

Midland Metro

Metro Phase 1 Expansion Programme



BCC Scrutiny Panel
17th November 2016

1.0 Introduction

The purpose of this report is to provide the Birmingham City Council Scrutiny Panel the background to the Midland Metro City Centre Extension and Tram Fleet Replacement Delivery Programme, to highlight the principal challenges that have arisen, the lessons learnt and the way in which these lessons will be taken forward in the delivery of the next stages in the expansion of the Metro network.

The report will review the original vision for the expansion programme as given in the Major Scheme Business Case submitted to DfT in 2011 and compare that to what has been achieved since funding was secured.

The programme of work has not been without challenge. Undertaking a major infrastructure scheme through the heart of the city street whilst keeping the city moving requires coordination between different agencies and stakeholders whilst simultaneously addressing engineering, logistical and operational interfaces in a highly constrained working space. The report aims to communicate some of the key challenges and how they impacted on the construction of the track work and associated systems.

The project team and key stakeholders have engaged in a programme of lessons learnt sessions to capture recommendations as to how future similar projects could be implemented differently to improve the delivery of the future Midland Metro expansion programme planned to take place over the coming years.

TfWM, through the Midland Metro Alliance will shortly begin construction of the next stages of the expansion of the Metro network and the report will briefly discuss how the Alliance, TfWM and BCC are working together to ensure that the challenges of construction in a city centre environment are better understood and that the lessons learnt from this first phase are embedded in our collective planning for the future.

2.0 The Vision

The first phase of the expansion of Midland Metro was developed as a means of helping to deliver the aims of national, regional and local policies. At its inception the Government had made clear its commitment to infrastructure investment to support jobs and regeneration and to address carbon emissions. These objectives were echoed at a regional and local level through the West Midland Transport Plan.

Midland Metro to New Street forms an integral part of the aims and objectives of Birmingham City Council's Big City Plan "Birmingham City Centre Vision for Movement" by supporting the economic growth and development aspirations. Like all major cities, Birmingham faces growing congestion causing increased journey times and a deterioration in air quality. Improved connectivity and excellent transport links are an essential element to enable Birmingham to continue to meet its committed future investment plans for long-term sustained economic growth. A high quality transport system is central to the successful delivery of this wider strategic vision for both the city and the West Midlands.

Powers to construct, operate and maintain the extension to Stephenson Street (and indeed through to Five Ways) were first obtained in 2005 with the granting, following extensive consultation, of the Midland Metro (Birmingham City Centre Extension etc.) Order 2005 (SI2005/1794).

In 2009 TfWM's predecessor, Centro (West Midland Passenger Transport Executive), submitted a Major Scheme Business Case for Midland Metro with plans for additional tram and depot capacity, enhanced frequency and an extension to New Street station as one of the top transport priorities for the West Midlands. In early 2012 the Department for Transport granted final funding approval for the programme. The scheme was designed to fully support the ongoing regeneration of central Birmingham and to integrate with the redevelopment of New Street Station and Grand Central to provide transport infrastructure fit for a world class city. The project aimed to deliver a step change in the real and perceived connectivity in central Birmingham and along the corridor to Wolverhampton and the heart of the Black Country.

The programme set out to deliver a fleet of 19 new trams to operate enhanced service frequencies on the existing system, the extension through to New Street and an associated extension to the tram depot facilities all to be completed in 2015. The combined effect of these improvements predicted a patronage increase of 60% some 3 years after opening.

Understanding the impacts of construction works on the city centre businesses and users the Transport Authority set out to deliver and maintain effective communication and consultation across the stakeholders with the aim of minimising and mitigating disruption and recognise the need for compensatory measures when necessary.

3.0 What Did We Achieve

The City Centre Extension and Fleet Replacement have been delivered as a programme by Centro and have provided the following:-

- 21 new 33m long trams capable of a maximum speed of 70km/h and of carrying over 200 passengers with capacity for future modification to allow operation of short sections of tram track without the need of the overhead electrical infrastructure.
- Extension, modifications and enhancement to the Midland Metro Wednesbury Depot facilities to accommodate the new fleet of trams and to provide improved maintenance facilities to drive fleet reliability.
- Modifications to the existing Line One traction power systems.
- Modifications to the existing Line One platforms to accommodate the new trams.
- The creation of six new bus interchanges across the city centre, significant highway works and installation of new infrastructure including bus shelters and way finding totems in order to relocate the bus routes from Corporation Street in preparation for the Metro extension to New Street
- Extensive utilities diversion work to relocate existing services from beneath the tram tracks has resulted in the renewal or replacement of some 3.5 km of pipes and cables with a consequent reduction in the risk of future highway, metro and utility service disruption.

- 1.4km of new twin tram track and associated infrastructure including overhead line equipment from Snow Hill through to New Street Station / Grand Central.
- New Snow Hill stop constructed on a new bridge above Great Charles Street.
- Three new city centre tram stops including the terminus stop at Grand Central incorporating associated shelters, infrastructure and real time passenger information systems.
- Extensive alterations and remodelling of 128 New Street (former Waterstones building) to provide improved pedestrian facilities in response to the redevelopment of New Street Station.
- Provision of enhanced building face to building face public realm comprising high quality granite and Yorkstone with key features and nodal points such as New Street / Corporation Street junction.
- Enhancement of the highway lighting provisions to meet new BCC standards
- Revised traffic management arrangements at streets along the route to enable the introduction and operation of the tramway.
- Passive provision for future City Centre extensions at Bull Street junction and Stephenson Street.

The original timeline aimed to deliver passenger service to New Street in 2015. Following the visit by Her Majesty the Queen in November 2015 Midland Metro commenced passenger service to Bull Street on 6th December 2015 bringing trams back to the streets of Birmingham for the first time in over 60 years. Passenger services to New Street commenced on 30th May 2016 following the completion of overhead line, tram stops and public realm works essential prior to tram operation.

During the last week of October 2016, 5 months after opening to Grand Central, daily patronage levels have increased on average by some 30% year on year with weekly growth in October peaking at 43%. This increase is exceeding expectations and suggest that the business case targets will be met by 2019/20 thereby providing robust support for the proposed future expansion of the network in the West Midlands over the coming years.

In conjunction with the redevelopment of New Street Station the Gateway to the city has been truly transformed enhancing the city's image to that of a clean, modern, connected forward looking international city that is ready to do business.

Throughout the works extensive communication and consultation was undertaken with those affected along the route via regular newsletters, website and regular face to face visits and updates by our stakeholder liaison team. Inevitably the programmes that were communicated to stakeholders were not always achieved as a result of many factors including the realisation of risks arising from the constrained working environment and this meant that expectations were not always met. In recognition of the impact that the work could have, particularly on small business, a compensation scheme was established, which over the course of the works, paid in excess of £300k to SME's. In addition to this Birmingham City Council established a business rate relief scheme to support businesses over the periods of disruption caused by the works.

4.0 What Were the Challenges

The original schedule anticipated the construction period for the city centre extension to commence in March 2013 with a duration of 24 months and opening for passenger service in Spring 2015.

The actual construction commenced in July 2013 with passenger service commencing to Bull Street some 29 months later on 6th December 2015 (ie. additional 5 months on site) and passenger service to Grand Central a further 5 months later on 30th May 2015 (ie. additional 10 months on site).

The challenges of undertaking a major civil engineering project within a city centre environment are many and varied.

The alignment passes through a number of sections all with their own challenges and constraints.

- **Off-street environment** - the new track alignment passes over an existing masonry arch viaduct owned by Network Rail on the northern approach to Snow Hill station and by the need to maintain Snow Hill station as an operating mainline rail station. Re-alignment of the track along this section required the installation of new drainage and waterproofing beneath the tracks and structural repairs to the existing arches prior to the laying of the tracks and associated infrastructure. All this work was constrained by the adjacent existing operational Metro service running into Snow Hill Station, by the needs of the arch tenants whose premises were required to undertake structural repairs and completed under the Network Rail asset protection requirements.
- **Snow Hill Estate** - before meeting with the on-street section the alignment passes over the new Ballymore viaduct adjacent to the new Snow Hill office development. The viaduct was constructed and is owned by Ballymore with Metro operating under a 250 year lease. The nature of this development and the legal arrangements associated with the tramway created specific aesthetic requirements for this section of the route and placed constraints on constructions timings and durations in order to minimise disruption to the users of the estate.
- **Colmore District** – the tracks enter the on-street highway environment via the traffic light controlled junction across Colmore Circus, a key highway route for traffic entering and egressing the city via the A38. Track laying across this busy city route had to be split into several phases to realign the highway and to ensure traffic flow could be maintained throughout. Delays to the start of construction in this area were compounded by the A38 summer tunnel closures in 2013 which required a revised phasing plan to meet the requirements of the BCC Traffic Manager.
- **Bull Street** – pedestrian and traffic management for accessing and servicing of the business premises were a key constraint along this section of the route. Further challenges related to environmental considerations and restrictions around noisy working close to the court buildings and the numerous offices and conferencing facilities in the vicinity.
- **Corporation Street and New Street**- challenges were similar in nature to Bull Street however the higher pedestrian footfall and number of retail frontages imposed further restrictions on the size of workspaces. The constraints on worksite sizes led to inefficiency's in the construction operations and poor aesthetic finishes.

- **Stephenson Street** – as above with the added competition for highway space brought about by the Birmingham New Street redevelopment and the requirement imposed by the city to cease all on street works in and around the area for the opening of station redevelopment and the Rugby World Cup requirements September 2015 (“Super September”)

Key Issues Arising

- **Procurement and limited interest from prospective bidders** – interest from contracting organisations at prequalification stage was very low with only 6 organisations expressing interest. 4 tenderers were pre-selected with 1 declining to submit a bid during the tender process. This has highlighted that relatively low value, high risk tramway projects are unattractive to contractors.
- **Loss of Balfour Beatty Rail as key sub-contractor** – loss of rail specialist at start of construction required a late change in procurement of key resources which was then compounded by difficulties arising from bending and installation of rail around tight radii.
- **Utilities** - discovery of uncharted utilities and highly congested footway sub surface requiring further diversions and resulting in delay and disruption.
- **Traffic Management** – competing requirements / interfaces with other developments such as New Street Gateway, Martineau Place, A38 tunnel closures and associated approvals to close up areas for construction
- **City centre events** – constraints such as Xmas working restrictions, “Super September” opening of Grand Central and John Lewis etc
- **Stakeholder requirements** – small worksites necessary to maintain servicing and access to all shops and premises required track work to be constructed as a “jigsaw” further constrained by competing stakeholder requirements in relation to working hours.
- **Lack of design integration** – design preparation, submission and acceptance process became fractured as a result of lack of coordination and integration by main contractor
- **Lack of client side resource** – as project became challenged from both a commercial and schedule and contractor performance reduced client side resource became overstretched
- **Highway Surface Finish** – Delayed start on site due to contractor unable to guarantee safety performance of the specified highway finish resulting in a proposed alternative subject to revised planning approval
- **Lack of Core Skills / Experience.** A feature of the feast and famine nature of tramway development in the UK has been the inability to develop and maintain the knowledge and experience of tramway construction within the client, designer, contractor and local authorities. The 15 year gap between completion of Line One and start of the BCCE project served to highlight this lack of capability.
- **Programmes should be challenging but realistic.** Typically tramway construction works in the UK take some 36-42 months to complete irrespective of the size of the project. Smaller schemes suffer higher programme risk as any unexpected technical challenges or imposed constraints result in significant programme disruption as there are no alternate worksite on which resources can be deployed.
- **Operator Engagement.** The input of the Operator into the development and delivery of the project is critical to achievement of desired outcomes. National Express played a critical role in the latter stages of the scheme and their input ensured that the safety assurance and acceptance of the works for operational use was effectively progressed.

5.0 What Did we Learn

Following commencement of passenger service to Grand Central TfWM commissioned a lessons learnt programme to enable the experiences of the BCCE project to be turned into clear recommendations for all parties that will have an effect on the way future projects are delivered. The programme comprised a series of workshops designed to capture data as to what went well and what could have been done better. Five independently facilitated workshops took place covering the following aspects of the project:

- Procurement and Contracts;
- Approvals and Consents;
- Design and Design Management;
- Stakeholder Management and;
- Project Delivery

The sessions were attended by appropriate individuals involved in the delivery from the client, the contractor, technical advisors and key stakeholders such as Birmingham City Council and Network Rail. Separate interviews were held with stakeholders, affected parties and others who were not able to attend the workshops to elicit their views and experiences in addition to the data collected at the workshops.

Key Learnings and recommendations:

- Value of schemes need to be sufficiently attractive to generate the interest of the main contractors and their supply chain;
- Contractual arrangements should provide an environment to collaborate, shared ownership for programme, performance, quality, risk and opportunity;
- Contracted partners / delivery organisations should be sufficiently robust and aligned to the project objectives to ensure delivery against their pre-contractual stated intent;
- Regional and local priorities relating to the project to be fully understood, communicated and to gain full alignment across delivery organisations including council officers and local politicians and;
- Prior to construction of main tramway works greater certainty is required over the final design solutions and traffic management arrangements to facilitate full coordination and integration of all aspects of the works.

6.0 What we are doing differently

To address the above key learnings and recommendations the following changes / differences will be applied to the delivery of the future Metro network.

Alliancing

Transport for West Midlands have formed the Midlands Metro Alliance as a means for delivering, value, innovation and accelerated progress in the delivery of the future Metro extensions across the West Midlands.

Alliancing is a form of relationship contracting often used for complex projects or programmes which require speed of delivery and cost certainty. Pure Alliances include the owner, designer and

contractor as alliance members who collectively seek outstanding outcomes through an integrated team characterize by aligned goals, innovative thinking and collaborative behaviours.

This is reinforced through a commercial framework set up to create win-win outcomes by aligning the commercial interests of constructors and designers with the owner's project objectives, with risk collectively assumed by all participants and rewards determined by collective performance.

The Alliance comprises Transport for West Midlands as owner, Egis (in consortium with Tony Gee and Pell Frischmann) as designer and Colas Rail as contractor to work as a single integrated team to develop and deliver the programme of works collaboratively under a single Programme Alliance Agreement (PAA) with the interests of all the parties aligned. The Alliance will be expected to

- Promote collaborative behaviours commensurate with a best for project approach
- Assume collective ownership for performance in programme and project delivery
- Take collective responsibility of all programme and project risk and opportunity
- Agree a commercial model that provides for a Pain share and Gain share mechanism

The Alliance has been formed to deliver what is expected to be in excess of £1billion of investment into future Metro routes across the West Midlands over a 10 year timeframe. The value and duration of this programme of work has not only proved to be attractive to the supply chain market but also enabled the selected partners to take a longer term view towards recruitment, resourcing and supply chain decisions, innovation and continual improvement.

Unlike traditional forms of construction contracts which seeks to defend positions , the PAA is very different insofar as it is principle based, placing obligations on the parties to act in good faith and commit to Best for Project decisions making on the basis that his will deliver the best outcome for all parties. The PAA includes shared risk, no claim, no blame and creating a collaborative self-governing environment in which a high performing, innovative team will thrive.

The Operator has an important role to play in the development of the network and early engagement in the development of proposals will help to ensure that the network can be optimised to meet future passenger expectations, achieve high levels of performance and be maintained at a reasonable cost. A dedicated project manager has been appointed by National Express to work with the Alliance to provide advice on the emerging proposals.

Early indications from the Alliance are promising. The engagement of the Alliance design and construction partners with the TfWM team, Operator and stakeholders has identified several significant improvements to the network proposals that will serve to improve the deliverability and operation of the network.

Alignment and Collaboration with BCC

The construction of BCCE has proved to be a fertile learning ground for both TfWM and BCC. Throughout the delivery of the project much has been learnt about the needs and drivers of each organisation. The last few years have seen a change in attitudes towards the challenges and benefits that light rail brings both locally and to the wider region from key stakeholders including the Highway Authority and the across the council departments. Equally the challenges faced by the council in coordinating the use of highway space by developers and statutory undertakers and the challenges the council faces in discharging it's own maintenance obligations via the PFI contract whilst minimising impact on business and the public is now far better understood and appreciated by both TfWM and its Alliance partners.

Moving forward the challenges the parties have experienced together over the past years has led to the building of far stronger relationships, with more effective communication with greater alignment and agreement of priorities for the future extensions. TfWM and Birmingham City Council officers are currently working together to develop a principles led Memorandum of Understanding that will set how we will work together, and how decisions will be made to enable the efficient delivery and operation of the expanded Metro network as a means to achieving the vision for growth in the West Midlands.

Timing of Detailed Design

Detailed design and logistical planning is now being progressed to a degree that will give confidence to the Alliance, TfWM and stakeholders (including the local highway and planning authorities) that the works can be delivered with minimum practicable levels of disruption whilst maintaining programme efficiency and quality of output. By way of example, progressing the detailed streetscape design in advance of the utility diversions implementation can facilitate consideration of solutions beyond the simple relocation of apparatus from beneath the future tram tracks ensuring that relocated apparatus avoids any tram related infrastructure that may be required within the footway. This should reduce the risk of utilities related delay and disruption during the installation of features under or in the footway such as communication ducting, traffic signage, overhead line equipment poles and cabinets.

7.0 The Future Metro Network

TfWM has now commissioned the Metro Alliance to review the future expanded network and to identify the optimum route for delivery of the works required to ensure that the network is delivered by 2026 and meets the Combined Authorities performance objectives by 2030. Over the coming months the Alliance will confirm the way in which the network will be expanded and the timing of major investments (such as a new depot, additional trams, new control room etc) By 2030 Midland Metro is expected to provide an extensive pattern of services over the following extensions to the existing network.

- Wolverhampton Station to The Royal
- Brierley Hill to Wednesbury via Merry Hill and Dudley
- Grand Central to Edgbaston (Five Ways)
- Bull Street to Digbeth via Curzon Street (HS2)
- Digbeth to UK Central via East Birmingham, Solihull and Birmingham Interchange

In addition TfWM and the Metro Alliance will work with stakeholders to identify and evaluate the case for other opportunities to extend the Metro network in support of wider plans for growth and regeneration (e.g. Birmingham City Centre to Birmingham University in line with the aspirations of the Smithfield Masterplan)

The schematic diagram below indicates the proposed routes and principal tram stops.

