Using AI to optimise transport delivery plans

The BTP Delivery Plan

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Ian Braddock

Jonny Browning

Alex Walton

Capital Investment Optimization, Our Experience

Wide Application Across Sectors

- ✓ Water
- ✓ Facilities Management
- ✓ Energy
- ✓ Public Infrastructure

Deep Delivery of Benefits

Case Study: Severn Trent Water

Total Financial Impact: £200m+

SOCIAL
- ✓ Produced auditable plans faster and with less error
- ✓ Moved from reactive to proactive asset management

ENVIRONMENTAL
- ✓ Minimized Carbon Footprint
- ✓ Social and Environmental valuation of service

ECONOMIC
- ✓ PR14 Industry leading score to support increased investments of £186m
- ✓ AMP6 performance incentive payments (ODI) ~£150m
- ✓ Industry leading Fast Track at PR19 worth £18m of additional funding

And now in Transportation

Transport for West Midlands

Birmingham City Council

national highways

THE BIRMINGHAM TRANSPORT PLAN – October 2021

ISSUES

Every week in Birmingham

- **18 deaths** due to air pollution
- **2 hrs / motorist** stuck in congestion
- **£12m** economic impact

Also **Route 2 Zero** ambition by 2030 or a soon as possible after

OBJECTIVES

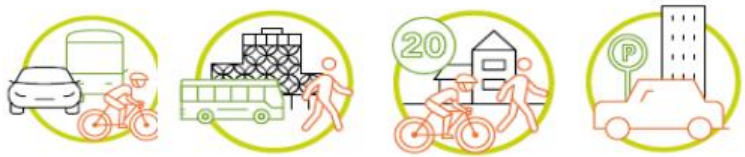
Sustain economic success.

Support, empower and connect communities.

Reduce the negative impacts of transport on the environment.

Urgently and drastically reduce carbon emissions from transport.

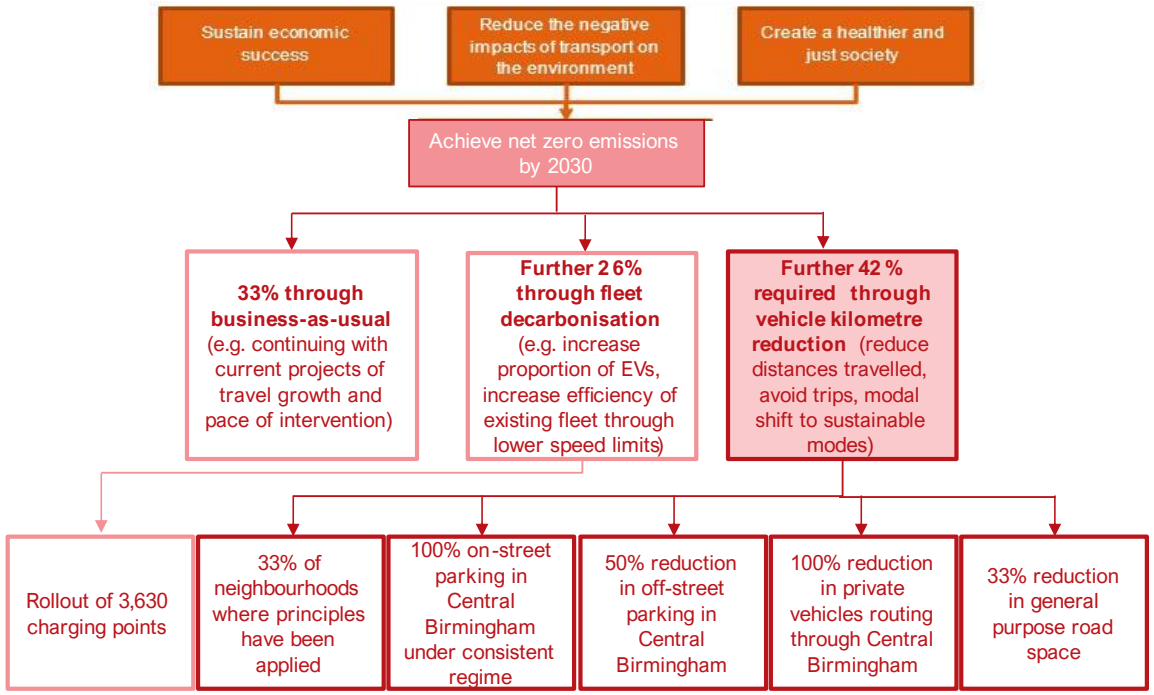
FOUR PRINCIPLES



1. Reallocate roadspace
2. Transform Central Birmingham
3. Prioritise active travel in local neighbourhoods
4. Managing demand, including through parking measures

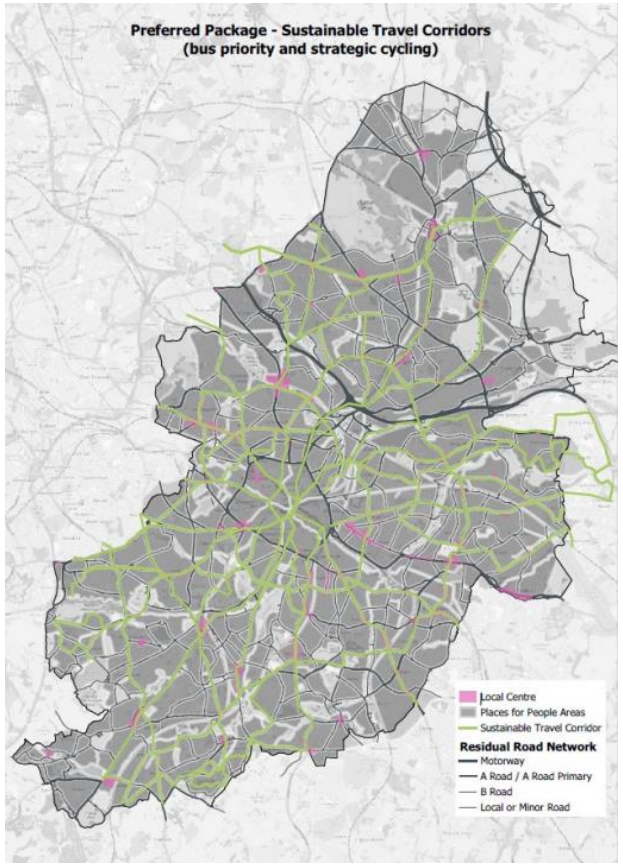
THE BIRMINGHAM TRANSPORT PLAN

ACHIEVING NET ZERO – THE CHALLENGE



A NEW SPATIAL FRAMEWORK

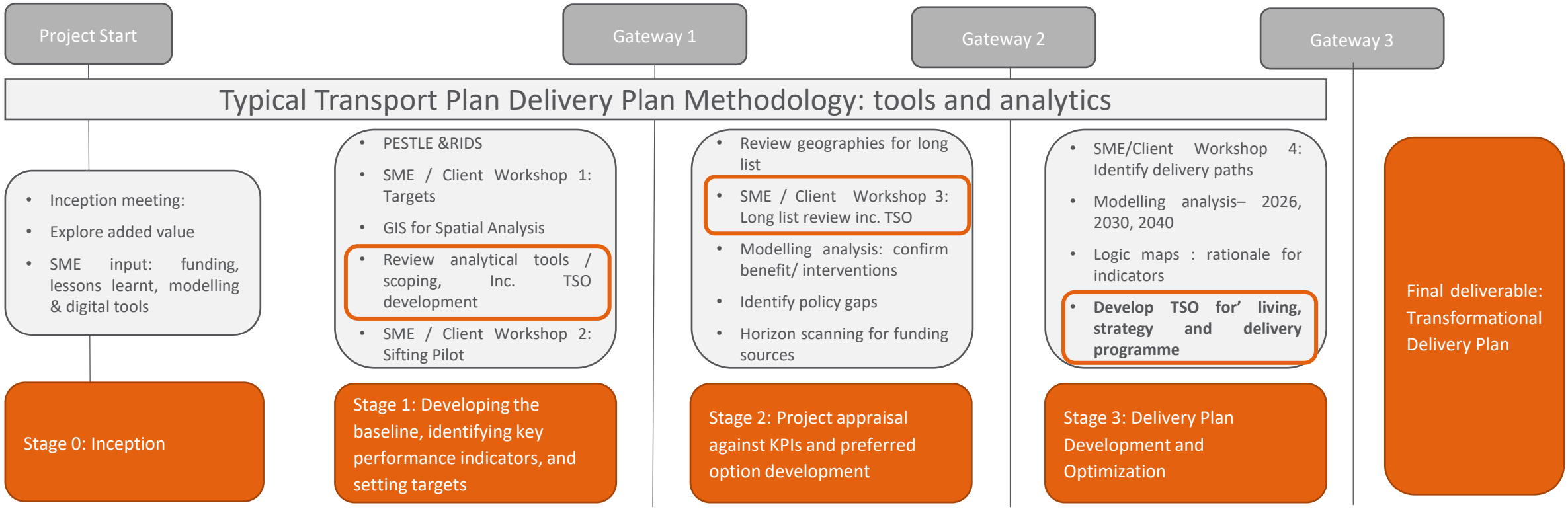
- **Neighbourhoods** where people live.
- **Centres** where people meet their daily needs.
- **Corridors** that connect key areas of the city and beyond.



Arcadis' Supporting Role

Create a prioritised, actionable & deliverable plan

Maximise outcomes with monies available



Our Transport Strategy Optimizer answers the question…

A **prioritized** plan leaves opportunities behind.
An **optimized** plan fully utilizes your resources.

What is the optimal Local Transport Plan Delivery Plan within our constraints and with our goals in mind?

Anything that **limits what you can do**:
budget, risk thresholds,
people, compliance

Anything that you **want to achieve**:
carbon reduction,
accident reduction,
inclusivity / equity,
economic development

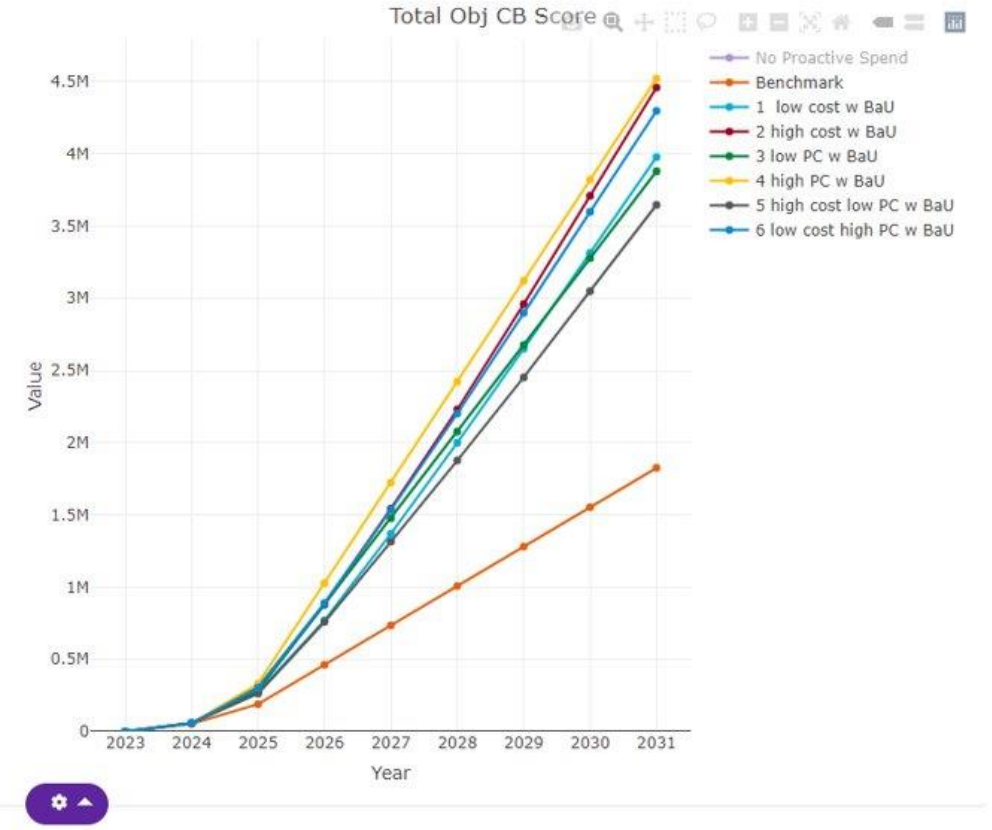
Demo

Outputs from the DRAFT Birmingham Transport Plan Delivery Plan

Initial scores (against objectives and vehicle kilometre reduction potential) for different scenarios.
Different scenarios, with variances in cost and outputs perform better against different targeted outcomes

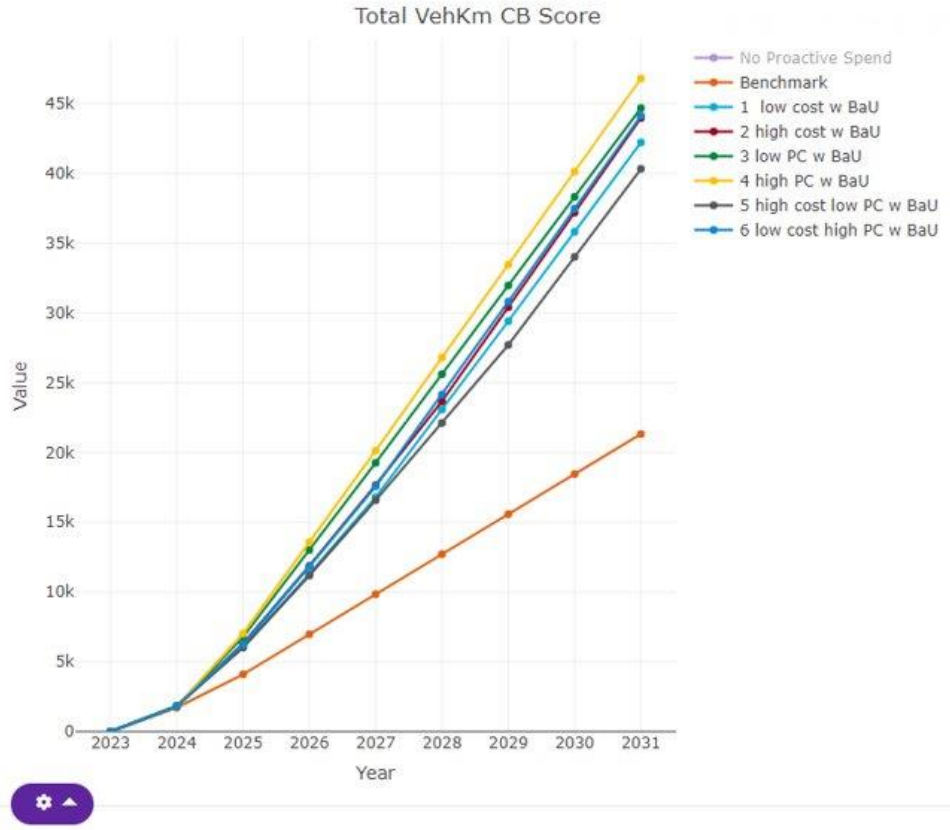
Left Chart

Objective Score



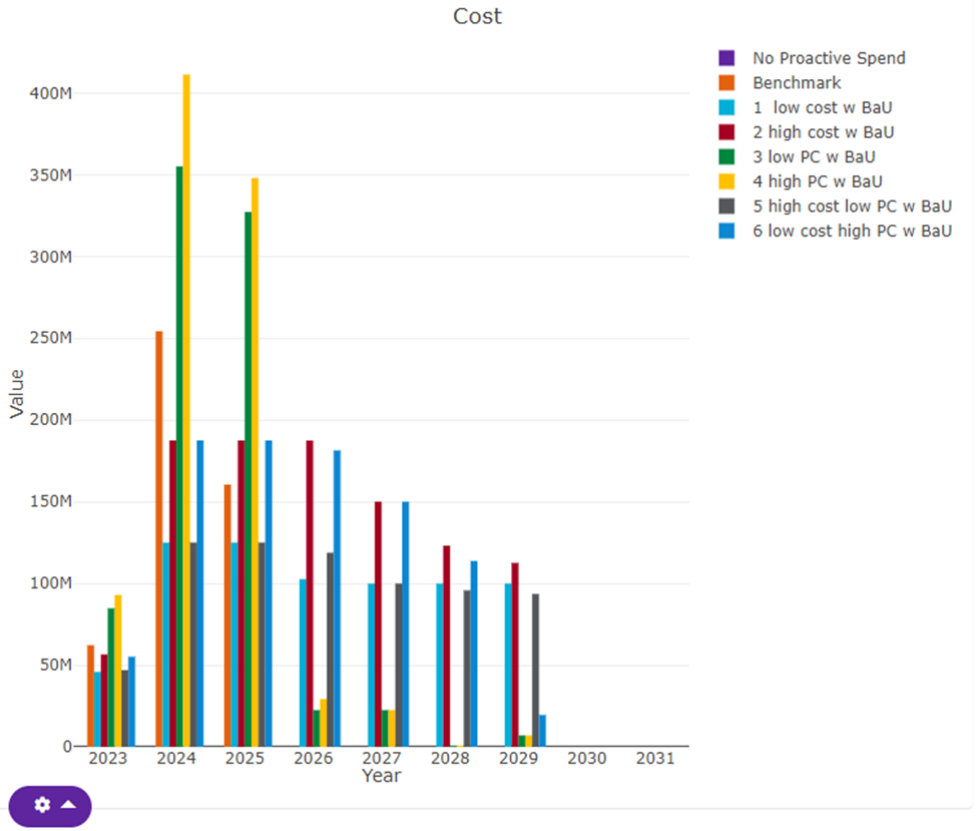
Right Chart

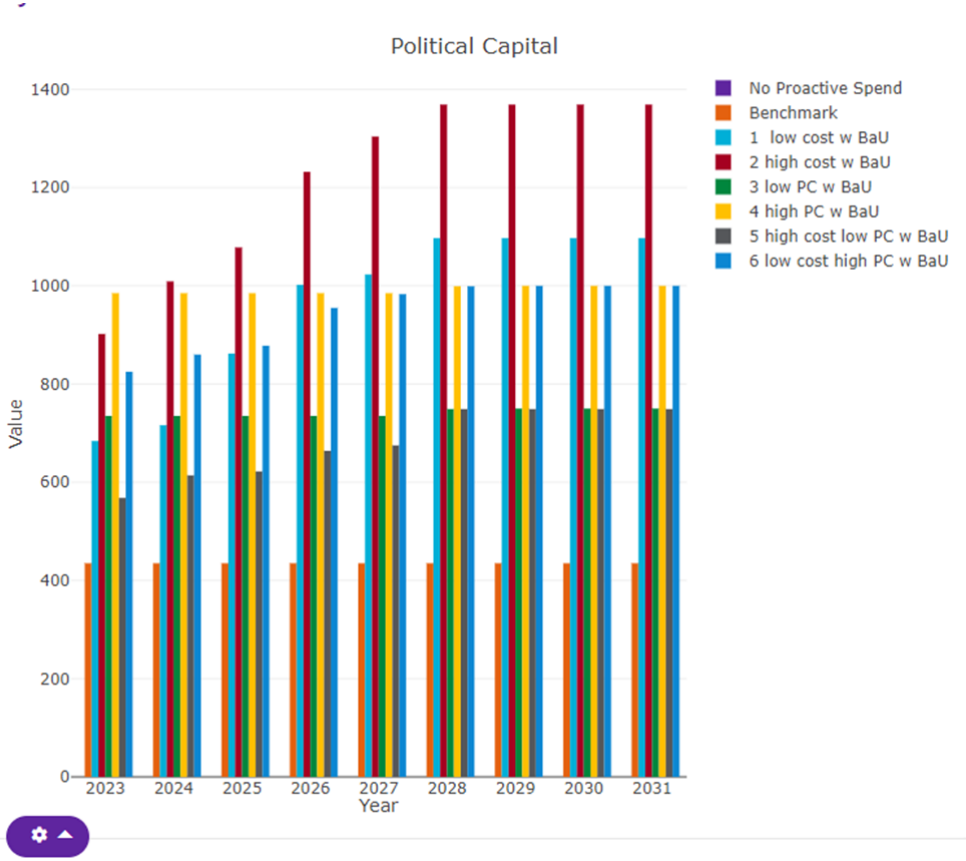
Vehicle km Reduction Score



Outputs from the DRAFT Birmingham Transport Plan Delivery Plan

Cost and Political Capital required to deliver scenarios. Differences in resource requirements or constraints for scenarios can be observed





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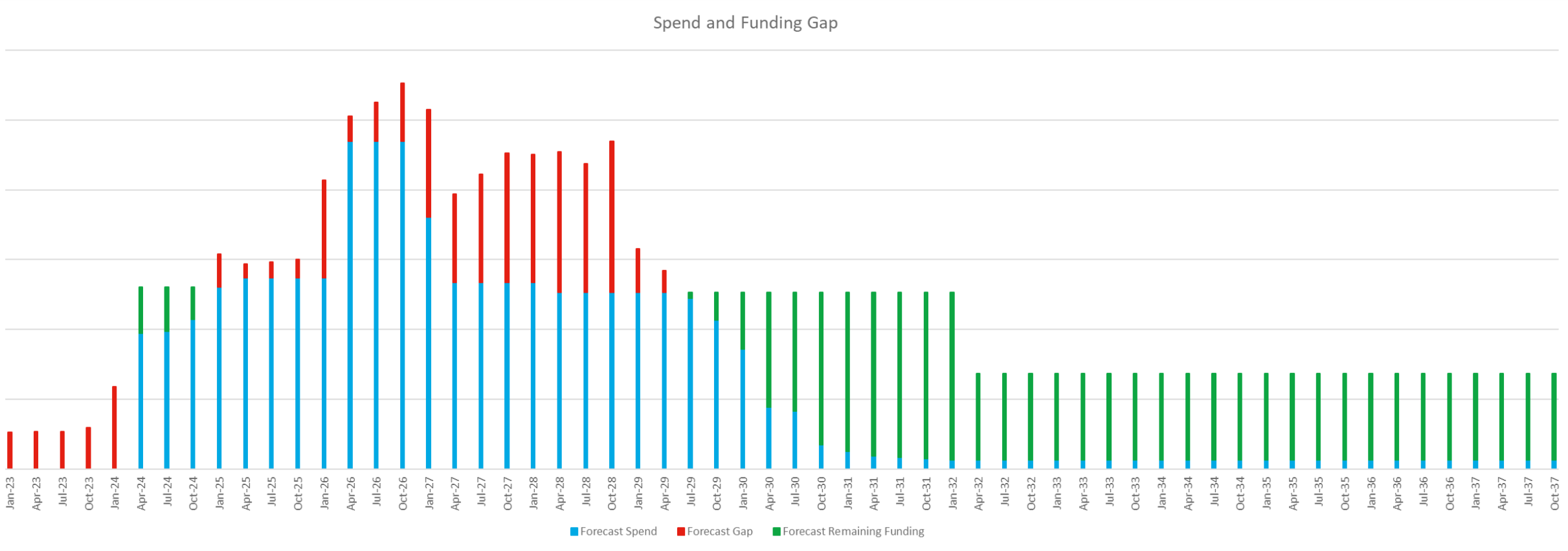
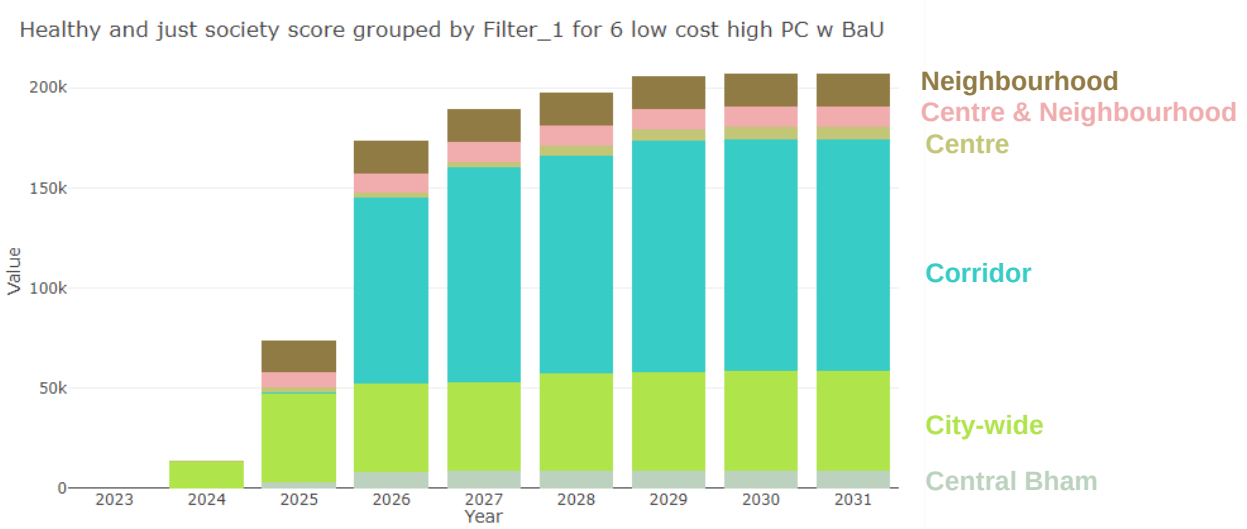
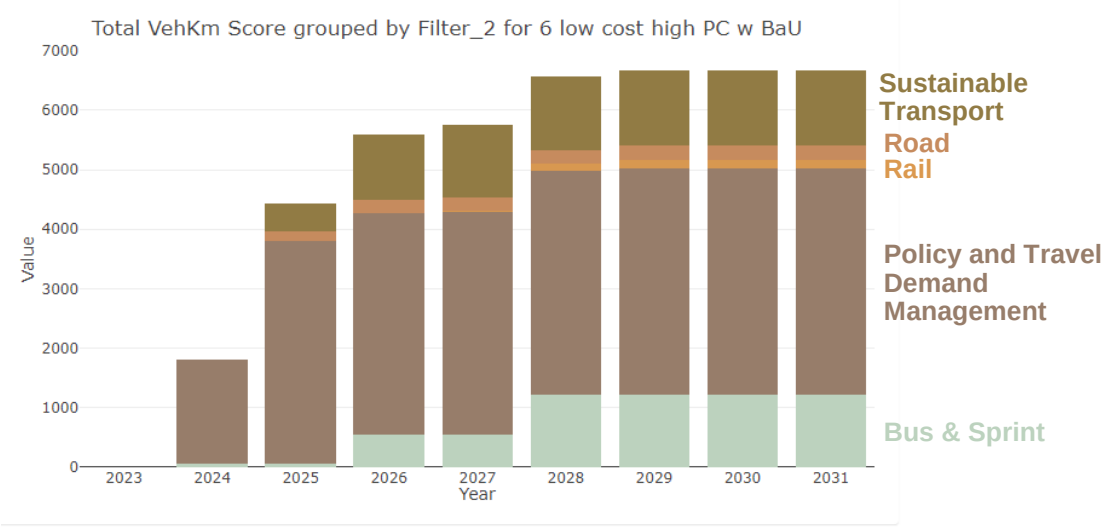


Outputs from the DRAFT Birmingham Transport Plan Delivery Plan

Scheme outputs presented by area and type, supporting workshop discussions

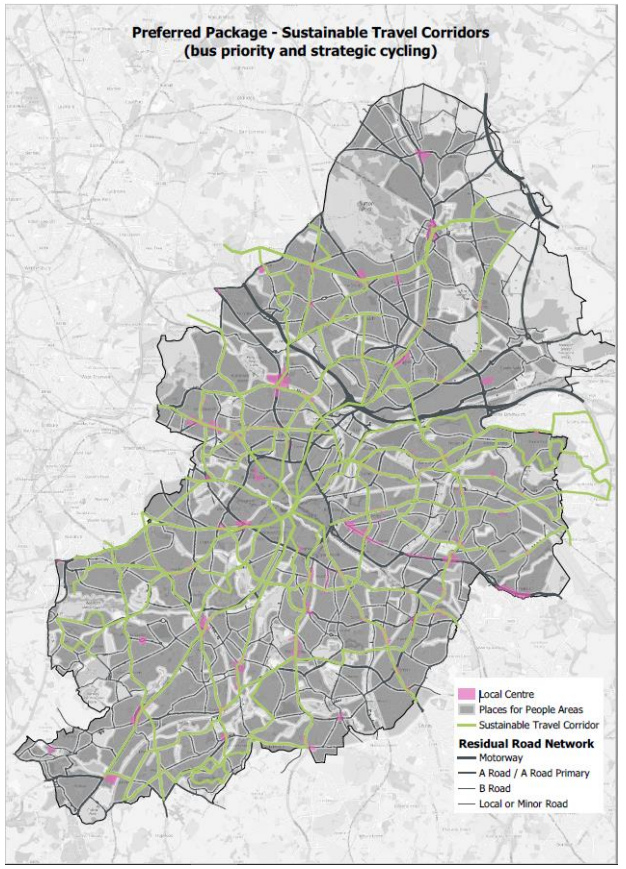




Outputs from the DRAFT Birmingham Transport Plan Delivery Plan

Dynamically linked into GIS software to support gap analysis and discussions in a live workshop environment

Name	Selected?	Scenario	2023	2024	2025	2026	2027	2028	2029	2030	2031
Ra-(SHS	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
Ra34-Ea	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ra35-Co	1	6 low cost high PC w BaU	0	0	1	0	0	0	0	0	
Ra37-So	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ra39-Tra	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ra41-Or	1	6 low cost high PC w BaU	0	0	0	1	0	0	0	0	
Ra42-Lo	1	6 low cost high PC w BaU	0	0	0	1	0	0	0	0	
Ra44-Co	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ra47-Op	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ra48-Up	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
BS12-Bu	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS16-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS17-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS18-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS19-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS20-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS21-Cr	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS23a-R	1	6 low cost high PC w BaU	0	0	0	1	0	0	0	0	
BS23b-C	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS23c-O	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS23d-C	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS23e-C	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS23f-Co	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS24-Fu	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
BS26-Bu	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	
Ro-(SHG	0	6 low cost high PC w BaU	0	0	0	0	0	0	0	0	
Ro3-20m	1	6 low cost high PC w BaU	1	0	0	0	0	0	0	0	



Outputs from the DRAFT Birmingham Transport Plan Delivery Plan

Feeds into ‘Living Programmes’ and ongoing strategy development, for resource planning and prioritisation

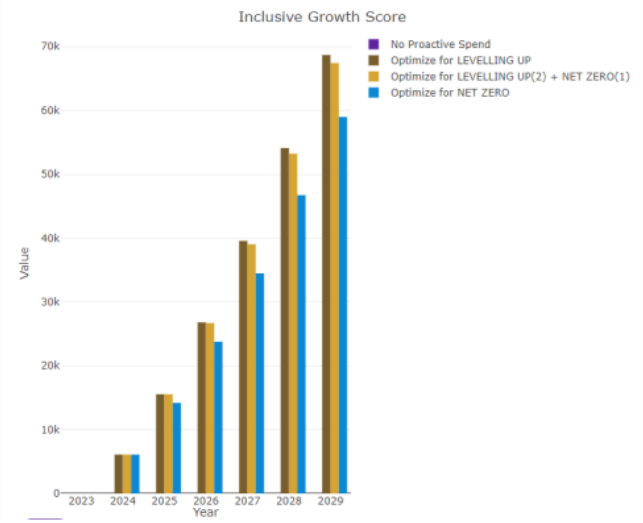
ID	Typology	Duration for Implementation (Years)		Gannt Chart								
		Development	Construction	2023	2024	2025	2026	2027	2028	2029	2030	2031
Ra-(SHSR)	Corridor	3	2	Development	Development	Development	Construction	Construction	Open	Open	Open	Open
Ra35	City Centre	1	1			Development	Construction	Open	Open	Open	Open	Open
Ra41	City Centre	2	1				Development	Development	Construction	Open	Open	Open
Ra42	Corridor	2	1				Development	Development	Construction	Open	Open	Open
BS12	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS16	City Centre	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS17	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS18	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS19	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS20	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS21	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
BS23a	City-wide	2	0				Development	Development	Open	Open	Open	Open
BS23b	Local Centre	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS23c	Local Centre	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS23d	Local Centre	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS23e	Local Centre	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS23f	Local Centre	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS24	City-wide	1	0	Development	Open	Open	Open	Open	Open	Open	Open	Open
BS26	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
Ro3	Neighbourh	1	1	Development	Construction	Open	Open	Open	Open	Open	Open	Open
Ro7	City Centre	1	1	Development	Construction	Open	Open	Open	Open	Open	Open	Open
Ro8	City Centre	1	1	Development	Construction	Open	Open	Open	Open	Open	Open	Open
Ro10	Corridor	1	1	Development	Construction	Open	Open	Open	Open	Open	Open	Open
Ro13	N/LC	1	1			Development	Construction	Open	Open	Open	Open	Open
Ro16	Corridor	2	1	Development	Development	Construction	Open	Open	Open	Open	Open	Open
Ro17	Corridor	2	1				Development	Development	Construction	Open	Open	Open
Ro23	Corridor	2	1				Development	Development	Construction	Open	Open	Open

Our Solutions – Going Beyond Spreadsheets

Support decide & provide Transport Strategies AND Asset Renewals, allowing adaptability, whilst being configurable to your unique local context

Undertake Rapid Scenario Testing

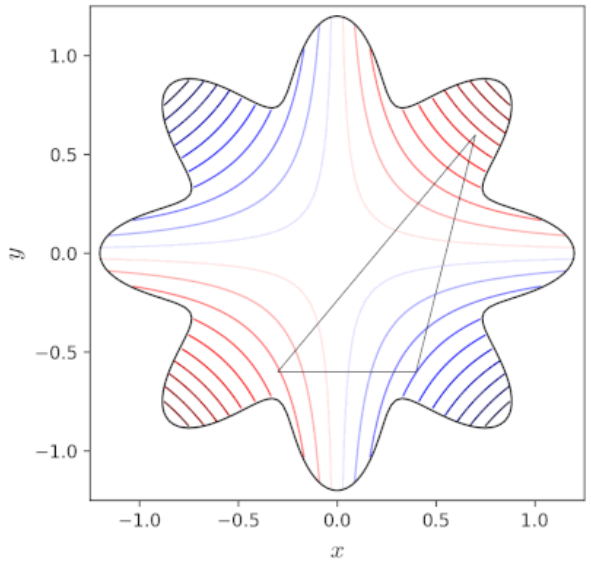
Compare different scenarios quickly and easily based on what is important to the local stakeholders in your region, **based on a single source of the truth**.



Harness the Power of Optimization

Our proven AI-powered solution answers the question, what is the optimal investment plan to achieve your goals, given your constraints.

It helps you demonstrate bang for buck.



Align Your Stakeholders

Visually communicate the differences between scenarios, allowing for a more transparent and collaborative decision making process.

Wider Use Cases & Contacts

Asset Management

national highways

Planning & Development, Yorkshire North-East,

"How can we apply optimisation to develop a programme that meets output & budget objectives, addressing asset need (asset risk, safety, reputation) early whilst balancing impacts on customer & burden on delivery."

CRSTS, LTF, Resurfacing Fund

- Requirement for delivery plans

North	£m
Mass Transit for West Yorkshire	2000
CRSTS Fund top ups (North)	3900
LITS (North)	2500
BSIP (North)	778
Resurfacing Fund (north)	3300
Major Roads Network uplift existing schemes	460
MRN2	1000
Midlands	
CRSTS East Midlands MCA	1500
LITS (Midlands)	2200
BSIP Midlands	230
CRSTS topup WMCA	1082
Midlands Resurfacing	2200
Major Roads Network uplift existing schemes	250
MRN2	650
National	
West of England CA CRSTS top up	100
National Resurfacing Fund - outside Mids & North	2800
Bus fares offer	225
Major Roads Network uplift existing schemes	610
MRN2	1000
Total	**26785**

Local Plan Site Allocations

- Best combination of development sites
- Balancing
  - local housing targets
  - impact on communities
  - impact on environment / greenbelt
  - potential for affordable housing
  - infrastructure costs
  - remediation costs
  - …

Summary

- Scenario testing
- Optimised investment & delivery plans
- Collaboratively & transparently with your stakeholders
- Multiple use cases
  - CRSRS, LTF
  - Resurfacing / Local Road Maintenance
  - Local Plan Site Allocations
  - …

Ian Braddock
Business Development
Ian.Braddock@arcadis.com

Jonny Browning
Associate Technical Director
Jonny.Browning@arcadis.com

Alex Walton
Product Owner
Alex.Walton@arcadis.com

Improving Quality of Life