



Subway Modernisation - progress update

Committee Strategy and Programmes

Date of meeting 10 May 2019

Date of report 17 April 2019

Report by Senior Director

1. Object of report

To provide to the Committee a progress update on the Subway modernisation programme.

2. Background

The Subway modernisation programme is the most significant investment and improvement programme to be undertaken in the Subway within the last 40 years.

The business case for this investment was approved by the Scottish Government in 2012, with an overall aim, once complete, of increasing passenger numbers and usage of the subway whilst at the same time reducing whole life costs.

The programme was scoped for delivery under five principle workstreams, namely:

- Stations and accessibility improvements;
- New Ticketing System;
- Renewal and Upgrade of Existing Infrastructure & Depot Facilities;
- New Rolling Stock, Signalling and Automated Control Systems; and
- Organisational Change and Employee Relations.

As part of the internal governance of the modernisation programme, a formal update is provided to the Partnership board every six months in addition to the day-to-day operations performance which is reported to the Operations Committee and financial performance to the Strategy and Programmes Committee.

This report provides an update on the key areas of progress since the last written report to the Partnership board in December 2018 and is provided to this S&P Committee to assist in the transition period with the Senior Director leaving SPT prior to the next main update to the Partnership Board on 17th June 2019.

3. Progress to date

3.1 Stations and accessibility

Members are asked to note that 11 out of a total of 15 stations have now been refurbished, these are: Hillhead, Partick (including the Bus Interchange), Ibrox, Kelvinhall, St Enoch, Buchanan Street, Govan (including the Bus Interchange), Cessnock, Kelvinbridge, Shields Road and Bridge Street. Of the four stations remaining, refurbishment works at two further stations (St Georges Cross and Cowcaddens) are ongoing. Refurbishment of the final two stations at Kinning Park and West Street will commence by autumn 2019.

Key areas of progress on this workstream since the last update are:

- Refurbishment work began at St Georges Cross in October and at Cowcaddens in November 2018. Both are on programme and scheduled to complete by summer 2019.
- As part of the works planning for station refurbishment of the remaining Subway stations, design interface work continues with the new Rolling Stock & Control Systems (RS&CS) contractor (ANSTA JV) to capture any RS&CS requirements at these sites.
- The programme of activity to strip out legacy redundant equipment and cabling in all stations continues. This work is being undertaken by our internal maintenance teams and will free up space prior to, or in conjunction with, the installation of new equipment being provided under the new Rolling Stock & Control Systems project.
- The RS&CS installation works have now also commenced at various stations, undertaking enabling works and cable containment in preparation for the new signalling and control equipment. This activity started at Govan Station in April 2019 and works have now progressed at a number of station sites on the south of the Subway system.
- A contract to address water ingress at stations was awarded to MacKenzie Construction in September 2018 and the initial works scope defined was completed in March 2019. Given the variable nature of water ingress problems, the contract was awarded to allow flexibility for additional scope to address arising/emerging issues. There are a few areas of the system where further works have been instructed to resolve water ingress this financial year.
- Works have also been undertaken at Subway stations to increase park and ride spaces within the existing SPT land boundary. A contract was awarded to Luddon to undertake the works. The improvements at Bridge Street were completed in November 2018 (increase from 158 spaces to 183) and works at Shields Road were completed in April 2019 (increase from 814 spaces to 839).

3.2 Ticketing

A separate report on ticketing has been provided to this Committee meeting and this includes all aspects relating to subway ticketing.

3.3 Infrastructure

Works have continued on the infrastructure workstream with an ongoing focus to complete the key activities and remedial works across tunnel, track and line assets, in readiness for new system and train testing on the system. Key progress made since the last update is as follows:

- The contractual close out for Ramps & Turnouts renewal works was completed.
- During the detailed investigations for the design of the new train units, areas of the tunnel system were identified that required clearance improvement in advance of train testing. A programme of works has been defined and our internal teams, supplemented where required with specialist support, are progressing this work for completion in 2019.
- Our internal teams also continue to progress and close out improvement activities on the track assets within the system and yard. Work has commenced to establish a prioritised programme of track geometry improvements that can be implemented prior to, and beyond, introduction of new trains. This will ensure long term passenger benefits of improved ride quality as well as improved asset management of our track with resultant lower whole life costs.
- Design, build and pre-operation assurance for the long welded rail carrier is now complete. Factory testing has been successfully completed and the carrier is scheduled for introduction to service to support re-railing works in this financial year. A separate paper seeking the award of contract for rail welding services is being presented for this committee.
- Investigations and assessments have also progressed to confirm the condition and longevity of legacy electrical, telecoms and IT assets that will remain and operate in conjunction with the new system. A key asset being assessed is traction power and now that the ANSTA JV designs are confirmed, SPT is undertaking an option appraisal to firstly ensure we mitigate any interface and integration issues with the new trains and signalling systems whilst at the same time examining long term improvements to maximise energy efficiency throughout the system.

3.4 Broomloan depot facilities

Work activity to ensure the integrity, reliability and longevity of key assets within Broomloan Depot, in conjunction with readiness and preparedness for new asset introduction, continues at pace. The key areas of progress on this workstream are:

- The stabling shed roof refurbishment contract, awarded to Clark Contracts Ltd, is progressing well. The works are being delivered in three phases across the full building structure. Phase one to the west is now complete; phase two is substantially complete with the final phase three to follow. The works include structural repairs, strengthening works and full roof replacement on the existing stabling shed building. This has required temporary long-term train stabling and electrical isolation arrangements for two track roads into the shed whilst the works are ongoing. The subway operational and maintenance teams continue to manage this constraint well and without any major impact on day-to-day depot operations and/or revenue service.
- ANSTA JV continues to develop the stabling shed extension design being delivered under the RS&CS contract. The ground investigation works have recently commenced on site and the design is now planned to complete in time for the JV to be ready to commence the extension after the completion of the existing shed roof refurbishment works by Clarks.
- The construction of a new Operational Control Centre (OCC) is well underway. The building construction is being delivered by Graham Construction Limited under sub-contract to ANSTA JV. Since the last update, work to external walls and roofing is now complete with the base internal fit out and building services installation currently on-going. The building is scheduled to be completed by autumn 2019, following which the ANSTA JV will commence the installation of new system equipment.

- Work also continues to modify the depot maintenance workshop to accommodate a wheel lathe and lifting jacks required as part of the maintenance system for the new rolling stock. This work is also being delivered by Graham Construction Limited on behalf of ANSTA JV. Works include modifications to the workshop structure, building services and installation of new plant and equipment. Works completed to date include reconfiguration of existing storage rooms, associated building services changes, the construction of new road pits and installation of foundation supports in advance of new plant and equipment arriving in the summer. This work necessitated significant enabling works and internal reconfiguration of parts of the maintenance shed area by our internal maintenance team and has been managed without any major impact on day to day operations.
- Other works planned at the depot include the installation of a new carriage wash and automatic train inspection equipment. Final design work by ANSTA JV for these new assets is nearing completion in preparation for installation within the yard as part of the upcoming programme of works planned by ANSTA JV in 2019.

3.5 New Rolling Stock and Control Systems

All of the following activity is being delivered by the ANSTA JV and their sub-contract/supply chain.

- The Manufacturer Depot and Testing Facility at Edmiston Drive has developed significantly since the last update. Constructed by Story Rail on behalf of ANSTA JV, following completion of site level profiling, the two operational buildings have now been constructed and the depot and test tracks have been installed. Works continue to complete site fencing and protection, road and pedestrian access and hard and soft landscaping. New third rail infrastructure has been installed and will be energised shortly, pending completion of all other works. This site will remain under the control and operation of the ANSTA JV for reception, storage, testing and modification of the new train units and will also act as the main works depot for system installation activity. The site is physically separated by security fencing from SPT's operational depot but the new test track does connect into SPT's yard track as this will be the future access route for vehicles entering into mainline testing in the system. The site works are due to complete by summer 2019.
- Factory assembly and manufacturer initial testing of the first new train is complete and plans are in progress to transport the first new train unit to the ANSTA Manufacturer Depot & Test Facility in Glasgow in May 2019. Once in Glasgow the vehicle will be readied to begin its full testing programme. A number of design modifications have been identified during the factory acceptance tests conducted to date. The modifications will be implemented at the ANSTA Depot in conjunction with the commencement of testing. The next two train units will be delivered in summer 2019 and commence testing and commissioning alongside unit one. There will be an extended period of offline testing conducted at the ANSTA test facility for these first three units before any other units go into production and transported to Glasgow. Following off-line testing there will be a period of mainline testing in the tunnel system, prior to staged introduction of new fleet into service. Given that the mainline testing will require night-time running, preparations are already underway to ensure the impacts of this are understood, managed and mitigated.
- Design of the signalling, telecoms and control systems as part of the new integrated system has continued to progress, with development of the migration strategies for the various control systems underway. This is in preparation for

the new equipment installation which is scheduled to begin after the summer. Given the complexity of the install and potential impacts to the operational and passenger environments from these works, detailed planning and scrutiny of contractor methodologies is ongoing to ensure these works are well coordinated with day-to-day operations and also other project and maintenance activity. Preparation works for the cable containment system within the stations has already commenced on site, as reported in section 3.1 of this report. .

- Concurrent to the final installation design development, the ANSTA JV has commenced factory acceptance and functional and integration testing for new assets, which has seen SPT staff in attendance at various international supplier facilities to witness these tests. This testing phase is gathering pace and is expected to reach a peak towards the latter part of the year.
- Commissioning of the CCTV system installed at SPT head office, Seaward Street facility and in bus stations, has been impacted due to delays in the close out of installation snagging works. The CCTV install is being delivered by the ANSTA JV as part of the improvement of corporate systems capital investment strategy. ANSTA JV continues to address this with their sub-contractor (OSL) and mitigations are in place to ensure operations affected can continue to rely on existing systems until new system handover. Following completion, ANSTA will move to install the new CCTV system for Subway later in the year.
- SPT continues to see improvement in the evidence provided by ANSTA JV to demonstrate the safety argument to show that design risk for the RS&CS Integrated System has been managed to a level 'As Low As Reasonably Practicable' (ALARP), as required under SPT's Safety Verification (SV) Scheme and in line with Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) requirements. The SV team has defined and commenced a suite of audits that will validate that the ANSTA JV has followed their documented and agreed project processes. These audits will allow the SV team to demonstrate that the safety argument has been presented in a fully traceable and compliant manner.

3.6 Manufacturing & Supply Agreement (MSA)

Members will recall all design, manufacturing, construction, installation and testing/commissioning work delivered by the ANSTA JV is under the Manufacturing & Supply Agreement contract. Following the re-baseline of the MSA delivery programme as reported at the last update, there has been significant progress made on works being delivered under the MSA contract. This is, however, a complex and challenging programme of works to deliver and the latest forecasts from ANSTA JV indicate there is forecast slippage to some key delivery dates, though ANSTA JV are working on mitigations to protect the impact to the final end date, which has seen some slight slippage forecast by ANSTA of 1 month since the last report. As advised at the last Partnership update, risk does however remain, as would be expected in a project of this type and scale. The next major phase of works – installing and migrating to the new control, signalling and telecoms systems, is the most challenging and is the critical path for the start of mainline train testing and fleet introduction to passenger service. SPT is working closely with ANSTA JV to identify and quantify the time risk associated with these activities to ensure ongoing forecasting is robust and risks are being adequately managed and reported.

As reported previously, ANSTA JV proposed a number of cost variations linked to the re-baselining of the programme and issues and opportunities encountered. A number of these have been agreed, which to date results in a net saving to SPT. A number of elements remain under review and challenge by SPT, in line with the contract process.

3.7 Technical Support and Spares Supply Agreement (TSSSA)

The Technical Support and Spares Supply Agreement contract with the ANSTA JV continues to progress. Under the TSSSA contract, ANSTA JV will take responsibility for management of the Subway material stores and spares supply for new assets. Since the last update, the area of the stores handed over to the ANSTA JV has now been fitted with new racking and lockable storage with new IT equipment and office furniture installation underway. Delivery of new spares materials for new assets has already begun. Whilst ANSTA JV is responsible for the supply of spares, SPT will still operate and manage a store for the legacy systems and assets. For efficiency, a variation agreement has been reached whereby SPT will provide stores personnel to manage both existing and new stock at Broomloan stores, negating the need for ANSTA JV staff for this element of the TSSSA contract. This results in a cost saving to SPT in the TSSSA contract. A software bridge between SPT's INFOR system and the Stadler version is being designed to allow fully auditable transactions and information sharing to take place between the two systems.

Two SPT staff started secondments to the TSSSA team in February 2019 and are benefitting from specialist training and direct involvement in the testing and commissioning phase. The secondees form part of the TSSSA team delivering technical support to SPT for the duration of the contract. The secondment agreement was established to ensure that, as new assets are being manufactured and tested, SPT staff have practical frontline involvement in order to learn and embed maintenance requirements prior to new asset arrival in Glasgow. The two members of SPT's maintenance team are currently working in various Stadler facilities across mainland Europe. Over time, these secondees will also help support the SPT training team to develop tailored training packages, thereby helping to secure knowledge transfer in the longer term, in preparedness of the task of training and developing the wider workforce. The provision of two SPT staff via secondments to the ANSTA JV technical support team also results in a cost saving to SPT for this element of the TSSSA contract.

The contract activity and associated payment profile for the TSSSA contract was agreed following the re-baselining of the MSA contract. Progress of the MSA and interaction between the two contract programmes is closely monitored. As noted above the two variations on the TSSSA contract relating to stores personnel and technical support secondments being provided by SPT have resulted in cost savings against the approved contract value.

3.8 Organisational Change and Employee Relations (including operational readiness)

As previously advised, a key part of our modernisation programme is ensuring operational readiness. Plans are being continually developed and implemented for all internal operations, engineering and maintenance activities required to prepare teams to operate and maintain our new assets safely, whilst protecting and ensuring continuity of revenue service.

Employee engagement across Subway continues in line with the programme. Drone footage, site visits and roadshows at each of our main operational sites (131 St Vincent St, Buchanan Bus Station and Broomloan Depot), have also helped to update all SPT staff on progress so far. Subway staff have also been given early access to new plant, equipment and software in order to start the familiarisation process ahead of formal training.

Trade Union and Safety representatives are briefed on progress regularly as part of our standing local Information and Consultation of Employees (ICE) meetings and safety

committee. These meetings allow the management team to demonstrate and encourage early, two-way dialogue on any potential issues arising.

Our continued focus on building resilience, competence and flexibility within our resource plans has opened up a range of development opportunities to our current staff. Within Subway Operations, around half of our staff are now fully competent in more than one service delivery function, demonstrating personal flexibility and capability in return for our increased investment in their learning and development. This strategy is particularly important ahead of the critical migration phases from re-control to the new OCC and the subsequent steps towards Unattended Train Operation (UTO).

SPT has accessed the Flexible Workforce Development Fund to secure basic electrical skills training for maintenance staff with a mechanical-bias currently and forms part of the broader training plan designed to bridge the gap between current and new technologies as far as it is possible to do so.

The Modern and Mature (Adult) apprenticeship schemes launched last year continue to progress. Our five apprentices have performed well in their first year at College on a full-time basis; when they revert to a day-release programme, their time on-site at SPT will be focused on involvement in the testing and commissioning activity for our new assets, creating a pathway to future technician roles. Further Mature apprenticeships are under consideration as this provides an excellent path to upskilling staff for the new technology being deployed.

Engagement with the Office of Road and Rail (ORR) has continued on a regular basis, with the six-month modernisation update held in December 2018 and routine three-month liaison meeting in March 2019. Relations with the ORR are good and SPT will continue to proactively engage with the ORR to ensure the future Authorisation and Certification requirements and expectations are clearly understood for the key operational changes as we progress towards unattended train operation.

As part of the preparedness for new system operational authorisation and certification, we have undertaken an assessment of the existing Subway operational rule book, regulations and process and procedure to understand how this will need to develop and change to be suitable for a modern, technologically controlled railway. A working group has been set up to map out the changes required and specialist support resource necessary to undertake this significant and critical task. The aim will be to deliver a new suite of Operating Procedures that are relevant and usable at all times during the transition and migration from old to new operations and into the future, prior to switch over to the new control and signalling system.

At the same time, all Safety Management System (SMS) documentation has been analysed, and updates are underway against a defined transition plan for each key operational change being delivered by project activity so that the SMS documentation is kept up to date, worthy of scrutiny by the ORR, and relevant to all staff.

3.9 Further information

3.9.1 Independent Competent Person (ICP) Contract

The Independent Competent Person (ICP) contract was awarded to Racon/Ricardo Rail in June 2014 and is a key support contract to SPT for Subway Modernisation delivery, providing independent verification (required under regulation and Subway's Safety Verification Scheme), that SPT and ANSTA JV are designing and delivering a safe transport system. This contract was a reimbursable (time and expenses) form of

contract and at the time of award, had an initial budget estimate of contract value circa £600k based on an estimate of four years' duration. The service has been delivered in line with the original budget estimate and will expire in June 2019. There is a need for ongoing ICP services, in order in to provide the full independent verification of all upcoming project phases in support of successfully achieving ORR Authorisation and Certification for the future Unattended Train Operation and technologically upgraded system.

With the level and duration of involvement of the ICP in the progression of designs and works to date and the expectations of the ORR on continuity of verifiers throughout the process, it would be very difficult to openly re-tender this service without a significant risk of programme delay or undermining the independent verification evidence already established. It is therefore proposed to extend the existing contract up to four years, at a further budget estimate of £600k. This remains a necessary service requirement for SPT to fulfil its regulatory and safety obligations. This additional spend is included and can be accommodated in the current modernisation programme budget forecasts.

3.9.2 Secure Communications Network

Subway currently uses the Home Office Airwave secure radio communications network for all operational communications and also to facilitate emergency services communications within the system. The Home Office currently has a replacement programme underway to change from Airwave to a new 4G mobile Emergency Services Network (ESN) being delivered by EE & Motorola. Upon roll-out of ESN, the Airwave service will be turned off as the secure radio frequencies used are MOD restricted. This switch over was originally planned for the end of 2019, however there has been significant delay to the Home Office roll-out programme. There is now a need to extend the current Airwave contract and also upgrade some of the existing infrastructure to ensure the system is robust and can interface with the new control system and trains. The current Airwave contract expires in December 2019 and negotiations are ongoing with Motorola Airwave on the extension requirements. This will be further reported and extension approval sought in a future committee report.

3.9.3 ANSTA JV update

In March 2019, ANSTA JV confirmed the Ansaldo STS rebrand to Hitachi STS, though legal standing as a registered company has not changed. For the purposes of the MSA contract and SPT reporting, the unincorporated joint venture between the now named Hitachi STS and Stadler will remain known as the ANSTA JV.

As previously reported the ANSTA JV team continues to grow and they have now re-located from Broomloan Depot to offices at Ibrox stadium, adjacent to their Manufacturer Depot, though both JV partners still have their main operational offices and facilities in mainland Europe.

3.10 Programme budget

Within the overall Subway Modernisation budget of £288.7m, the 2018/19 budget was set at £52.935m at the SPT Partnership meeting of 23 February 2018 and amended to £50.359m at the Strategy & Programmes Committee on 8 February 2019.

Final spend for 2018/19 (subject to audit) amounted to £44.941m. Cumulatively, £149.600m has been incurred against the total budget of £288.7m on the programme.

Overall, the subway modernisation capital programme remains within the approved budget and available funding.

As noted in 3.6, there are cost variations proposed for the MSA contract currently under review. The proposed variations are within the overall budget for the programme.

4. Conclusions

In conclusion good progress continues to be made across all subway modernisation workstreams, as follows:-

- station refurbishment works continue to progress well with works planned to start on the last two stations later this year, with all fifteen stations complete by 2020.
- progress on infrastructure and depot improvements and readiness in advance of new train arrival and testing continues
- a key milestone is achieved with delivery of the first new train unit in May 2019 to commence the initial phase of offline testing at ANSTA JV testing facility at Edmiston Drive
- ongoing progress of the signalling and control aspects of the modernisation programme will be a critical area in the year ahead, especially installation of the equipment in stations and tunnel.
- some minor slippage has been forecast in the MSA programme end date and risk remains, especially in the installation and testing phased ahead. This, and any impacts to TSSSA, will be carefully monitored
- continued progress on operational readiness activity and engagement with staff and trade unions regarding future operational needs and changes
- overseas travel will continue to be an essential requirement for the project delivery team over the next year for various testing, familiarisation and acceptance phases
- key SPT support and service contracts remain necessary to safely and robustly manage the programme. These will need to be extended/varied to meet the needs of the programme delivery as each contract reaches expiry/agreed limits
- the subway modernisation capital programme remains within the approved budget of £288.7m and available funding

5. Committee action

The Committee is recommended to note:

- the progress made since the last written update to the Partnership in December 2018;
- the on-going programme of implementation of station improvements, with site works nearing completion at both St Georges Cross and Cowcaddens;
- progress on the infrastructure workstream in preparation of train testing;
- ongoing improvements of the facilities at Broomloan Depot continue in readiness for the introduction of the new rolling stock and control systems. Works to refurbish the stabling shed roof, install the new wheel lathe and construct the new OCC building continue to progress well;
- a significant milestone progress has been made on the new rolling stock and control systems activity, with new train unit delivery underway,

- following initial train delivery, there will be an extended period of time required for the necessary testing and commissioning and safety approvals prior to operational use;
- slippage to programme forecasts for the MSA contract with final operational dates impacted by approximately one month, with ongoing assessment of programme risks;
- progress on works and activity under the TSSSA contract with the two staff secondments now established and the stores personnel being provided by SPT, with resultant cost savings in the TSSSA contract;
- in-house activity towards operational readiness and staff engagement continues;
- the ongoing positive engagement with the ORR;
- the variation to extend the Independent Competent Person contract, which is necessary to ensure we adhere to our Safety Verification Scheme requirements;
- the future need to extend the Airwave contract which will come to a future committee/Partnership meeting; and
- the programme is within overall budget and funding.

6. Consequences

Policy consequences	<i>The subway modernisation is a key objective of the Regional Transport Strategy.</i>
Legal consequences	<i>None identified within this report.</i>
Financial consequences	<i>Overall the proposed works remain within the allocated capital and revenue budgets and subway modernisation business case.</i>
Personnel consequences	<i>No significant changes within this report. Though significant changes are expected as the operational readiness programme is developed.</i>
Equalities consequences	<i>None within this report.</i>
Risk consequences	<i>None within this report. A detailed risk register is available for individual projects and the modernisation programme as a whole.</i>

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