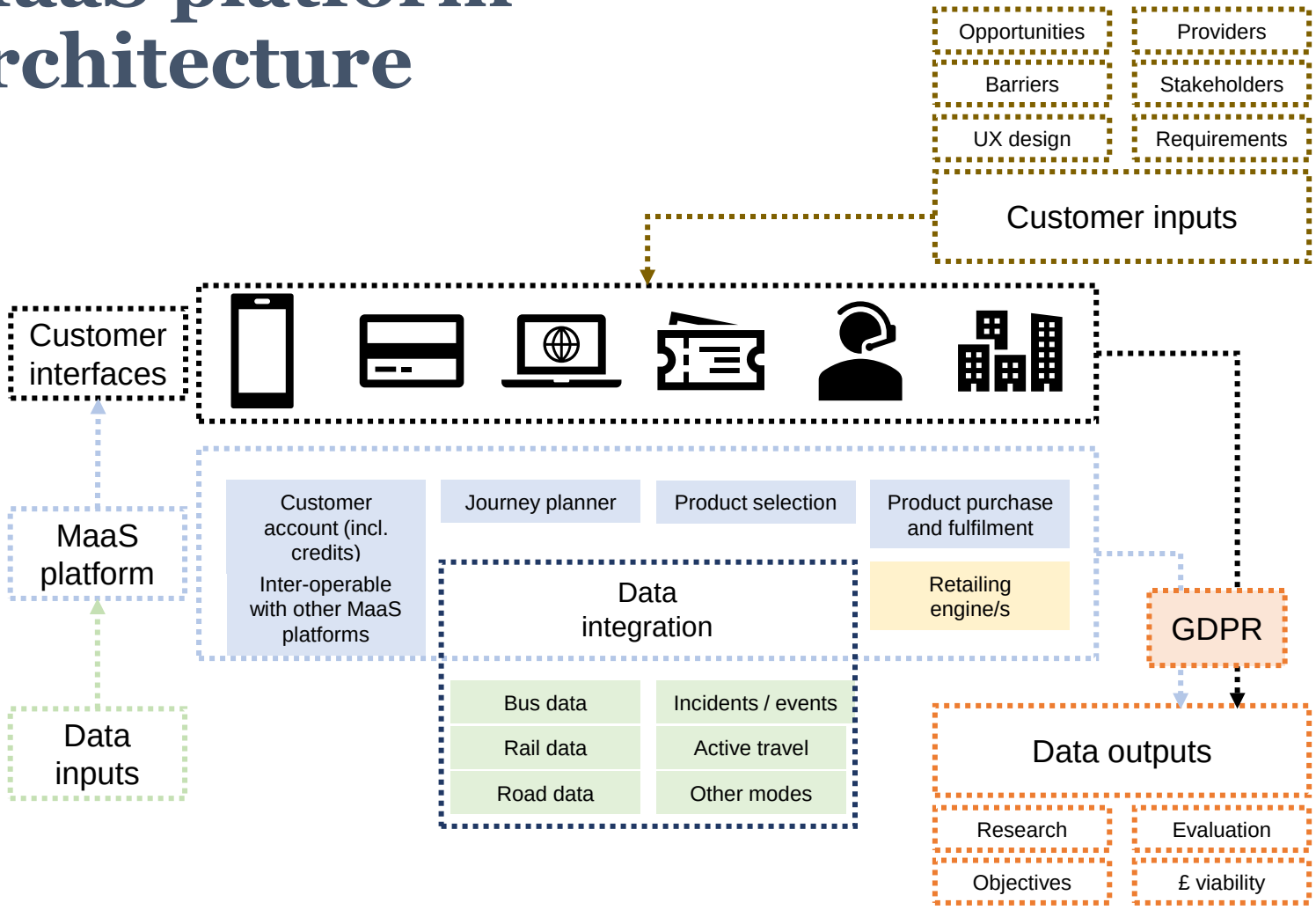
Creating an integrated and customer-centric travel tool to plan, book, pay for and travel across the region

Enabling customers to make more journeys sustainably by harnessing smart technology and data integration





MaaS platform architecture



MaaS: The Challenge

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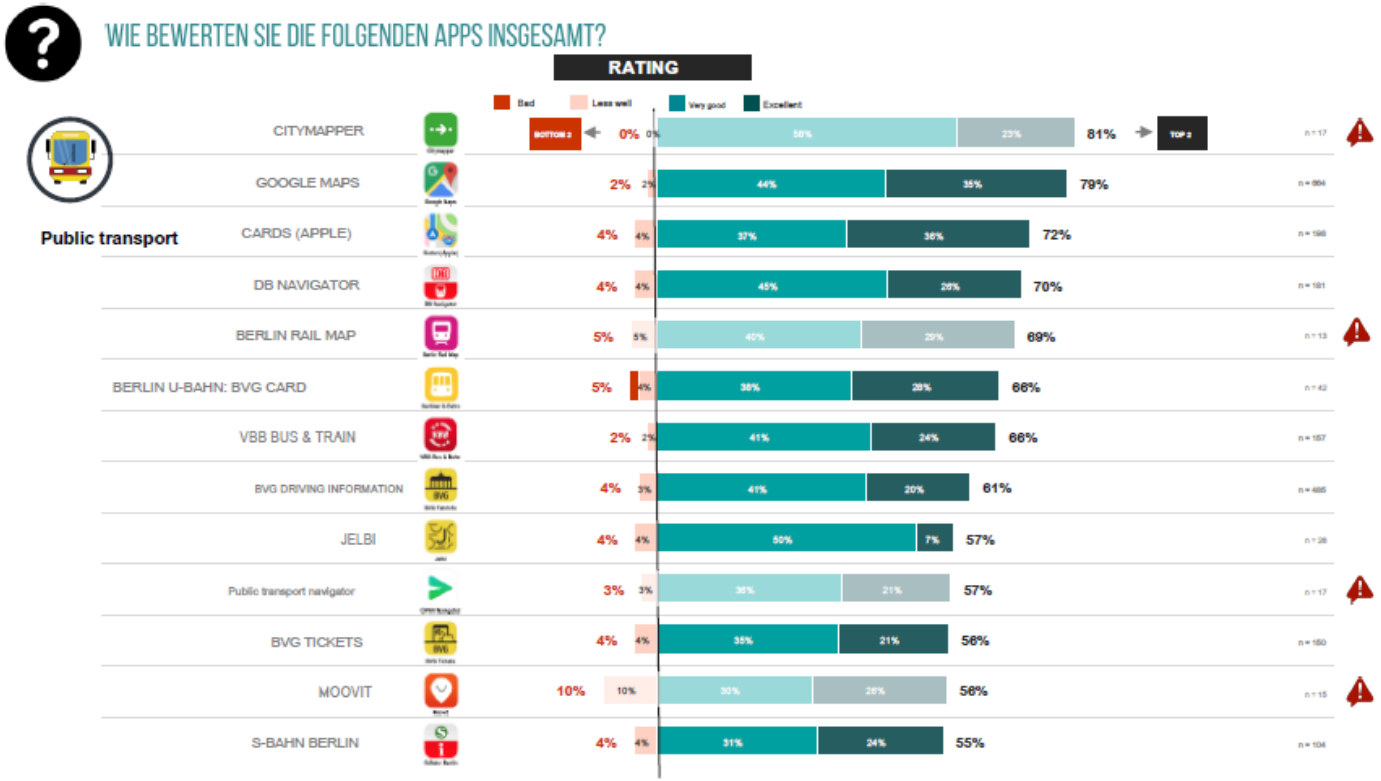
DEL RESE

Evaluation of the app offers Public transport

The map apps from Google and Apple with the best rating.



Q25. How do you rate the following apps overall?
Basis: All users of the respective apps, n = different - see table

Low number of cases: result only to be interpreted as a tendency

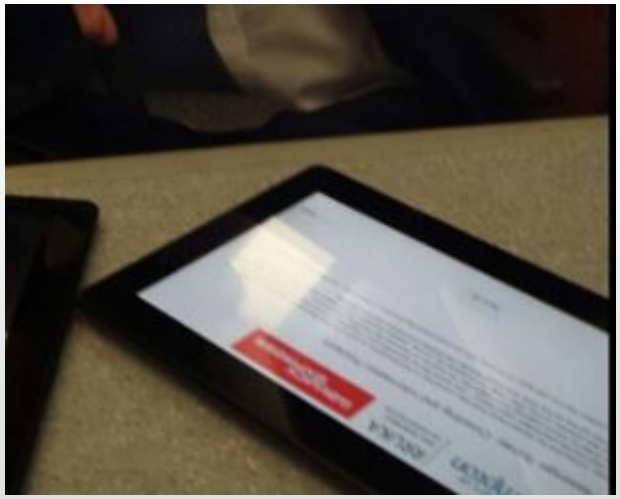
MaaS Research

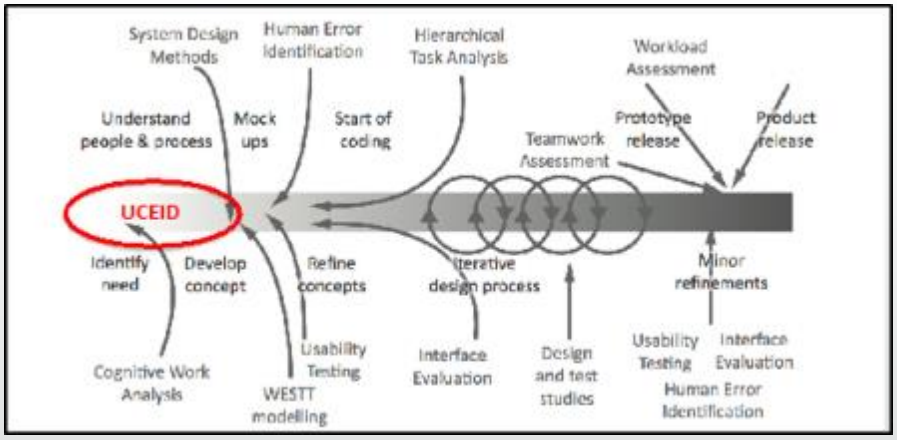
WP S1: Quantification of Barriers and Assessment of Incentives.

WP S2: Environmental Studies and Sustainable Benefits.

WP S3: User Centered Ecological Interface Design (UCEID).

WP S4: Iterative Inclusive Design





MaaS: Research Questions (1)

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Question	Expected High Level Research Outcome(s)
1. What are the barriers to modal shift towards MaaS in a car-dependent context for different user groups?	• Depiction of barriers to modal shift & their importance for behaviour change, which can be applied in other contexts
2. What incentives/rewards might be effective in overcoming barriers and encouraging modal shift towards MaaS in a car-dependent context?	• Demonstration of how certain provisions could assist in overcoming barriers to modal shift (e.g. new cycle infrastructure to overcome safety barriers) • An evaluation of incentive schemes and their effectiveness in encouraging use of a MaaS app and their influence on behaviour
3. Can MaaS be used to encourage active travel?	• Evidence (or otherwise) that a MaaS app encourages the use of active travel modes

MaaS: Research Questions (2)

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Question	Expected High Level Research Outcome(s)
4. Are proposals to incentivise car drivers to make use of a MaaS app effective: i. Encouraging drivers to make use of a MaaS app? i. Reducing car usage?	• Evidence (or otherwise) that those who would default to driving make use of the app • Evidence (or otherwise) that using the app encourages alternatives to the car to be used.
5. How should a MaaS app be designed in order to maximise the desired behavioural change?	• Outputs from Design With Intent (DWI) workshops and other studies/focus groups which provide a 'best practice' blueprint
6. How could the MaaS app be designed to be inclusive?	• Depiction of different user groups and needs • Evidence that MaaS can improve access to mobility

Workstream 1: User Requirements

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WP S1: Barriers & Incentives

Objectives

1. Identification of barriers to modal shift and to MaaS.
2. Quantification of barriers to modal shift and to MaaS
3. Classification of barriers to modal shift: Identification of the major stakeholder(s) responsible for each barrier.
4. Assessment of possible mitigations and incentives to overcome barriers and encourage the desired modal shift.

Activities

- Initial literature review
- Qualitative & quantitative analysis of travel survey responses
- Interviews & focus groups
- Stated preference surveys
- Analysis of journey data (acquired through the MaaS app and from other sources where available

Literature review (1)

Observation from Sydney (1):

"The one stop shop for all mobility that is claimed to be mobility needs, may in fact contain many non-needs and missing some relevant needs, creating ambiguity, confusion and resulting lack of interest."

Hensher, D. A., & Mulley, C. (2021). Mobility bundling and cultural tribalism - Might passenger mobility plans through MaaS remain niche or are they truly scalable? Transport Policy, 100 (November 2020), 172–175.

- How do we meet needs and ensure transport for all?

  Common themes throughout literature is that barriers to shift from the car/to MaaS are particularly high for certain groups e.g. families

  We need to avoid the situation where the MaaS facilitates the existing travel behaviours of public transport users, and changes the behaviours of very few.

Literature review (2)

Observation from Sydney (2):

- MaaS users with a subscription bundle appeared more likely to reduce their car usage than PAYG MaaS users

Hensher, D. A., Ho, C. Q., & Reck, D. J. (2021). Mobility as a service and private car use: Evidence from the Sydney MaaS trial. *Transportation Research Part A: Policy and Practice*, *145* (March), 17–33. https://doi.org/10.1016/j.tra.2020.12.015

- Do we need to think about subscription models/bundling?
- There is also some evidence that bundling non-mobility products and services could be good incentives.

Workstream 1: User Requirements

University of Southampton

WP S2: Economic and Environmental Information

Objectives

1. Develop a system which provides accurate cost and GHG estimates for journeys made by car.
2. Accurately quantify GHG emissions for alternative modes, taking into account system usage.
3. Develop a method for highlighting potential contributions to poor air quality.
4. Estimate the impact of behavioural change driven by MaaS on overall journey GHG emissions.

Activities

- Collection of data about car make and model and actual running costs.
- Collection of data from providers about fuel/energy consumption and system capacity.
- Use of previous research to make some estimates for public transport energy consumption and emissions
- Surveys, crowdsourcing (e.g. for capacity and loading information) and analysis of MaaS app usage.

Work Stream 2: Human Factors Aims and objectives

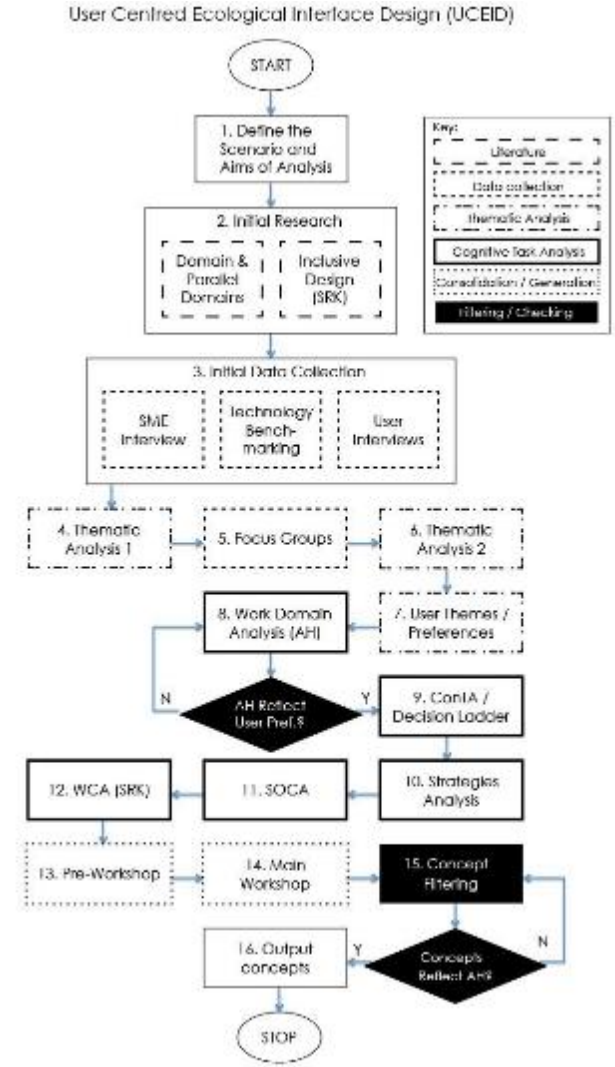
Overall Aim: to identify MaaS design requirements that may encourage behaviour change in terms of reduced private car use and increased active travel for the target population of FTZ users.

Objectives:

- to produce design concepts & product specification inputs;
- to identify and address needs of an inclusive range of user groups;
- to measure usability and acceptance of MaaS App users in order to generate design amendments

WP S3: User Centred Ecological Interface Design (UCEID)

- Data Collection
  - Step 3
- CWA (Cognitive Work Analysis)
  - Steps 8-10



UCEID – The Best of Both Worlds: Combining Ecological Interface Design with User-Centred Design in a Novel Human Factors Method Applied to Automated Driving Revell et al 2021

Cognitive Work Analysis (CWA)

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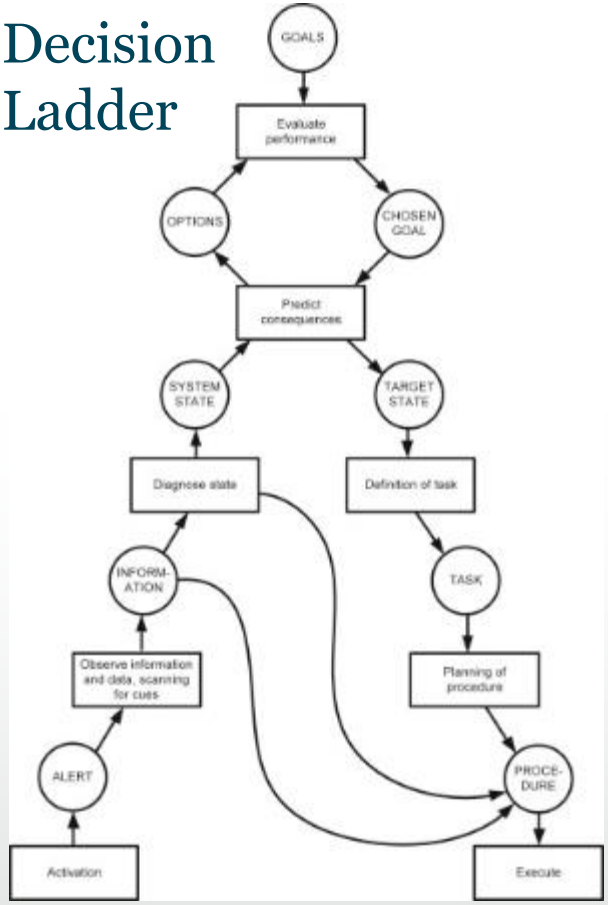
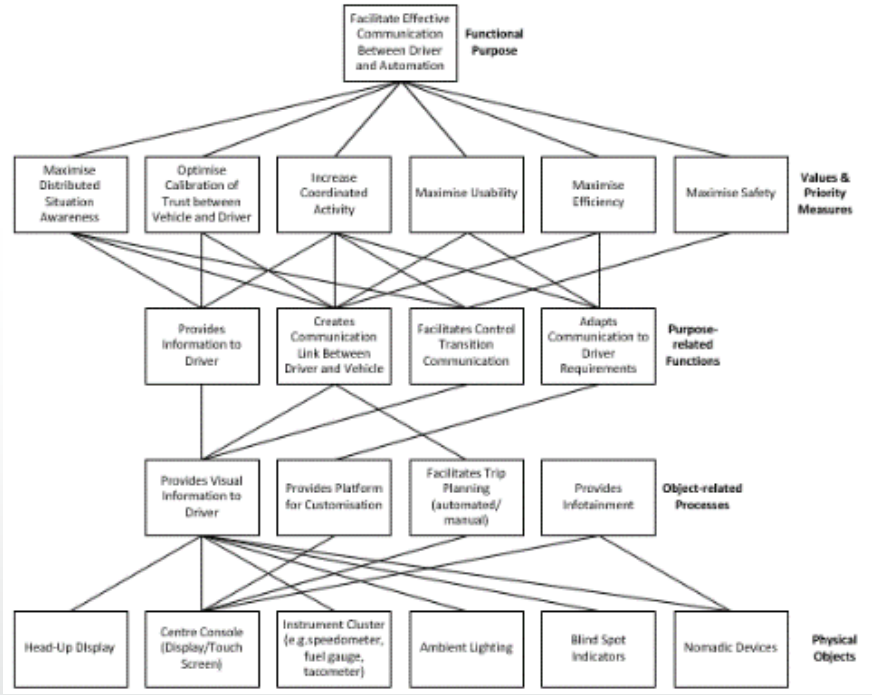
Decision Ladder



Abstraction Hierarchy



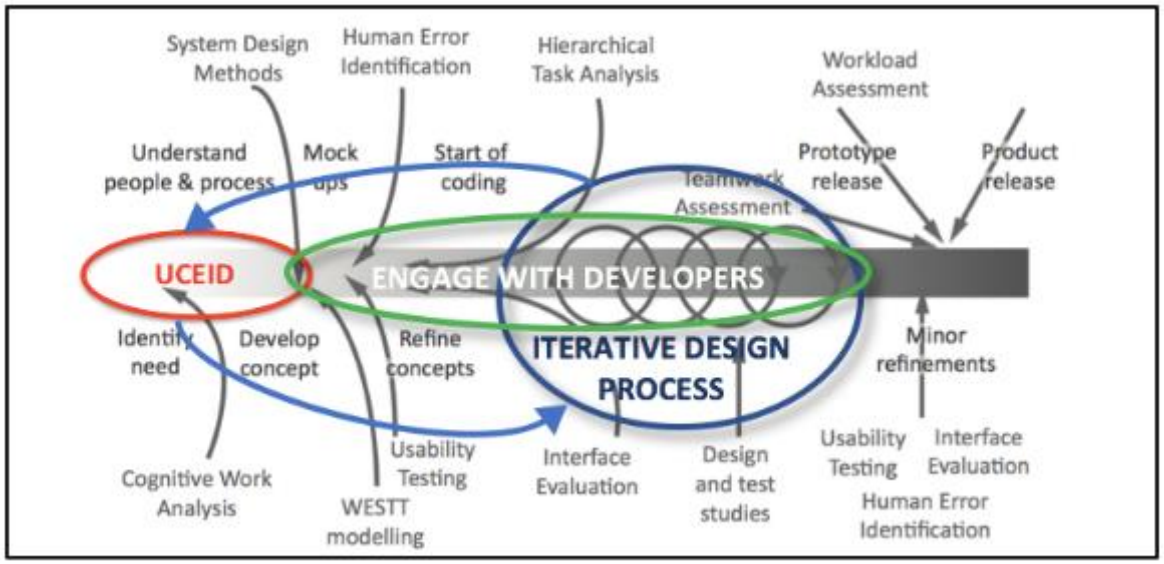
Using the decision ladder to understand road user decision making at actively controlled rail level crossings Mulvihill et al 2015

Developing an abstraction hierarchy for visual displays in semi-automated vehicles Clark et al 2020

DwI (Design with Intent)

Design with Intent (designwithintent.co.uk) Lockdon 2015

WP S4: Iterative Design



S4 Iterative Design - User Trials

Quantitative Data Collection
- Questionnaires
  - System Usability Scale (SUS)
  - Task Acceptance Scale (TAS)

Qualitative Data Collection
- Post Trial Interviews

Potential changes identified, especially those meeting behaviour change and inclusivity goals. Fed back to Trafi for implementation. Process repeated until optimal product has been developed.

10

Fitting-it all together

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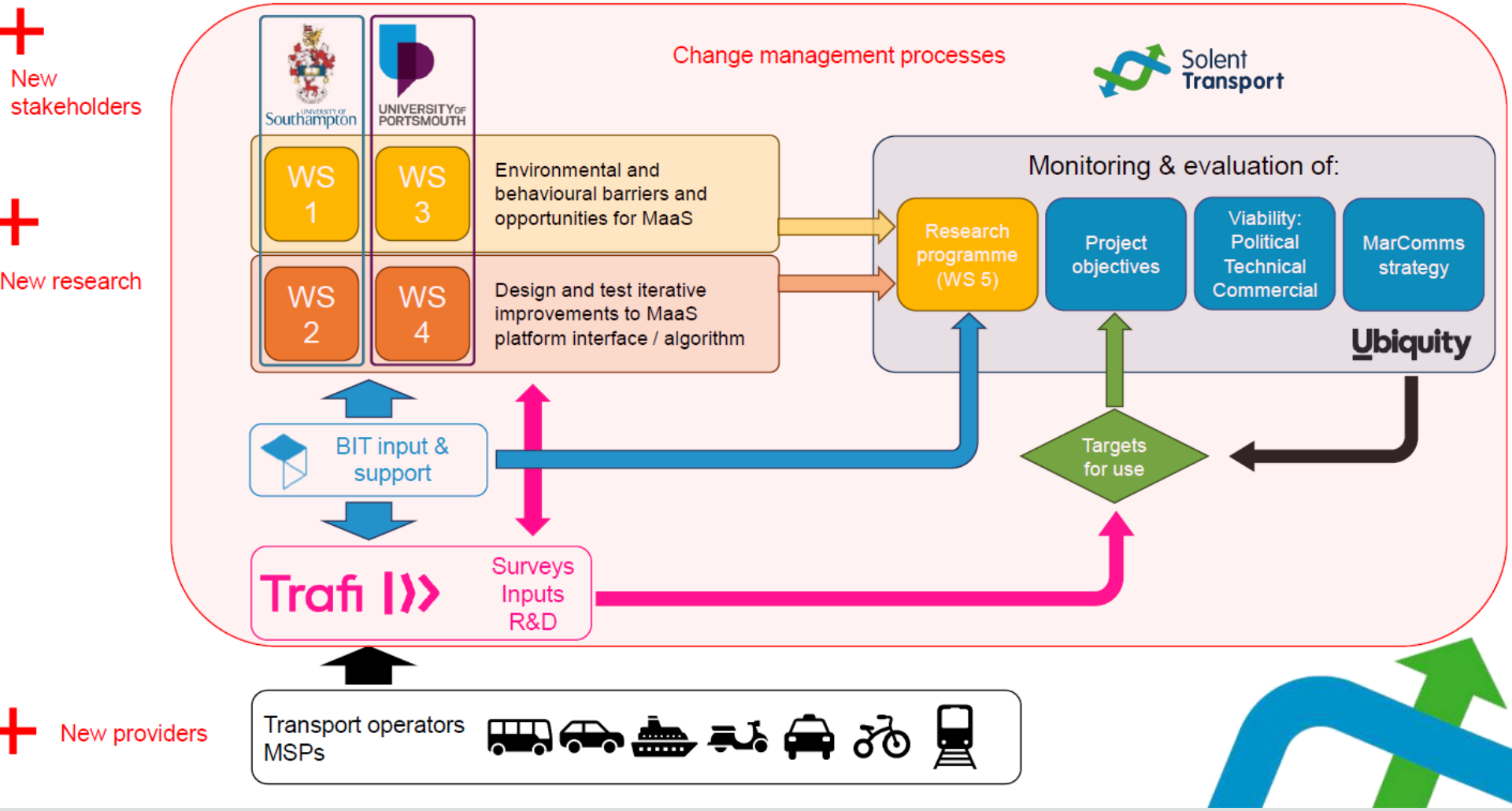
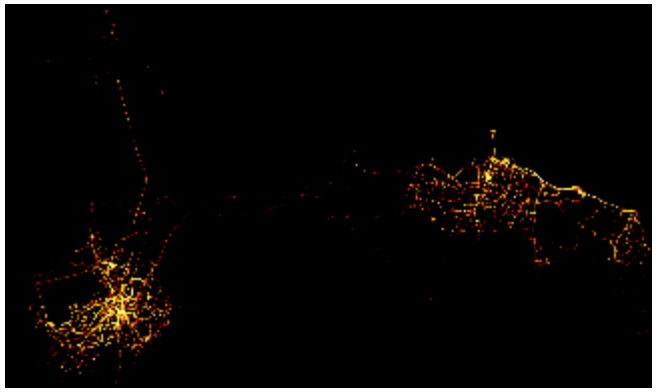
Solent MaaS research programme structure



Next Steps



- Collate M&E data
- Commence MaaS fieldwork
  - Barriers and Incentives Stated Preference Surveys
  - Decision Ladder and CWA
- Annual Report to DfT
- Recruit two PGRs (one in M&E, one in MaaS).