



NEXUS - SOUTH GOSFORTH TO AIRPORT STATION

Affordable Renewals Through Scoping,
Collaboration And Design

5th November 2025

AGENDA

1 Introductions & Project Overview

2 **Strategic Scoping**
– How early decisions enabled effective and efficient delivery

3 **Design Innovation**
– Reducing cost and enhancing construction efficiency through smart design

4 **Lessons Learnt**
– Agile collaboration driving affordable renewals

5 **Conclusions**
– Challenging convention to shape future-ready, cost-effective infrastructure

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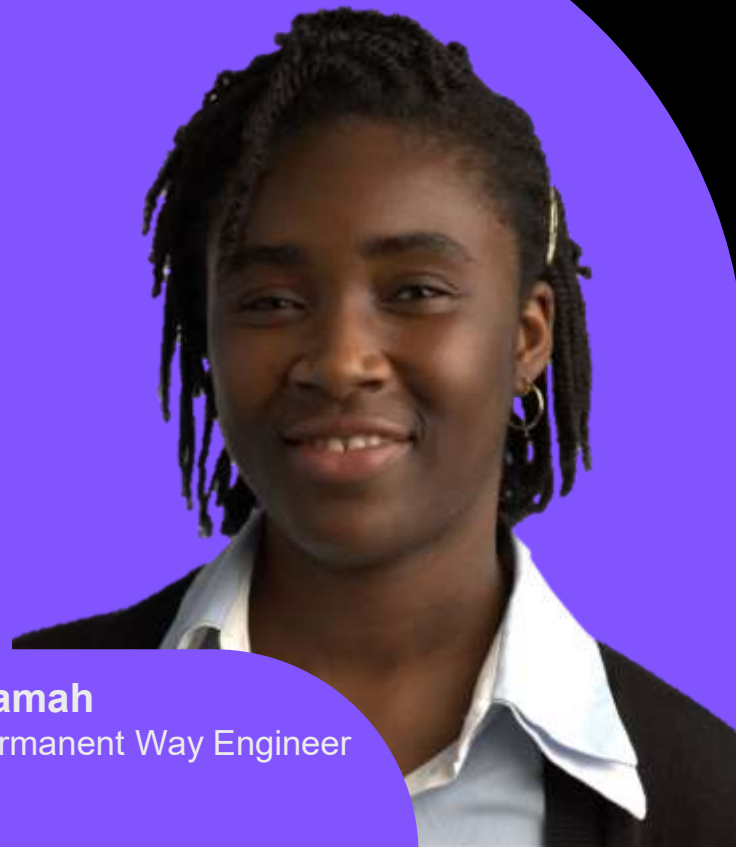
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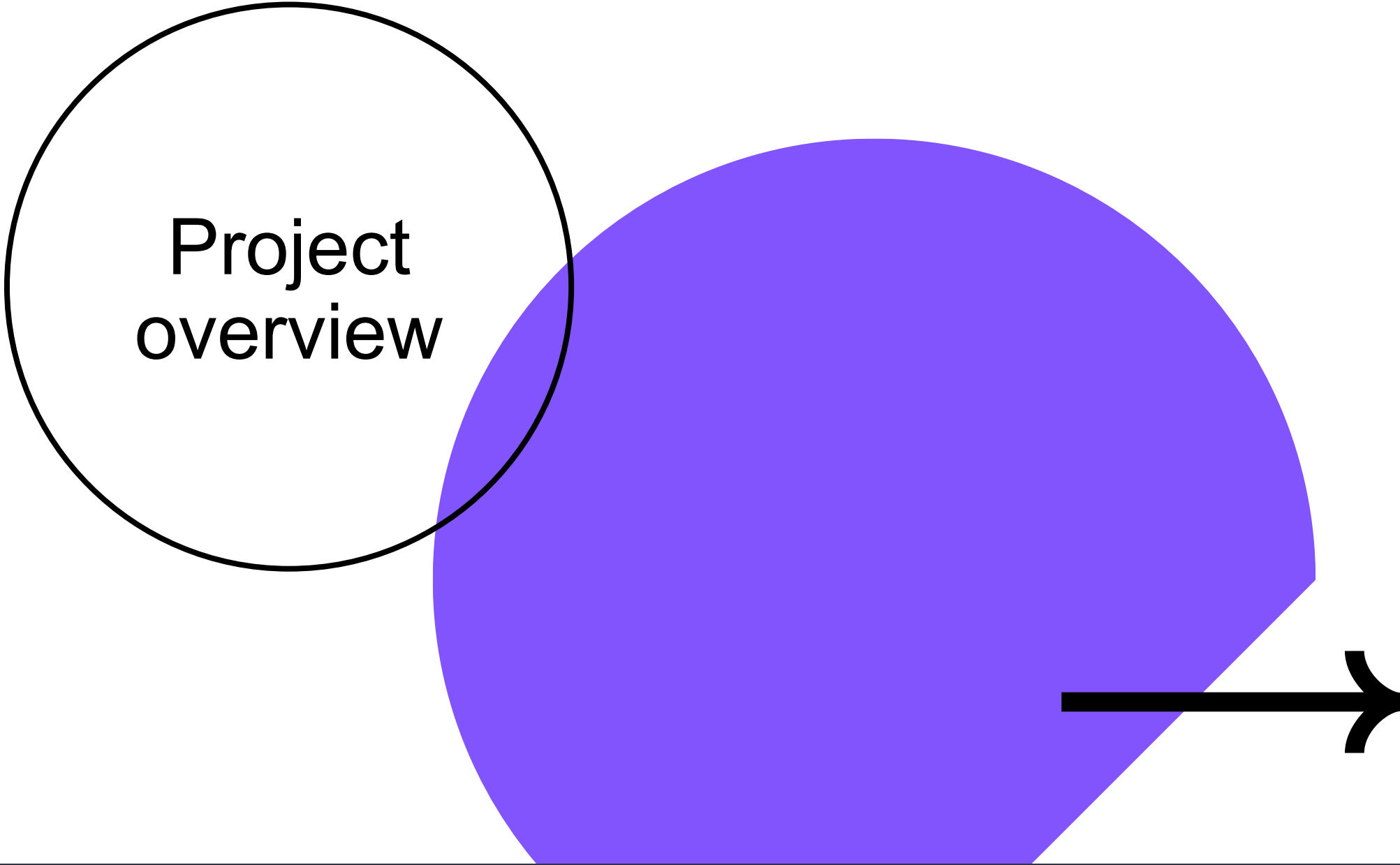
Gavin Jennings

Head of Engineering Management
(former Head of Track)

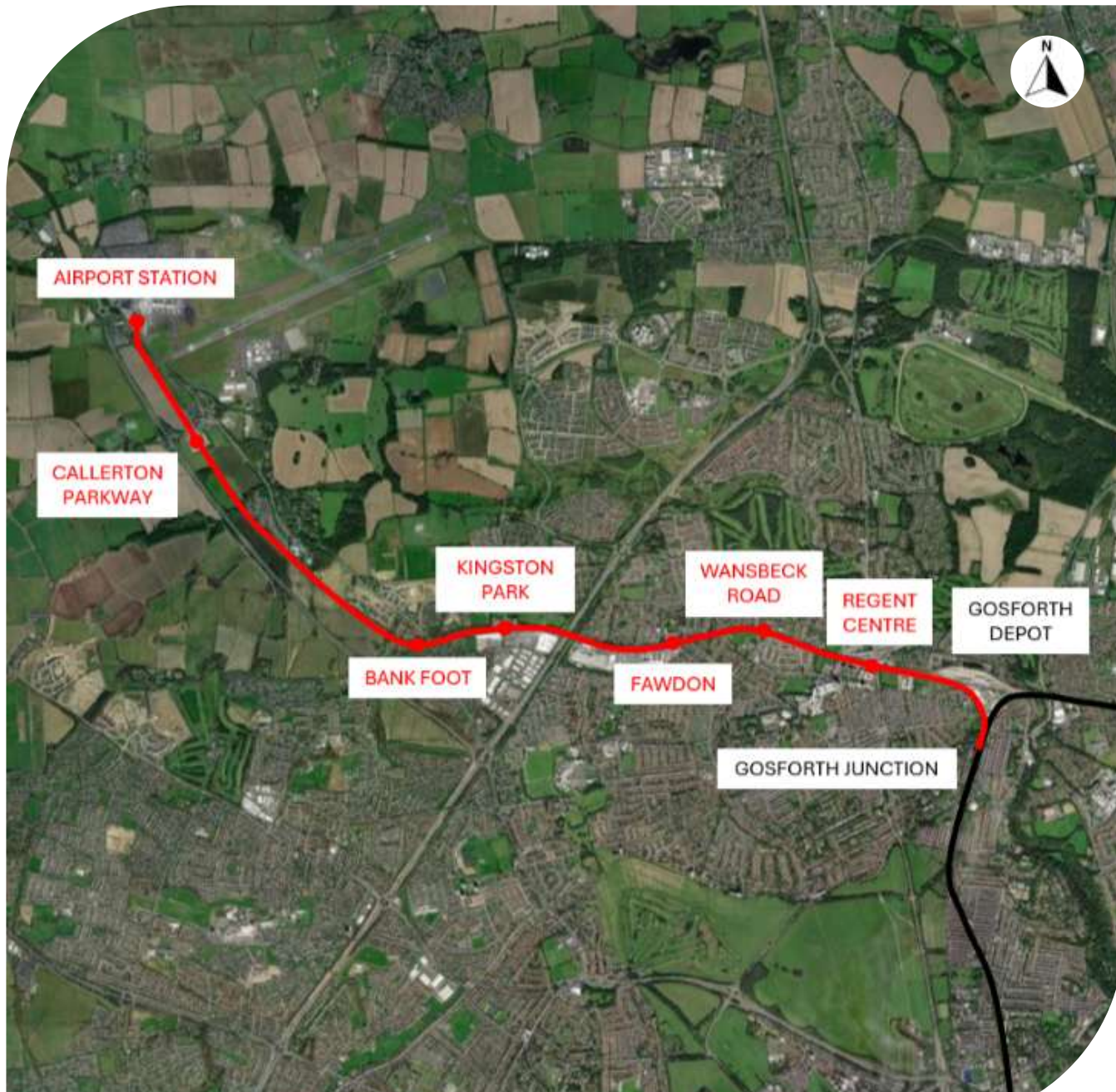


Noye Isamah

Senior Permanent Way Engineer



Project
overview



● Project overview

PROJECT	South Gosforth Junction to Airport Station Renewals
CLIENT	Nexus
LOCATION	Airport Branch of Nexus' metro network
SCOPE	Survey and design of plain line and switch and crossing (S&C) renewals with associated drainage and Overhead Catenary System (OCS) design

8.2km

Total route

6

Stations

3

Crossovers

5

Level crossings

Project aims

1.

Renewal of life
expired assets

2.

Reducing
maintenance liability

3.

Improving reliability
of network

4.

Connecting
communities and
cities

5.

Improving
passenger
experience

Design Scope

Track

Various categories of renewal along route from ballast top up, tamp and stress to full dig and renewal

Nexus Cat H – 5km

Nexus Cat F – 1km



Drainage

Renewal limited to 300m of positive drainage around Kingston Park

Asset condition / manhole survey

New GRP manhole covers



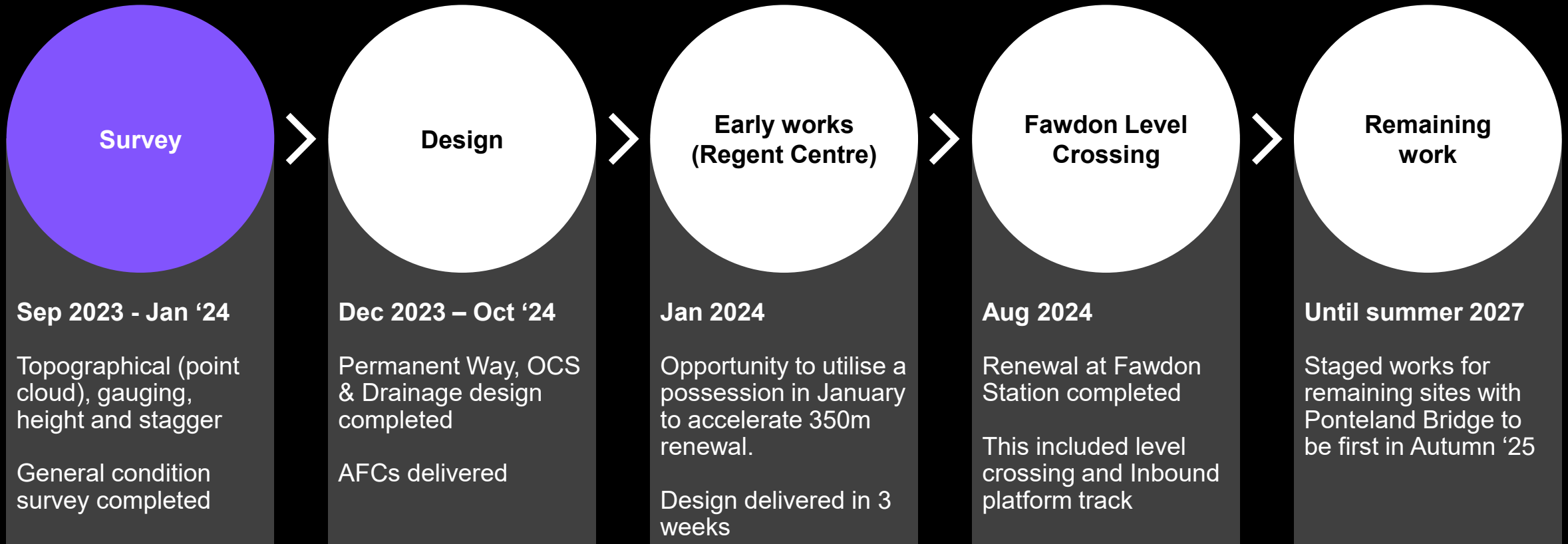
OCS

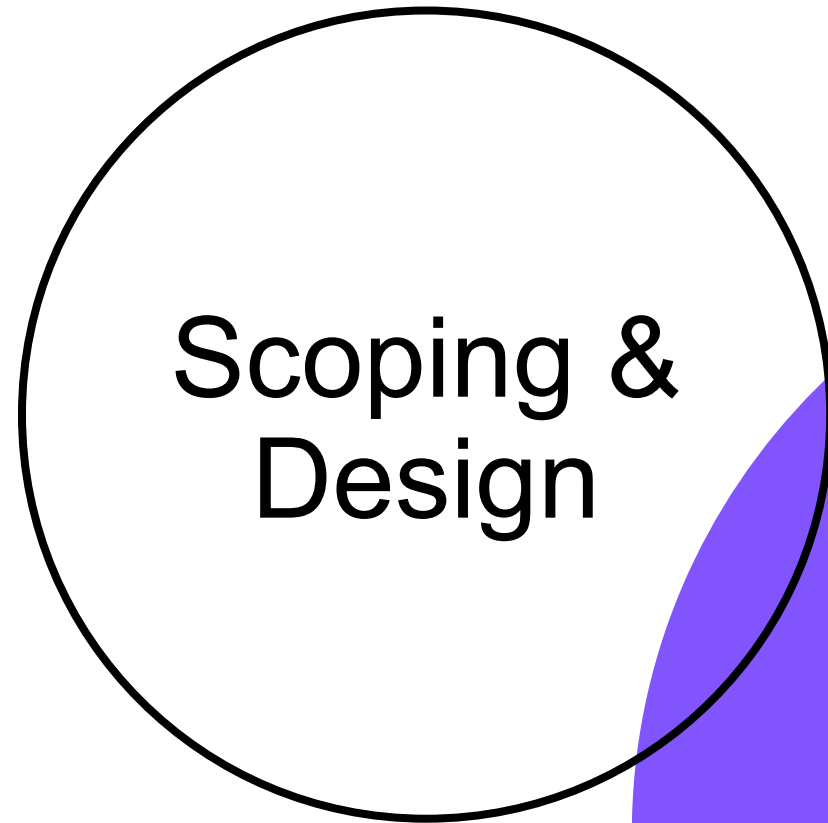
Height and stagger survey and design to improve existing non-compliances and match proposed through alignment design



Programme

Design & Construction





Scope prioritisation and clarity

- Client knowledge and In-house contractor
- Identification of critical assets
- Tabulated and mapped scope
- Categories of renewal
- Devolution advantage



Regent Centre Jan '24



Fawdon Station Aug '24

Platform train interface & MVP

- Key project aim to achieve platform offsets in tolerance for new Class 555
- Avoided platform works and track lowering to reduce construction works
- Deviated against out of tolerance values outside of train stopping area for minimum viable product



S&C refurbishment and renewal & Cost-benefit awareness

Complete renewal of 5003pts at Kingston Park station

- Upgrade from timber to concrete bearers
- Installation of shallow depth switches
- Re-use of existing HW point motors

Heavy refurb of 5017 and 5018pts at Airport station

- Switch panels and cast crossings replaced
- Conversion to shallow depth switches



5018pts
crossover

Esri, Intermap, NASA, NGA, USGS | Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS | Maxar, Microsoft

Component specification & Long-term thinking



Existing PAN9 installation

- Ponteland Bridge – rails directly fastened to concrete deck
- Consistency in network specification for streamlining (not possible due to physical constraints)
- 4 bolts vs 2 bolts for redundancy, history of bolt failure
- Management of stiffness transition and history of buckling

DASH

Design Analysis Software Hub:

Speed calculations & checks, platform calculations, gauging input/output

Efficient
processing of
data from
multiple
software
packages

Excel input for
standards
updates

Graphical user
interface for
widespread
adoption across
business

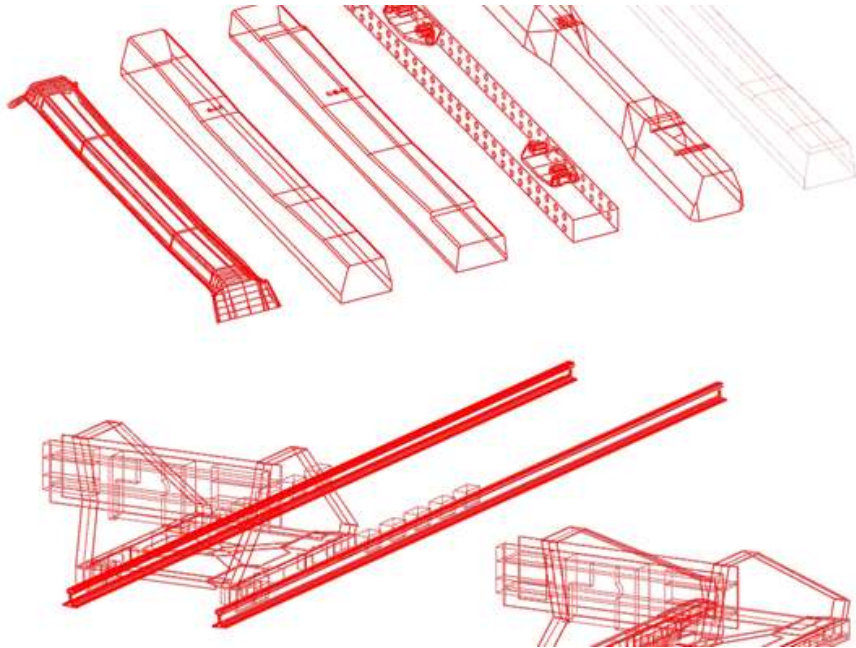
Consistent
outputs for
internal/client
assurance

Future proofed
for cyber
security



Moata Intelligent Content library

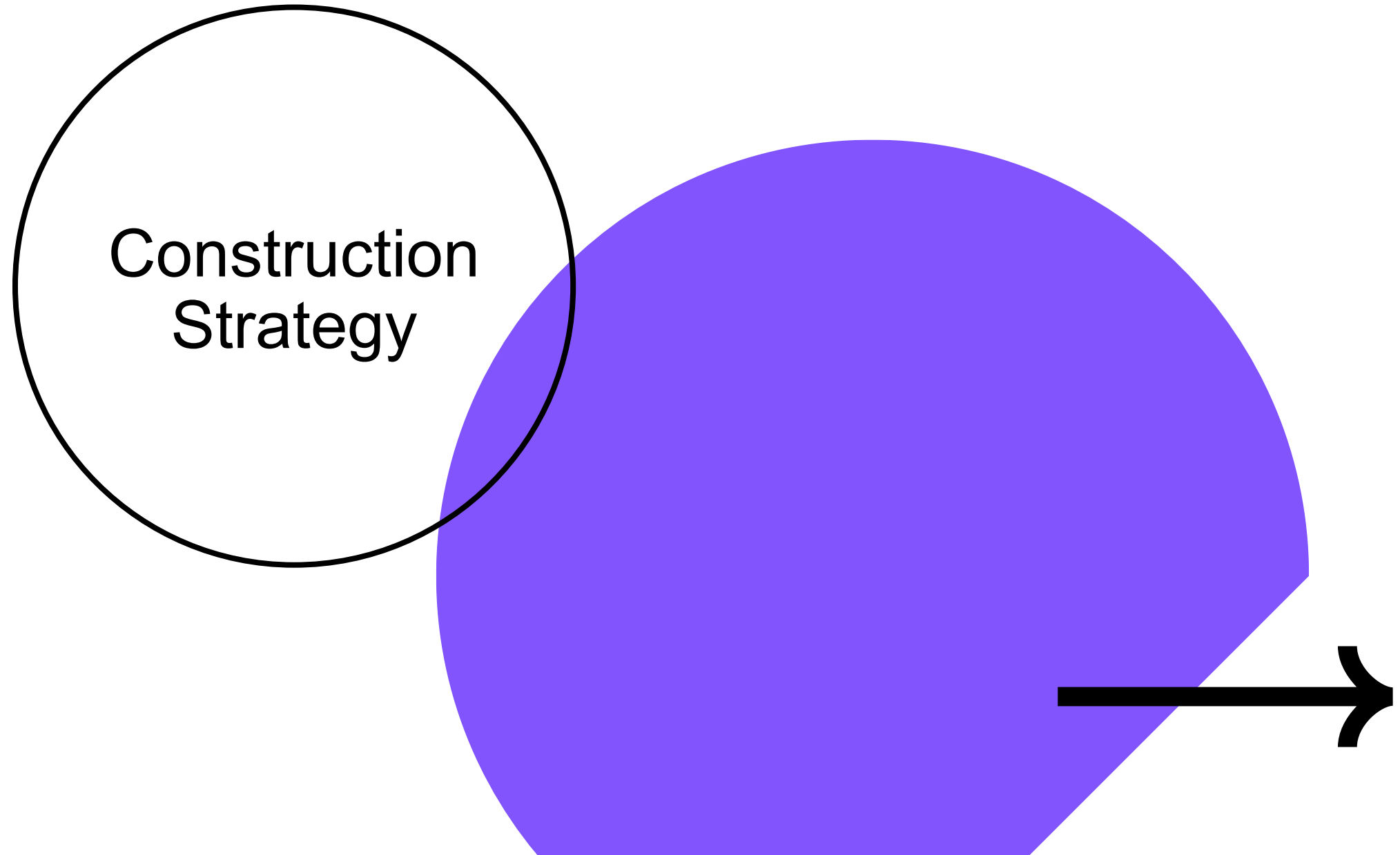
Building Information Modelling (BIM) Integration and Visualisation



Standardised, parametric digital assets for efficient federated model creation and coordination, including:

- Track components (sleepers, rail etc)
- Structure Gauge
- Ballast support zone
- Buffer stops and overrun risk zone





Construction delivery strategy

Priority Works, 2024/25:

- Life expired rail
- Wet beds
- Unmaintainable offsets at stations
- Fastening condition and buckle history

Airport Route Upgrade, 2027:

- Mostly ballast tipping, tamping and stressing
- Track, OCS and signalling renewals



Construction delivery strategy

How and Why?

Top-down
advocacy

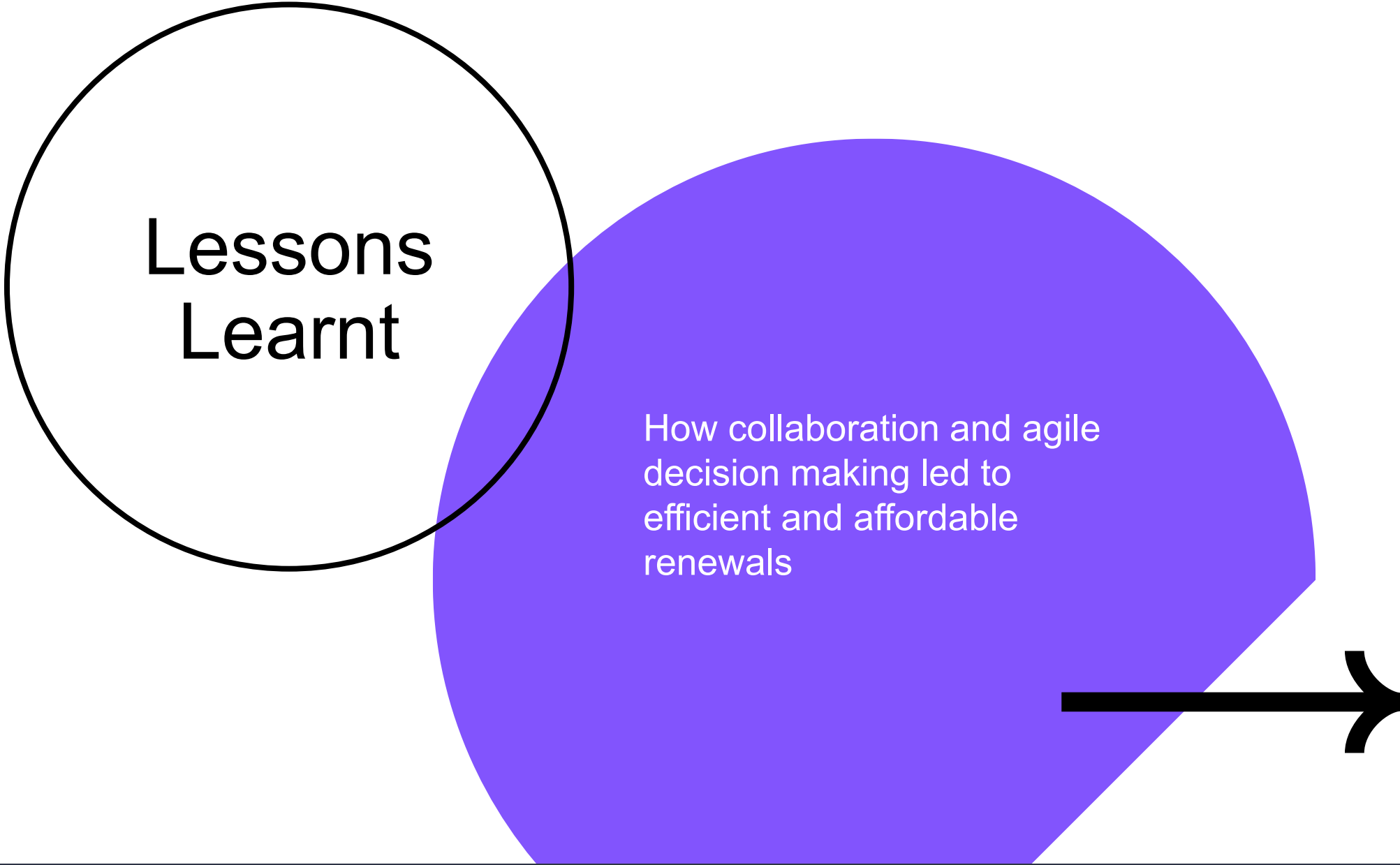
Unique
benchmarking

Physical site
constraints

Local Resource
vs External
Contractor

Volume
efficiencies





Lessons Learnt

How collaboration and agile
decision making led to
efficient and affordable
renewals

Lessons learnt

Collaboration + agile decision making = efficient and affordable renewals

1

Clear technical scope - removed ambiguity

4

Progressive assurance - minimised review comments during milestones submissions

2

Detailed client knowledge - quick decisions for technical queries and information requests

5

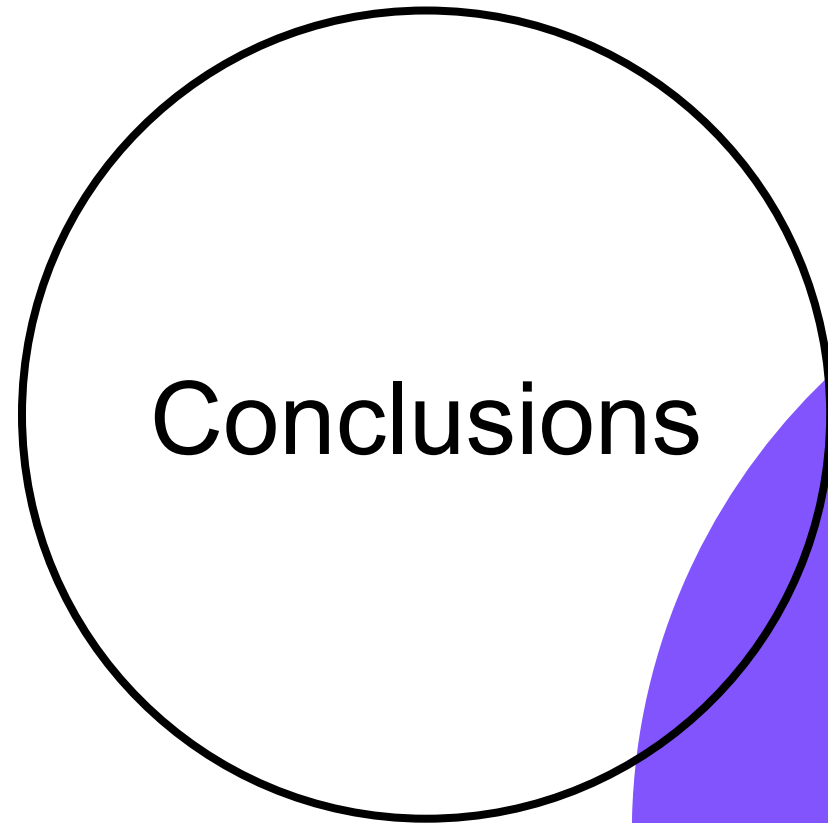
Innovations enabled efficient delivery - DASH and Moata sped up design process, aided visualisation / assurance

3

Open communication – collective best interests of the project at heart

6

Future projects may benefit from more site visits



How do designers influence
the affordability of
renewals?



Challenging Convention

How do designers influence the affordability of renewals?

Challenging Standards

Ongoing process and front of mind

Scope Limits & Specification

Challenging limits and component requirements

Retaining / Recovering Assets

Identify, specify and communicate

Right-first-time

Model based assurance and automated checking

Whole of Life Cost

Modelling wheel/rail wear and component deterioration

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