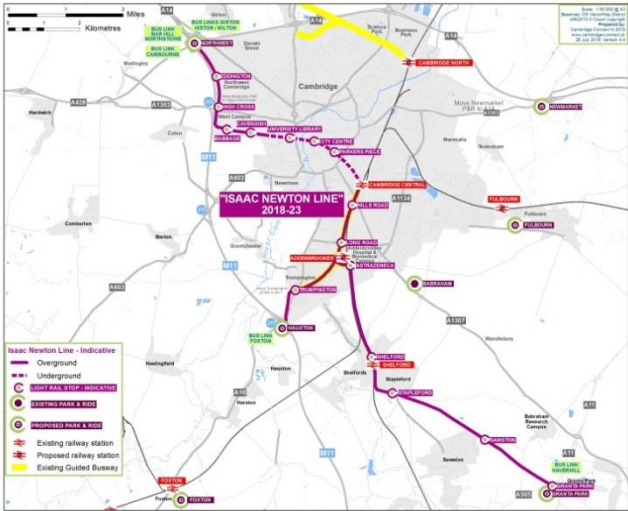
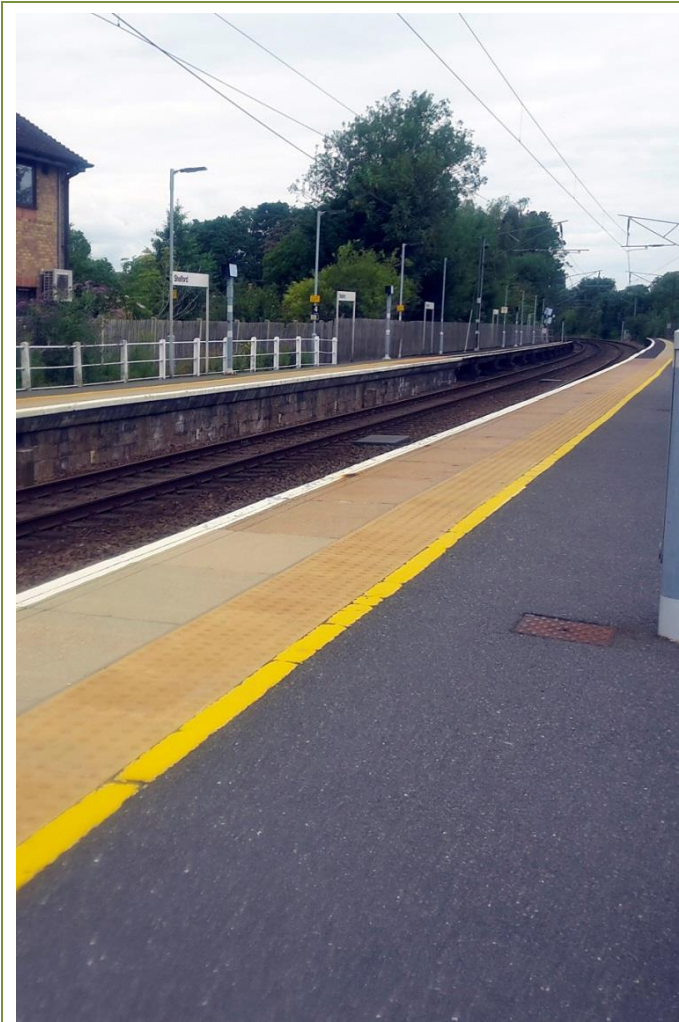


# Cambridge Southeast Transport Greater Cambridge Partnership Public Consultation



## Cambridgeshire Light Rail

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1 November 2019 (v1)



cambridge  
connect

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# 1 Introduction

Cambridge Connect was initiated to promote a strategic and sustainable approach to public transport in Cambridgeshire. Emphasis is placed on the potential of light rail as part of that strategy, and on an integrated and multi-modal approach to meeting the transport needs for Cambridge and the surrounding region. We recognise the need to link local solutions into broader regional strategies.

Within the immediate Cambridge region, we have proposed a light rail line from the Girton Interchange in the northwest to Granta Park in the southeast, via the University West Campus, city centre, Cambridge Central Rail Station, Addenbrookes, Great Shelford, Stapleford and Sawston. The line would extend ~22 km (~14 mi) and we call this route the 'Isaac Newton Line' (Figure 1) (Harris *et al.* 2019). The light rail line would follow existing and former rail alignments, run underground within the historic city core, and follow the busway alignment between Cambridge Central Rail Station and Addenbrookes. Extensions to the 'Isaac Newton Line' light rail backbone are possible in due course, for example to Haverhill, Cambourne and St Neots to name a few.

This approach would provide a transformational long-term solution for Cambridge that is both scalable in terms of capacity and extendible to key destinations as demand and finances allow. Cambridge Connect is coordinating with Railfuture, UK Tram in developing these proposals and engaging with local organisations (e.g. CPPF and Rail Haverhill) and residents. Cambridge Connect understands that the Greater Cambridge Partnership has excluded light rail from consideration. However, we believe this decision should be reconsidered and light rail should form part of the strategic long-term approach to meeting transport needs in Cambridgeshire.

Reconsideration of light rail is needed because it is clear from Steer (2019) that the **costs for the Cambridgeshire Autonomous Metro (CAM) will be comparable to Cambridge Light Rail**. The original conclusion that CAM could be delivered for one-third of the cost of light rail has been shown to be wrong (Steer 2019). The business case for CAM was 'compelling' and would be stronger with light rail, which is able to deliver greater modal shift than buses. It is therefore **essential that the strategy for metro delivery in Cambridgeshire is thoroughly reviewed to include light rail**.

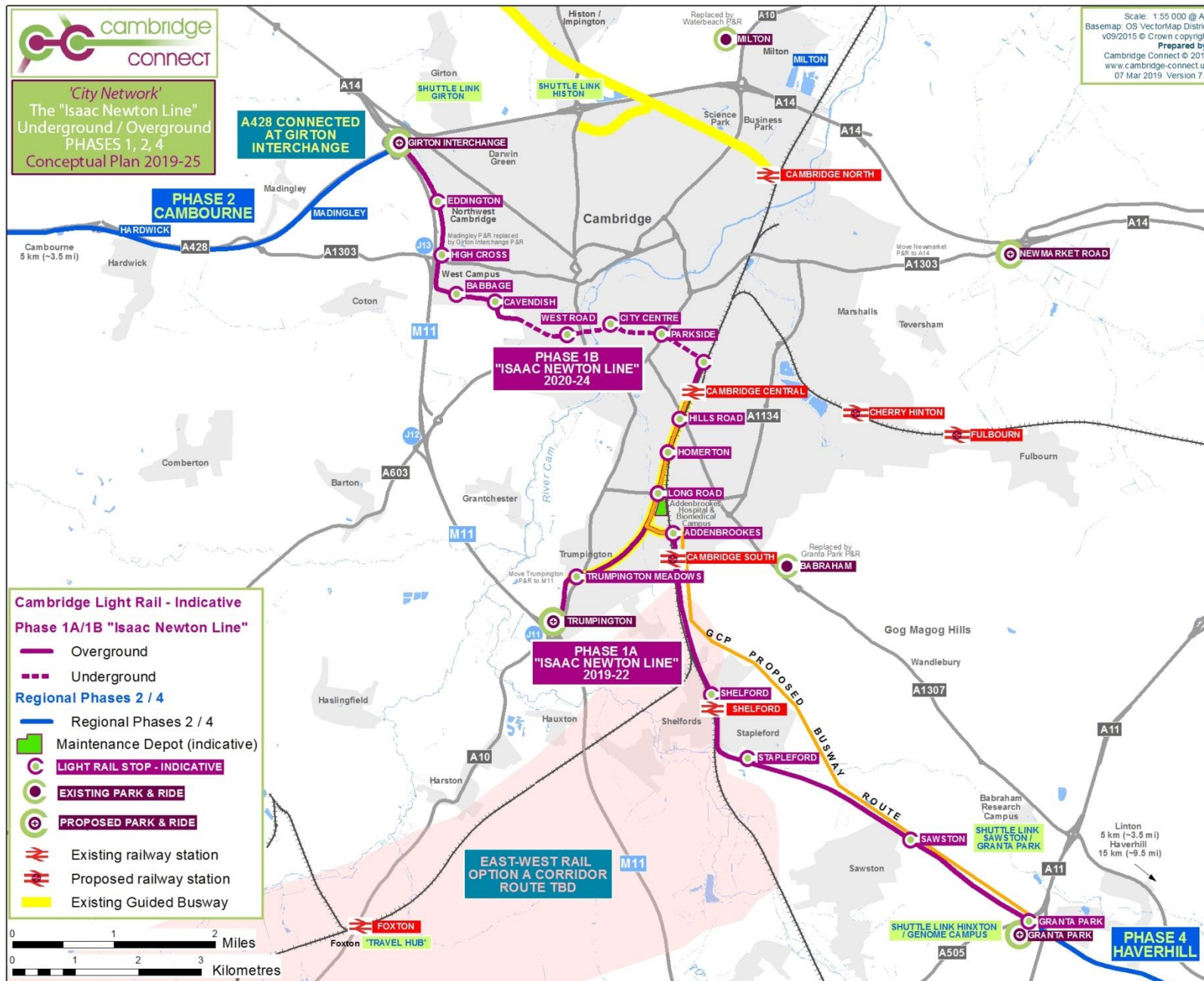
## 2 Summary conclusions

Our submission to the public consultation on options for public transport improvements in the Southeast region of Cambridge is based on the conviction that light rail remains a viable and preferred alternative both to busways in the immediate future, as proposed by the GCP, and the rubber-tyred CAM vehicle proposed for delivery at some unknown time in the future.

- 1 Cambridge Connect supports development of a new public transport route in the Southeast following the alignment of the existing and former rail lines via Great Shelford / Stapleford.
- 2 Based on current evidence, we do not concur with the conclusion that a new public transport route (whether light rail or busway) aligned with the existing and former rail line through Great Shelford is not feasible.
- 3 Cambridge Connect does not support the route proposed by the GCP because of unacceptably high and unnecessary impacts on the Green Belt and on the highly valued rural landscape which lies in close proximity to Gog Magog Hills, which have not been sufficiently taken into account.
- 4 Cambridge Connect supports light rail as the mode of delivery for the public transport route.
- 5 Cambridge Connect supports a Park & Ride at Granta Park, although has not made site-specific assessments. The scale and size of the site chosen should take into account delivery of the new public transport route to Haverhill, which will influence demand for Park & Ride at this location.



Figure 1. The Cambridge Connect 'Isaac Newton Line' and the proposed GCP Southeast Busway



### 3 Long-term transport planning

Cambridge Connect considers that infrastructure development needs to be fit-for-purpose for the region with a planning horizon into the 2030s and beyond. The key drivers of economy, population, demand, education, science & technology environment & heritage, and social & cultural values all need to be taken into account with a long-term view, and these need to be balanced against the cost and investment needed for future generations.

Cambridge Connect suggests that when considered over an appropriate planning time horizon, the option of light rail represents a realistic, attractive and financially viable alternative that can offer many benefits to Cambridge and regional residents.

Before progressing new busways, a detailed plan for delivery of the long-term strategy for Cambridgeshire public transport needs to be adopted. Local solutions should then be designed so they integrate seamlessly into the overall strategic plan, both in terms of technologies used for the metro and also the routes. This strategy should be at an advanced stage of development when implementing local solutions, even if this would mean a short-term delay in delivery of some local improvements. This approach would avoid waste and bring cost-savings over the medium-term.

### 4 Sustainability

Around one third of energy consumption is used on transport (MacKay, 2009: 118). The evidence shows that rail remains the most energy-efficient means of public transport available, being at least twice as efficient as buses and up to 18 times more efficient than cars. Improving the energy efficiency of our transport systems must be a key consideration in our choice of transport solutions. This approach is consistent with commitments made at the 2015 Paris Summit on Climate Change, and with the more recent declaration by the UK Government of the 'Climate Emergency', in particular with respect to the need to adopt more sustainable approaches to city planning and transport.

Light rail also performs much better than other public transport on pollutant emissions. Fine particulate pollution is released by rubber-tyred vehicles, and these pollutants enter the atmosphere, terrestrial and water systems. These emissions have been shown to account for as much particulate pollution as released by vehicle tail-pipes, so even if buses were electric a substantial air pollution problem would remain. Rubber tyres are largely made from synthetic plastics, which take a very long time to degrade. The microplastics from wear enter into aquatic and terrestrial systems, and are taken up by organisms. In addition, large numbers of waste tyres are produced, and for a high frequency metro operation this could lead to many hundreds or thousands of waste tyres per year.

Light rail is more sustainable for metro operation than buses because it consumes substantially less power than rubber-tyred buses, owing to the low rolling resistance of steel wheels on rails (~ one tenth of rubber tyres on road). Light rail lines may also offer benefits through more sustainable water drainage systems than the extensive tarmac / concrete needed for bus roads.

### 5 Light rail: general benefits for Cambridge Southeast

The 'Isaac Newton Line' would substantially address transport needs to the south of Cambridge in the general area of the A1307 highway by linking the bioscience campuses at Granta Park / Babraham to the biomedical campus at Addenbrookes and to the central rail station and city centre. In the southeast Cambridge region, the 'Isaac Newton Line' would:

- Provide a light rail 'backbone' extending from Granta Park in the southeast to Girton Interchange in the northwest, linked to the heart of Cambridge city;



- Integrate with the heavy rail network at Cambridge Central Rail Station, at Great Shelford, and at the proposed new Cambridge South Station at Addenbrookes;
- Provide multimodal links to bus / coach and Park & Ride services at key interchanges – for example the A11 / A505. Similar multimodal links would be provided at Junction 11 on the M11 / A10 and at the Girton Interchange on the A428 / A14 / M11;
- Provide a new Park & Ride near the A11 / A505 junction, close to the A1307 and Granta Park, which would serve the surrounding region;
- Provide reliable, fast and frequent public transport into the heart of Cambridge from the south, meeting public transport objectives in this region;
- Provide a reliable, fast and frequent link between the three University campuses;
- Connect the Babraham Campus and Granta Park employment centres and other research institutes and businesses in the south of Cambridge directly with the Biomedical Campus, the city centre, and University West Campus;
- Provide an excellent public transport service that could be closely linked to Hinxton / Wellcome Trust and Babraham Campus developments by short and cost-effective shuttle services, which could in the future be fully automated;
- Relieve vehicle traffic pressure on the A1307 / Hills Road by attracting people onto the alternative light rail route, which would provide rapid travel into the centre of Cambridge without congestion;
- Directly serve the villages of Sawston, Stapleford, the Shelfords, Abingdon and Babraham (the latter by shuttle) with a high-quality, reliable public transport system;
- Enable improvements in the links to Haverhill and Linton, which in the longer term could be served directly by a light rail extension from Granta Park to Haverhill;
- Serve potential growth in housing and development to the south of Cambridge, including in the long-term to lower cost housing areas such as Haverhill;
- Serve and strengthen business connections at the South Cambridge Business Park;
- Serve the Football Club grounds in Sawston by excellent public transport, which would reduce potential congestion associated with game fixtures;
- Directly serve Sixth Form Colleges and the University Technical College at Long Road and Hills Road, better linking these to the villages of the Shelfords, Stapleford and Sawston;
- Encourage walking / cycling from nearby residential areas and employment centres to strategically located stops on the public transport network;
- Foster a more sustainable city and region, protecting its rich heritage and environmental values, with light rail being the best technology for air and water quality.



## 6 Specific comments on route proposed by GCP

Cambridge Connect opposes the route proposed by the Greater Cambridge Partnership to link Addenbrookes to Granta Park on the following grounds.

### 6.1 *Practical feasibility, constraints and costs*

- 6.1.1 Cambridge Connect notes that WSP (2018: 2) highlighted “Stakeholders and members of the public ... indicated a preference for new infrastructure to follow, where possible, the route of the dismantled railway on the grounds this is an established and accepted transport corridor”.
- 6.1.2 Cambridge Connect also notes WSP (2018: 2) pointed out that “Transport modelling... identified a significant benefit from routing Strategy 1 close to the settlements of Sawston, Stapleford and Great Shelford, where the introduction of intermediate passenger stops would offer the most significant step change in user behaviour, with access to approximately 2800 dwellings within 800 metres of the route that would result in a pronounced mode shift away from private car travel, more than other options tested”.
- 6.1.3 WSP (2018: 4) noted the “unguided nature of the design requires a more traditional carriageway width of 7.3m, based upon DMRB TD 27/95 fig4.4a), that is greater than that required for a kerb or track guided busway”.
- 6.1.4 WSP (2018: 7-8) concluded: “A route following the dismantled railway through to Great Shelford was considered; unfortunately this is not viable for a road based Public Transport system given the lack of available space alongside the existing ... railway, particularly at Great Shelford station ... encompassed by residential and commercial development that precludes taking a new route that by-passes the station and platforms that abut the railway...”.
- 6.1.5 The conclusion appears based on an assumption that any new road-based public transport route would of necessity by-pass the existing Shelford station, platforms, and adjacent buildings. However, no factual evidence (such as measurements and identification of potentially affected structures) in support of this conclusion was presented in WSP (2018). Moreover, options for alterations to the station, adjacent buildings, car parking and roads do not appear to be considered, and certainly are not presented or costed.
- 6.1.6 The route option through Great Shelford is thus dismissed with insufficient evidence and not discussed further in the remainder of the Technical Note, which is focused on the route north of the villages (i.e. the GCP route issued for consultation).
- 6.1.7 Cambridge Connect understands that further analysis of the route option through Great Shelford was requested by local residents, and that Mott MacDonald was appointed to make a second and more detailed evaluation, resulting in the Mott MacDonald (2019) Technical Note.
- 6.1.8 Mott MacDonald (2019) referred to the work by WSP (2018) that considered the old rail route and concluded “Given that using the former railway alignment through Shelford has previously been considered unfeasible, this was not considered further at this stage”. While this seems to suggest that the WSP conclusion was taken ‘as read’, despite the lack of evidence, Mott MacDonald did carry out some further site technical evaluation of the specific section through Great Shelford, since part of their report identifies potential constraints along this section and includes cost estimates to address those constraints.



- 6.1.9 The Mott MacDonald (2019) Technical Note also concluded that a public transport route through Great Shelford parallel to the existing and former rail alignment is not feasible. However, the Technical Note did not conclude that the physical constraints could not be overcome (listed in Section 6 of the Technical Note), but rather drew the conclusion that it would be more costly.
- 6.1.10 The work to overcome the practical constraints was estimated to be in excess of ~£15 m, or approximately 10% of the project budget. Thus, while perhaps more difficult and expensive in certain places, the route nevertheless could be delivered through an additional investment to address the physical constraints.
- 6.1.11 A clear distinction needs to be made between practical physical constraints (physical possibility) and budget constraints (need to consider costs versus benefits, or availability of funds). Mott MacDonald (2019) indicates the practical physical constraints can be solved, and this was confirmed in person by one of the Technical Note authors when questioned on this point at a public consultation in Haverhill. Therefore, should the route through the villages be preferred, the question of feasibility becomes more a matter of cost, rather than one of pure physical constraints *per se*.



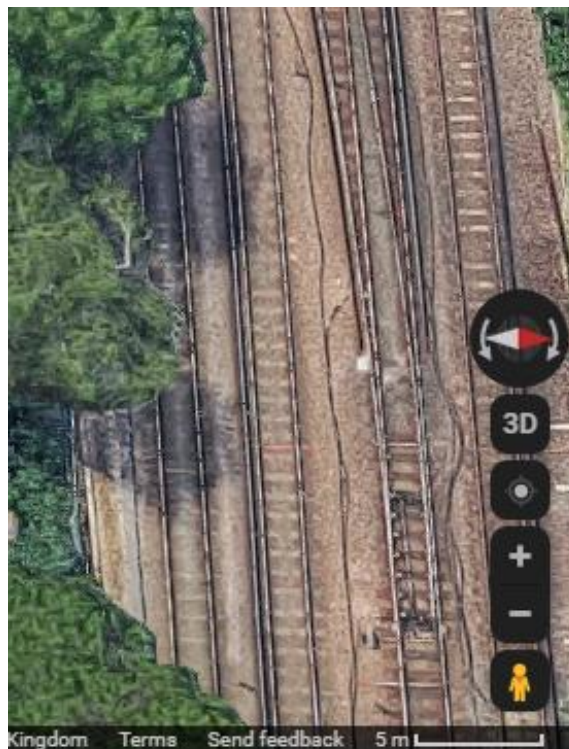
**Figure 2:** Much of the former rail alignment remains as an elevated embankment suitable for reinstatement (Photo: C. Ross 2019).

- 6.1.12 This is very important, because while the cost of addressing the physical constraints of the route through Great Shelford has been estimated (in excess of £15 m), the *value* of the Green Belt and its associated landscape, ecology, farm production (i.e. potential losses owing to 'orphaned' fields), and recreational benefits have not been assessed.
- 6.1.13 Neither have the additional costs of an alignment through Great Shelford been considered against the substantial additional economic benefits that would accrue by locating the public transport route at the heart of the community, as confirmed by WSP (2018) (see Section 6.1.2). These economic benefits would accrue both by fostering ridership on public transport, and also by improving the accessibility of businesses located within the villages of Great Shelford and Stapleford to people coming from outside of these communities. This would contribute to improved economic activity and vibrancy in the villages. Additional economic benefits would accrue by reductions in the number of car journeys that would be made to access the stops.





- 6.1.14 WSP (2018) conclusion there is insufficient physical space is based on an apparent assumption that existing structures cannot be altered, while Mott MacDonald (2019) concluded that the physical space could be found by removing constraints but made an apparent assumption that the additional costs would make this option not feasible.
- 6.1.15 Those assumptions are not considered reliable as a basis for rejecting the route – if it is primarily a cost issue, as noted above, the costs versus the loss of other values (Landscape, Green Belt, ecology, recreational benefits, farm values) have yet to be assessed. If this is the case, the conclusions drawn in both the WSP (2018) and Mott MacDonald (2019) would, in our opinion, be invalid.
- 6.1.16 Both the WSP (2018) and the Mott MacDonald (2019) Technical Notes are based on a non-guided road-based public transport alignment. This option would require greater land-take than a light rail option, which has physical guidance by rails. As such, their conclusions on feasibility, both in terms of physical space and cost, do not apply to light rail.
- 6.1.17 An assessment of the feasibility of light rail following the former rail line route is needed, and then a clear distinction needs to be drawn between those factors that are related to physical constraints and those that are related to cost.
- 6.1.18 A preliminary examination of Croydon Tramlink shows that it is possible to align a light rail line alongside a heavy rail line with minimal separation (Figure 3). While we have not carried out detailed investigations, this suggests that a light rail line along the Great Shelford route may be significantly more feasible, and perhaps less costly in some respects, than the proposed busway. For example, it is likely to have narrower width requirements, and require fewer physical barriers to separate the railway from the public transport route.



**Figure 3:** Croydon Tramlink alignment immediately west of Beckenham Junction station. The light rail line is at far left, while the remaining three lines are heavy rail. (Image: Google Maps 2019).



- 6.1.19 In addition, the GCP has made no assessment of the feasibility of small sections of single-track alignment where there are particular constraints on space at 'pinch-points'. This type of approach is currently successfully implemented at pinch-points on the southern Cambridge Guided Busway. We understand that modern signaling systems are capable of managing short single-track sections such as might be needed without significant delays. A proper assessment of this option should be undertaken, not only for light rail but also for the bus-based solution.
- 6.1.20 The GCP route has three at-grade crossings, each of which increase costs. The alternative light rail line as proposed below in Section 6.4 has one at-grade crossing, reducing costs. While the proposed grade separation would cost more at Granham's Road, this could be shared with other stakeholders, perhaps lowering costs to be paid for through this specific scheme.

## 6.2 Improved connectivity and integration

- 6.2.1 The route proposed by the GCP is isolated and approximately one km and uphill from centres of the villages of Great Shelford and Stapleford. It is thus not well-integrated with the community along the route. This distance is a barrier to residents and makes public transport use less likely, suppressing potential modal shift, which runs counter to the scheme purpose.
- 6.2.2 The distance to the new line will dissuade many from walking to the stops. This may encourage people to drive to the nearest stop, with knock-on implications for parking and congestion. While this may be mitigated to some degree by provision of a connecting bus service from the village to the new public transport line, and perhaps imposition of parking restrictions, this introduces additional and unnecessary barriers to use of public transport.
- 6.2.3 A public transport route going through the heart of the villages would be more accessible to the community, and as noted in WSP (2018) is also the clear preference of the local communities. This would promote use of the service, and lead to an outcome that is more environmentally, socially and economically sustainable. This approach would help to drive the much-needed modal shift, one of the scheme's overall objectives. Evidence shows that this effect is even greater where the public transport provided is light rail (Harris *et al.* 2019).
- 6.2.4 Close alignment with the heavy rail line within Great Shelford enables co-location of the Rail Station and light rail stop. This would facilitate easy interchange between light rail and heavy rail, improving public transport options for the community, and improving its attractiveness. The GCP route is isolated and fails to achieve this close connectivity.
- 6.2.5 Co-location of the Rail Station with a light rail stop would be an opportunity for improvements to the urban realm in this location, e.g. offering commercial opportunities for cafes etc.
- 6.2.6 The scheme should be planned in an integrated way with cycling, pedestrian and vehicle provisions. We have not examined all of these issues in detail, and would only comment that the public transport and cycleway / pedestrian paths do not always need to be running immediately alongside of each other. There may be opportunities to reduce permanent way width where necessary by using an alternative and separate route for cycling / pedestrians.



### 6.3 *Environmental benefits, landscape values and sustainability*

- 6.3.1 The GCP route involves needless incursion into Green Belt and development of major infrastructure for a busy transport route across relatively tranquil and unspoiled rural landscapes of high aesthetic value. It will impact local ecology and recreational uses. It will create additional severance of the Gog Magog Hills from local communities. These values have not been given sufficient consideration in the decision to proceed with this route.
- 6.3.2 The GCP route requires major new land-take from the Green Belt. There is insufficient justification for this because, in our view, it is likely there exists a feasible route through Great Shelford and Stapleford that utilises the existing transport corridor and the former railway line.
- 6.3.3 The GCP route runs counter to policies that seek to minimise the impact of infrastructure and development on Green Belt land, and against policies that seek to protect landscapes of high value. The landscape affected is immediately adjacent to one of the most iconic and high-value elevated sites in the Cambridge region, namely the Gog Magog Hills. This site is already compromised by the major A1307 highway, and a further major public transport route across this landscape will further degrade and despoil the remaining high landscape values.
- 6.3.4 Cambridge Connect supports the view expressed by local communities that it is preferable for the new infrastructure to follow the route of the dismantled railway, which is an established and accepted transport corridor.
- 6.3.5 A major question left unanswered in the GCP documentation and analysis is: how is the loss of Green Belt, landscape, ecology and recreational use valued and compared against the costs (in £) of addressing the physical constraints of the route through the villages?
- 6.3.6 In the long-term, an additional capital expenditure of £15 m to protect those important values could be considered small in comparison to the benefit of protecting a highly valued landscape and rural environment for the long-term. There is difficulty in reconciling these different types of values, although the attempt needs to be made or there is an unacceptable risk that highly valued landscapes, Green Belt, local ecology and habitat, and aesthetic values will be wrongly disregarded in the decision-making.

### 6.4 *Opportunities for long-term gains – a proposal for developing an integrated approach to improvements in rail and public transport at Cambridge Southeast*

- 6.4.1 Future developments of the heavy rail network need to be taken into consideration. For example, developments such as Cambridge South Station, East-West Rail, and service improvements more generally will influence activity and services on the main rail lines.
- 6.4.2 The frequency of trains on the line through Great Shelford, and the length of trains, are likely to continue to increase. This has significant implications for practical operation of the two level crossings in Great Shelford. Already, lengthy periods of barrier down-time are common on these level crossings, and the crossings also significantly constrain the rail network. It is increasingly apparent that effective and efficient operation of train services along this line will require grade separation at busy crossing points.



- 6.4.3 Grade separation is likely to be needed for the main rail line in the near future, and bringing forward its delivery to coincide with delivery of a light rail link between Granta Park and Addenbrookes could benefit from cost-sharing with Network Rail. This approach could offer a win-win both for Network Rail, the GCP and the Combined Authority when providing the new public transport route. It would also be a major benefit to the local community. It is important to consider these issues now so that schemes can be optimised to meet all objectives and are fit-for-purpose well into the future.
- 6.4.4 Cambridge Connect therefore supports detailed investigation into options for grade-separated crossings of the main rail line on Granham's Road and Station Road/ Hinton Way in Great Shelford, and suggests that this should form an integral part of the overall scheme for public transport delivery because it has a material influence on which options are deemed viable / preferable.
- 6.4.5 An approach to address the grade separation problem in a way that integrates with public transport improvements in Cambridge Southeast has been outlined by Peter Wakefield, Vice-Chair of Railfuture East Anglia. In this submission, we will refer to this proposal as the 'Grade Separation Proposal'. Cambridge Connect supports the general approach in the Grade Separation Proposal, and believes it should be given detailed consideration for delivery of any public transport solution in Cambridge Southeast.
- 6.4.6 We recognise Grade Separation would be a complex project and that detailed studies and plans will need to be developed. Our comments at this stage are offered in support of the general principle, and variations on the outline Grade Separation Proposal are most certainly possible.
- 6.4.7 In summary, the outline Grade Separation Proposal proposes a new road bridge on Granham's Road to provide grade separation over the existing heavy rail line, and this would also span the parallel light rail line that we propose from Great Shelford to Addenbrookes. The Grade Separation Proposal includes closure of the current at-grade crossing on Station Road / Hinton Way, with provision of an alternative vehicle route over to the newly-bridged Grantham Road. Pedestrian / cycle access along Station Road / Hinton Way would be continued via a modern, wide ramped, fully accessible and well-lit subway under the railway line.
- 6.4.8 The Grade Separation Proposal would result in vehicles using Granham's Road for access to the A1307, and the Station Road / Hinton Way would become for local traffic only, with no through-route. The proposal assumes that a bridge or subway for vehicles would be impractical on Station Road / Hinton Way. The proposal supports a light rail line parallel to the existing and former rail line between Addenbrookes and Granta Park, as originally proposed by Cambridge Connect, Railfuture and UK Tram.
- 6.4.9 The new public transport route proposed by the GCP requires three at-grade crossing points with existing roads (Babraham Road, Haverhill Road, Hinton Way). These crossings will require full control by traffic lights, and will both slow public transport along the route as well as create additional constraints on vehicular traffic flow. Moreover, every crossing point contributes to additional safety risks.



- 6.4.10 The Grade Separation Proposal, supported by Cambridge Connect, would result in only one at-grade crossing point along the light rail route instead of three, and this would be in the same location as shown by the GCP on Babraham Road. Reducing the number of crossings would significantly improve the speed and safety of the public transport route, and also improve flows for traffic needing to travel to/from the A1307 and Great Shelford.
- 6.4.11 Cambridge Connect urges the GCP and Combined Authority to give full consideration to the Grade Separation Proposal with a view to examining its delivery in combination with the light rail options presented in our submission following the alignment along the existing and former rail lines through the village of Great Shelford.

## 7 Specific comments on Park & Ride proposals by GCP

- 7.1.1 Cambridge Connect supports a new Park & Ride in the general vicinity of Granta Park. It has not been possible for us to make site-specific assessments and therefore cannot recommend one location over another based on site characteristics.
- 7.1.2 However, as a general principle, it is important that the location selected can be practically integrated with future development of the proposed segregated public transport route to Haverhill, which should be implemented using light rail.
- 7.1.3 The size and scale of the Park & Ride should ideally be planned in conjunction with delivery of the Granta Park – Haverhill public transport route, because a high proportion of demand for the Park & Ride is likely to arise from residents along this route and from Haverhill.
- 7.1.4 In this respect consideration should be given to opportunities for a metro model with more 'distributed Park & Ride' sites, where stops on the metro network accommodate much smaller areas of parking where practical. This approach would reduce demand for very large Park & Ride sites that concentrate high levels of local impacts with large areas of land-take / usage. Distributed parking at metro stops could result in less intrusive developments for parking, although it is acknowledged that this could mean more, but smaller, sites.

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