# Technical Note No. 4 – Infrastructure Costs, Phasing and Construction

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| **Project name:** | Trams to Granton, Bioquarter and beyond | **Reviewed by:** | Grant Davidson |
| **Project no:** | B2340264 | | |

## 1. Purpose

The purpose of this Technical Note is to provide analysis and commentary on the following:

1) Benchmarking-based forecast of infrastructure costs associated with the delivery of the North-South Tram project to support and validate the primary bottom-up estimates;
2) Summary of structures analysis and cost implications;
3) Phasing options and implications; and
4) Technical and engineering factors relating to future construction.

## 2. Infrastructure Costs

### 2.1 Costing Basis and Assumptions

At Strategic Business Case (SBC) stage, the technical design of the route is at an early stage. The estimation of cost is therefore aligned to this level of detail, and recognised mechanisms are used to account for uncertainties and unknowns. A more detailed approach takes place later in the business case lifecycle in order to more accurately inform funding requirements and construction contracts.

In order to better inform the SBC process, three principals have been adopted:

- Disaggregation of the route into sections that reflect the technical complexities and subsequent cost envelope;
- Identification of individual infrastructure elements that are likely to have a significant impact on costs and treating these separately from the route section analysis (e.g. major structures); and
- Applying construction rates that are based on outturn information from similar projects.

In addition to this, SBC guidance requires practitioners to recognise and account for factors that impact the derivation and estimation of scheme costs at early stage development. This is recognised in HM Treasury guidance for the assessment of schemes, and requires practitioners to apply risk and optimism bias (OB) uplifts to forecast infrastructure costs in order to give a more robust assessment. In future stages of scheme development (outline and final business case), the OB percentage reduces in line with better understanding of the technical solutions and associated cost envelope. Quantative Risk Assessment (QRA) is also applied during these later stages to disaggregate and better understand issues of risk, uncertainty and contingency.

Constructed schemes have a range of values that are significantly different from one another, which reflects the technical challenges posed and associated works required in that specific location. In terms of benchmarking using recent data, Manchester Metrolink and Edinburgh Tram itself provide key data points. The benchmark schemes are set out in the table below.

| Project | Year | Length (km) | Cost £m (at 2025/26 prices)* | Cost £m per km (at 2025/26 prices) |
|---|---|---|---|---|
| Edinburgh Tram – Trams to Newhaven | 2023 | 4.7 | 252**[1] | 53.6** |
| Manchester Metrolink – Trafford Park Extension | 2017 | 5.5 | 494[2] | 89.8 |
| Edinburgh Tram – Airport to York Place | 2014 | 14 | 1290[3] | 92.1 |
| Manchester Metrolink – Phase 3b Airport section only | 2014 | 14.5 | 661[4] | 45.6 |
| Manchester Metrolink – Phase 3a Rochdale / Oldham / Droylsden | 2011/2013 | 32.4 | 971[5] | 30.0 |
| Nottingham Express Transit – Line 1 | 2004 | 14.4 | 481[6] | 33.4 |
| Manchester Metrolink – Phase 2 Eccles | 2000 | 6.4 | 431[7] | 67.3 |

* this uses construction price index to standardise prices at 2025/26 levels for comparison
** this figure does not include utilities works that were undertaken as part of the previous (2014) tram works.

As can be seen from the table above, there is a wide range of values (~£30m per km to ~£90m per km), and it is necessary to consider the context of each of these applications in order to be able to select appropriate rates to apply on this project. It is also important to note that these are delivery prices and care has to be taken to understand potential disaggregation of costs and/or inclusion/non-inclusion of vehicle costs and similar.

| Project | Rank (1 most expensive, 7 least expensive, per km) | Notes |
|---|---|---|
| Edinburgh Tram – Airport to York Place | 1 - £92.1m | Dense urban through to peri-urban, on-street and segregated, historic locations, major new structures |
| Manchester Metrolink – Trafford Park Extension | 2 - £89.8m | Dense urban, on-street, major new structures, extensive placemaking, |
| Manchester Metrolink – Phase 2 Eccles | 3 - £67.3m | Urban, mix of on-street and segregated running, redevelopment area with fewer constraints |
| Edinburgh Tram – Trams to Newhaven | 4 - £53.6m | Dense urban, on-street, historic locations (some utility diversion costs already taken under Airport to York Place stage) |
| Manchester Metrolink – Phase 3b Airport section only | 5 - £45.6m | Urban/peri-urban, extensive use of segregated alignments next to roads (interaction at junction etc). |
| Nottingham Express Transit | 6 - £33.4m | Mixed route type, extensive running adjacent to existing rail route, extensive segregated running beside or remote from roads, major new structures |
| Manchester Metrolink – Phase 3a Rochdale / Oldham / Droylsden | 7 - £30.0m | Urban/peri-urban/countryside, almost entirely using previous heavy rail routes |

In order to provide a series of top-down estimates for each of the line sections, the benchmarking data has been used to develop a set of applicable rates as follows:

[1] https://www.edinburgh.gov.uk/tramstonewhaven/faqs/full-business-case-questions-answered

[2] https://www.eib.org/en/projects/pipelines/all/20180016

[3] https://www.edinburghtraminquiry.org/final_report/the-inquiry-report/

[4] https://www.manchestereveningnews.co.uk/news/video-manchester-airport-metrolink-line-7300833

[5] "Metrolink Phase 3, Monitoring and Evaluation Early Findings Report", TfGM 2016

[6] https://hansard.parliament.uk/%E2%80%8CCommons/2007-06-19/debates/07061962000031/NottinghamExpressTransitTramway

[7] https://lrta.info/archive/Manchester/funding.html

| Name | Description | Rate per km (2025/26) |
|---|---|---|
| Development Area – segregated running | Area of major redevelopment/modern development, segregated tram operation in planned location with limited or no interaction with other traffic | £32m |
| Development Area – on-street | Area of major redevelopment/modern development, tram operation mixed with or high degree of interaction with other traffic | £39m |
| Suburban on-street | Lower density, tram operation mixed with or high degree of interaction with other traffic | £45m |
| Urban – historic, on-street | High density, historic streets, high degree of constraint, city centre or edge-of-centre location | £71m |
| Urban – on-street | High/Medium density, city street, less constrained than edge-of-centre | £58m |
| Suburban - segregated running | Lower density, segregated tram operation with limited or no interaction with other traffic | £32m |

## 2.2 Granton to Existing Line (Princes Street) via Orchard Brae

| Element | Classification | Length km (if applicable) | Rate per km | Section Total |
|---|---|---|---|---|
| Granton Square to W Granton Road | Development area, protected alignment adjacent to street | 1.4 | £32m | £45m |
| W Granton Road to Ferry Road | Modern alignment, adjacent to street | 1.0 | £39m | £39m |
| Ferry Road to Craigleith Road | Suburban, on-street, property requirements | 1.5 | £45m | £68m |
| Orchard Brae | On-street, 7% gradient incline | 0.5 | £58m | £29m |
| Queensferry Road | Historic street environment, on-street | 0.5 | £58m | £29m |
| Dean Bridge (slab) | 'A' Listed. Major works required. Track slab. | n/a | n/a | £25m |
| Dean Bridge (future strengthening) | 'A' Listed. Works to strengthen structure in future through tram operation. | n/a | n/a | £100m |
| Lynedoch Place / Queensferry Street | Historic street environment, on-street | 0.4 | £71m | £28m |
| **High-Level Estimate** | | | | **£363m** |

## 2.3 Granton to Existing Line (Haymarket Western Approach) via Roseburn

| Element | Classification | Length km (if applicable) | Rate | Section Total |
|---|---|---|---|---|
| Granton Square to W Granton Road | Development area, protected alignment adjacent to street | 1.4 | £32m | £45m |
| W Granton Road to Ferry Road | Modern alignment, adjacent to street | 1.0 | £39m | £39m |
| Ferry Road to Telford Road | Former railway alignment, off-street | 0.8 | £32m | £26m |
| Telford Road to Craigleith proposed stop | Former railway alignment, off-street | 0.3 | £32m | £10m |
| Craigleith proposed stop to Roseburn proposed stop | Former railway alignment, off-street, single track | 1.6 | £32m | £51m |
| Roseburn proposed stop to west of Haymarket | Former railway alignment, off-street | 0.4 | £32m | £13m |
| Roseburn corridor works | Environmental improvements | 3.0 | £4m | £12m |
| Structures on corridor | Coltbridge Viaduct and replacement / modified structures | n/a | £25m | £25m |
| **High-Level Estimate** | | | | **£220m** |

## 2.4 Granton to Existing Line (Haymarket Western Approach) via Roseburn (Telford Road)

| Element | Classification | Length km (if applicable) | Rate | Section Total |
|---|---|---|---|---|
| Granton Square to W Granton Road | Development area, protected alignment adjacent to street | 1.4 | £32m | £45m |
| W Granton Road to Ferry Road | Modern alignment, adjacent to street | 1.0 | £39m | £39m |
| Telford Road (alternative) | Modern alignment, on-street. Property requirements | 1.1 | £45m | £50m |
| Telford Road to Craigleith proposed stop | Former railway alignment, off-street | 0.3 | £32m | £10m |
| Craigleith proposed stop to Roseburn proposed stop | Former railway alignment, off-street, single track | 1.6 | £32m | £51m |
| Roseburn proposed stop to west of Haymarket | Former railway alignment, off-street | 0.4 | £32m | £13m |
| Roseburn corridor works | Environmental improvements | 3.0 | £4m | £12m |
| Structures on corridor | Coltbridge Viaduct and replacement / modified structures | n/a | £25m | £25m |
| Telford Road viaduct | Structure | n/a | £5m | £5m |
| **High-Level Estimate** | | | | **£249m** |

## 2.5 South St Andrew Street – Shawfair via Bioquarter

| Element | Classification | Length km (if applicable) | Rate | Section Total |
|---|---|---|---|---|
| Delta Junction | Junction works | n/a | £20m | £20m |
| S St Andrew Street to North Bridge | Historic street environment, on-street | 0.2 | £71m | £14m |
| North Bridge/South Bridge to South College Street | Historic street environment, on-street | 0.7 | £71m | £50m |
| North Bridge | 'A' Listed. Historic structure. Major works required. | n/a | n/a | £20m* |
| South Bridge | 'B' Listed. Historic structure. Major works required. | n/a | n/a | £70m |
| South College Street to West Preston Street | Historic street environment, on-street | 1.0 | £71m | £71m |
| West Preston Street to Liberton Road | Suburban, on-street | 1.6 | £58m | £93m |
| South Suburban Railway overbridge | Bridge over existing railway line (south suburban) | n/a | £3m | £3m |
| Liberton Road to Sharpdale Loan | Suburban, off-street | 0.4 | £39m | £16m |
| Sharpdale Loan to Little France Drive | Peri-urban, on-street | 2.0 | £45m | £90m |
| Little France Drive to Tobias Street | Development area, protected alignment | 0.9 | £32m | £29m |
| Tobias Street to Shawfair | Peri-urban, development area, off- or on-street | 2.6 | £39m | £101m |
| **High-Level Estimate** | | | | **£577m** |

* based on current scheme having delivered primary load strengthening for tram operations.

Completing these high-level construction estimates requires the application of (i) risk/contingency, (ii) optimism bias (OB), and (iii) adding allowance for depot and land purchase. The OB has been applied using three bands. Normally, at this stage, guidance and practice would apply a 60% figure. This has been applied for most elements, but there are four structures that require a more bespoke approach; informed by the current North Bridge Project and the work undertaken as part of Report 4 – Bridges and Structures. We have applied an OB level of 100% to cost estimates relating to Dean Bridge and the South Suburban Line bridge to reflect (i) the almost unique nature of the Dean Bridge structure, and (ii) the potential cost escalation from a relatively low base position on the Newington Railway Bridge. For North Bridge and South

Bridge, the scale of cost escalation on the current works is indicative of the technical challenges and bespoke solutions nature of these historic structures. For that reason, it is considered prudent at this stage to adopt a 150% OB level until more detailed structural assessment can be undertaken to validate cost estimates.

The calculation of total infrastructure cost estimate is shown in the table below. Note that figures are rounded to the nearest £1m.

| Element | Full route via Orchard Brae | Full route via Roseburn Path | Full route via Roseburn (Telford Road variant) |
|---|---|---|---|
| Base cost (2025/26) | £939m | £797m | £825m |
| Contingency @20% | £188m | £159m | £165m |
| Total (2025/26) | £1127m | £956m | £990m |
| OB @60% (general elements and new build) | £519m | £507m | £527m |
| OB @100% (Dean Bridge and Newington Railway Bridge) | £154m | £4m | £4m |
| OB @150% (North and South Bridges) | £162m | £162m | £162m |
| Total 2025/26 (incl OB) | £1,962m | £1,628m | £1,683m |
| Depot / Land (incl OB) | £160m | £160m | £160m |
| **Total** | **£2,122m** | **£1,788m** | **£1,843m** |

It is important to stress that these are necessarily calculated as point values, but the purpose of undertaking this top-down analysis is to provide validation to the infrastructure cost estimation element of the more detailed and comprehensive bottom-up analysis. The cost estimates derived through that more detailed build-up are quoted as range values, which is consistent with the level of scheme development, and important in not giving a false impression of certainty around a point value.

Looking at the route as a whole (Granton to Shawfair), and taking the Roseburn Path option as the base (100%), then Orchard Brae is around 19% more expensive (~£330m) and the Telford Road variant is around 3% more expensive (~£55m). The differences are all driven by the alternative option in the north-east part of the overall route as the southern section is consistent among the options.

Directly comparing the options in the north-east section only (i.e. excluding depot and SE section), the cost estimate are set out in the following table. Note that figures are rounded to the nearest £1m.

| Element | Orchard Brae | Roseburn Path | Roseburn (Telford Road variant) |
|---|---|---|---|
| Base cost (2025/26) | £363m | £220m | £249m |
| Contingency @20% | £73m | £44m | £50m |
| Total (2025/26) | £435m | £264m | £299m |
| OB @60% (general elements and new build) | £171m | £158m | £179m |
| OB @100% (Dean Bridge and Newington Railway Bridge) | £150m | n/a | n/a |
| OB @150% (North and South Bridges) | n/a | n/a | n/a |
| **Total** | **£756m** | **£422m** | **£478m** |

- Orchard Brae £756m (~79% more expensive than Roseburn Path)
- Roseburn Path £422m
- Telford Road variant £478m (~13% more expensive than the Roseburn Path)

The standalone cost for the south-east section (including depot) is £1,366m (this is the same across all three options).

The cost differential between the Roseburn Path option and Telford Road variant is driven by:

- The provision of a new structure to facilitate tram movement between Roseburn Path and Telford Road; and
- The more complex construction and operating environment along Telford Road and Crewe Toll (utility diversion, on-street construction solutions, junction control, etc).

The more significant cost differential between the Roseburn Path option and the Orchard Brae option is driven by a number of key elements:

- The more complex construction environment along the majority of the route (utility diversion, on-street construction solutions, etc.);
- The more complex operating environment along the majority of the route (allocation of roadspace, junction control, stop location/operations, etc.); and
- The specific and exceptional costs associated with providing an effective and safe solution to tram operations across Dean Bridge, in keeping with its historic status.

It is also noted that at this stage, no differential costing has been introduced to reflect the Transport and Works (Scotland) Act 2007 (TAWS) order process (that could be significantly different for the three north-east route options). This is due to (i) the 'all-up' nature of the applied rates that, taken at a project level, are sufficiently robust at this stage to account for this, and (ii) to simplify effective comparison among the options by reducing the number of variables. In further stages of design and business case development, it will be necessary to split out these costs as part of the general disaggregation.

These cost estimates represent the 'top-down' approach through the application of 'all-up' rates for the overall infrastructure. This is mirrored by a 'bottom-up' approach in the SBC that takes a more disaggregated methodology and build up. The 'bottom-up' approach is necessarily still matched with the level of technical detail currently available, but the comparison of the results from these two approaches should give a greater degree of confidence in the cost 'envelope' for the options.

# 3. Summary of Structure Analysis and Costing

In order to inform the SBC analysis and cost estimation, a review of significant structures along the length of the route has been undertaken. Separate reports for each structure have been produced. At this time, no intrusive work has been undertaken, and these are desktop reports based on the available information regarding each structure, and any previous design work undertaken. The structures split into three broad categories:

- Major structures;
- New/replacement structures; and
- Modified structures.

## 3.1 Major Structures

There are three structures that come under this category, that are all significantly different in their structural form and design:

- Dean Bridge;
- North Bridge; and
- South Bridge.

**Dean Bridge** is part of the Orchard Brae option alignment on the north-west part of the route. The bridge was designed by Thomas Telford and constructed in the late 1820s. This historic Category A listed structure has a unique form of construction with principal internal elements designed hollow (piers and arch spans), by Telford to reduce the total mass of the structure, relative to the bearing capacity of the underlying strata layers. The proposal to increase the mass of Dean Bridge by various options to accommodate tram loading, may well affect the structural viability of the original design, which was not designed for rail loading. Given the Category A status and setting, replacement of the bridge is not considered to be a viable option.

Based upon the considered information, it is strongly recommended that an alternative route be taken forward in lieu of the Dean Bridge routing proposal, as this would mitigate the concerns pertaining to modifying the structure to accommodate trams and their operation.

It is difficult to overstate the level of potential risks inherent in modifying this structure to be capable of safely accommodating tram operations. Uppermost, there are significant risks in relation to confirming and implementing a design solution, and it is unclear whether contractors would be willing to take on such risks without a significant cost premium. Recent experience on North Bridge has demonstrated how cost escalation can occur when dealing with historic structures. Given these uncertainties, the use of standard

optimism bias (OB) of +60% is not appropriate, and a bespoke figure of +100% has been applied to the cost estimates for Dean Bridge. These comprise two elements, (i) works associated with the installation of the track slab (£25m), and (ii) works required to support the longer-term viability of the structure in safely and effectively supporting tram operations across it (£100m).

**North Bridge** has had significant works undertaken over the past few years as part of a major renovation programme to this 130-year old Category A listed structure that links the Old and New Towns. The historic nature of the three-span bridge, the setting and emerging issues during the programme have caused a significant cost and programme overrun. It is understood that the current works originally included full strengthening to allow for future tram operations, but a latter part of this has been de-scoped from the works as it is not required imminently, and costs therefore do not need to be incurred at this point in time. It is also understood that this element was budgeted at around £20m (in addition to the standard track infrastructure costs already accounted for). Given the cost overrun issues and inherent risks associated with works on historic structures, the use of standard OB of +60% is not appropriate, and a bespoke figure of +150% has been applied to the cost estimate.

**South Bridge** dates back to the 1780s and is a multi-span masonry arch viaduct where the arches have been fully enclosed by buildings on either side, and where the high spans have been further subdivided into a series of vaults; some of which are used as social/entertainment venues. The structure is largely hidden from view, apart from the span that crosses the Cowgate. It is fair to describe the structure as complex due to its (i) age, (ii) compound relationship with neighbouring buildings, and (iii) lack of definitive information on the full extents of the structure, however it fundamentally remains a masonry arch viaduct. It is well established that such structures can accommodate the actions arising from the combination of light rail and vehicle use. Notwithstanding that significant work will be required to determine the exact capacity and any defect rectification, it is reasonable to anticipate that the structure can safely be repurposed for use within the south-east part of the proposed tram route. In addition to the standard track infrastructure costs, a budget of £70m has been identified for works to the structure, but due to the uncertainties from a desktop study, and in line with the approach taken for North Bridge, OB has been set at +150% for this element.

### 3.2 New/Replacement Structures

The analysis work undertaken recommends new or replacement structures in a number of locations:

- Roseburn Option and Roseburn (Telford Road variant)
  - Roseburn Terrace – crossing the A8 (Roseburn Terrace), it is proposed to replace the existing structure with a new one to accommodate the tram and active travel requirements. The aesthetics of the bridge, including distinctive facia across the road, would be replicated in the new structure.
- Roseburn (Telford Road variant)
  - Telford Road ramp – a new structure to allow the tram to transition from the lower level of the Roseburn Path to the higher level of Telford Road.
- South-East section
  - Newington Railway Bridge – reasonable worst case scenario of full replacement is being allowed for at this stage (£3m). Future technical work may determine that the existing structure has sufficient depth to accommodate the track slab, in which case the existing structure will be maintained and modified accordingly. Due to the level of complexity (building proximity, operational railway, etc) and unknown conditions relating to the masonry abutments and foundations, it is considered prudent that a higher level of OB is applied to cost estimates for this structure, therefore a +100% figure has been applied.

### 3.3 Modified Structures

- Roseburn Option and Roseburn (Telford Road variant):
  - Coltbridge Viaduct – the proposed single track solution removes the need for a cantilevered pedestrian/active travel additional structure and maintains the aesthetics of the existing structure.
  - St George's School Access – parapet and associated works required for vehicle containment.
  - St George's School Footbridge – installation of infill panels for pedestrian containment.
  - Ravelston Dykes - parapet and associated works required for vehicle containment.

  - Craigleith Drive - the proposed single track solution removes the need for a replacement or additional structure and maintains the aesthetics of the existing structure.
  - Holiday Inn Access – parapet and badger tunnel works required for pedestrian containment and ecology.
  - Queensferry Road - parapet and associated works required for vehicle containment.
- Roseburn Option
  - Telford Road - parapet and associated works required for vehicle containment.
- Roseburn Option, Roseburn (Telford Road variant) and Orchard Brae
  - Crewe Road Gardens – an additional span would be added to the existing structure to provide sufficient width for tram and other road users.

There are also two structure (culverts) that have been considered at Old Dalkeith Road and Royal Infirmary of Edinburgh. While exact construction requirements will need further investigation at a future stage, any works required are within normal civil engineering operations for such structures, and are not considered to represent high risk or high cost elements of work.

## 4. Phasing

The delivery of the project depends on a number of key factors, including:

- Business case approvals;
- Funding and Financing; and
- Statutory processes.

The current operational tram line was delivered in two main stages with the first part (Airport to York Place) equating to the Line 2 Act and the second stage (York Place to Newhaven) being part of the Line 1 Act. For clarity the Line 1 Act was for the full circular route (City Centre, Leith, Newhaven, Granton, Haymarket). From a statutory perspective, it is clear that the new line section to the south-east from Princes Street towards the Bioquarter and beyond would require to gain statutory powers through a TAWS order. This would also be the case for Orchard Brae alignment and for the Telford Road deviation, were those to be selected. The Roseburn alignment to Granton Square may be deliverable under the extant powers set out in the Tram Line 1 Act.

While the SBC considers the Granton to Bioquarter/Shawfair route as a whole for operational reasons, the actual infrastructure comprises two distinct sections, separated by the existing city centre section of line.

From a funding perspective, and with reference to notes on rolling stock in Technical Note 3, there may be advantages in taking the north-west and south-east sections through separate Outline Business Cases (OBCs). This would feed into separate procurement and construction processes, but these could be consecutive and linked to provide greater value from skills development, mobilised plant/equipment and lessons learnt. If Orchard Brae is the preferred option, then both the north-west and south-east would require TAWS processes. Notwithstanding this, it may still be preferrable to deliver this and the south-east section in distinct phases. If Roseburn is the preferred option, then this may be capable of delivery under existing powers, and using existing (potentially modified) rolling stock, meaning that is could be delivered significantly in advance of the south-east route.

It is also noted that, depending on the availability of funding, it would be possible to deliver the south-east route in at least two phases with potential phase-end-points, for example, at Cameron Toll and/or Bioquarter.

A further consideration on phasing in relation to the south-east route is at what point of development a depot facility will need to be provided. As with the current arrangement at Newhaven, it is likely to be possible to design-in overnight stabling facilities on-track at the southern end of any intermediate stage of delivery. This is the subject of a separate technical note.

## 5. Construction

While actual construction of the route is some time off and requires the development of an Outline Business Case, it is appropriate at SBC stage to consider the high-level construction issues that could result from the implementation of the project.

The table below shows a summary of the potential construction issues for each sub-section of route and a RAG rating is also provided; red representing sections where significant impact could be anticipated to green representing sections where impact is anticipated to be more localised/manageable. It should be noted that any level of construction will by nature have impact.

| Element | Potential Construction Issues | RAG Rating |
|---|---|---|
| **Common Route Section** | | |
| Granton Square to W Granton Road | Largely off-street protected route. Minimal construction issues and impacts on other road users. | |
| W Granton Road to Ferry Road | Largely off-street apart from crossings. Some impacts on existing road users, but localized traffic management only. | |
| **Orchard Brae Route** | | |
| Ferry Road to Craigleith Road | On-street alignment. Could require property acquisition to allow for effective route alignment. Potential impacts on residential accesses and hospital access during construction. Significant traffic management measures required. | |
| Orchard Brae | On-street alignment. Significant traffic management measures required. Technical challenges at south-end joining Queensferry Road. | |
| Queensferry Road | Historic on-street environment. Potential impacts on residential accesses during construction. Significant impacts on public transport operations, active travel and other road users. | |
| Dean Bridge | Listed structure. Critical risk element. Non-standard construction techniques required. Likely to require full closure to traffic during construction with diversions via Bells Brae Bridge, St Bernard's Bridge (both walking/cycling as not suitable for main traffic diversion), Belford Bridge and Stockbridge. Major impacts on west Edinburgh traffic and public transport routes to north-west/Fife. Area-wide traffic management measures required. | |
| Lynedoch Place / Queensferry Street | Historic on-street environment. Potential impacts on residential accesses and business deliveries during construction. Significant impacts on public transport operations, active travel and other road users. | |
| **Roseburn Route** | | |
| Granton Square to W Granton Road | Largely off-street protected route. Minimal construction issues and impacts on other road users. | |
| W Granton Road to Ferry Road | Largely off-street apart from crossings. Some impacts on existing road users, but localized traffic management only. | |
| Option 1: Ferry Road to Telford Road | Off-street alignment. Construction impacts on active travel route users. Likely to require diversion route via Telford Road or localized management. Minimal impact on other road users. | |
| Option 2: Telford Road (alternative) | On-street alignment. Potential construction impacts on side road and existing road users, including access to the hospital. Could require property acquisition to allow for effective route alignment. Localised traffic management measures required. | |
| Telford Road to Craigleith proposed stop | Off-street alignment. Construction impacts on active travel route users. Likely to require diversion route via Groathill Avenue. Minimal impact on other road users. | |
| Craigleith proposed stop to Roseburn proposed stop | Off-street alignment. Construction impacts on active travel route users. Likely to require diversion route via Craigleith Crescent / Coltbridge Terrace. Localised management may not be possible due to nature of route. Minimal impact on other road users. | |
| Roseburn proposed stop to west of Haymarket | Off-street alignment. Construction impacts on active travel route users. Likely to require diversion route via Balbirnie Place. Minimal impact on other road users. | |

| Element | Potential Construction Issues | RAG Rating |
|---|---|---|
| **South-East Route** | | |
| S St Andrew Street to North Bridge | Historic on-street environment. Potential impacts on business deliveries and existing road users during construction. Significant traffic management measures required. | |
| North Bridge | Historic structure. Major works required. Potential impacts on existing road users. Significant traffic management measures required. | |
| South Bridge | Historic structure. Major works required. Potential impacts on business deliveries and existing road users. Significant traffic management measures required. | |
| South College Street to West Preston Street | Historic on-street environment. Potential impacts on business deliveries and existing road users during construction. Significant traffic management measures required. | |
| West Preston Street to Liberton Road | Historic on-street environment. Potential impacts on residential accesses during construction. Localised traffic management measures required during construction. | |
| Liberton Road to Sharpdale Loan | Suburban/modern off-street alignment. Potential construction impacts on shopping centre access and existing road users. Localised traffic management measures required. | |
| Sharpdale Loan to Little France Drive | Peri-urban on-street alignment. Potential construction impacts on side road and existing road users. Localised traffic management measures required. | |
| Little France Drive to Tobias Street | Off-street protected route. Minimal construction issues and impacts on other road users. | |
| Tobias Street to Shawfair | Off-street development area alignment. Minimal construction issues and impacts on other road users. | |