Design Freeze A: Value Engineering Options

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Ashton Vale to Temple Meads and City Centre BRT

Bristol City Council and North Somerset Council

12 April 2011

Halcrow

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Document history

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This document has been issued and amended as follows:

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001	04/04/2011	Draft, revised following client comment	Darren Cox	Bruce Slattery	Bruce Slattery
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Contents

Appendices (A, B and C)

1 Executive Summary

This report describes the work that has been undertaken to reduce the overall scheme cost of the Ashton Vale to Temple Meads Bus Rapid Transit system in the build up to submitting the Best and Final Bid (BAFB) in September 2011. This work aims to ensure the scheme is well positioned within the development pool to receive funding.

This work has concentrated on developing cost savings whilst protecting the purpose and objectives of the scheme and the majority of the defined benefits. The work has also promoted options that are in line with the Transport and Works Act Order (TWAO) application submitted in 2009 and do not require modifications to the Environmental Statement (ES) prepared in support of this.

The objective is to reduce the overall capital works costs excluding risk and inflation from the original Major Scheme Business Case (MSBC) value of £31,741,000 to the proposed £27,241,000 as defined in the expression of interest submitted to the Department for Transport (DfT) in December 2010.

The aim of this report is to inform the Project Board of the project team's progress with this work and to gain confirmation that the proposed cost reduction measures are acceptable, as well as seeking agreement to the final measures required to complete the exercise.

All variations and costs quoted are based on the cost assumption that the rapid transit scheme is developed before the proposed new Bristol City Football Club stadium on Ashton Fields as this represents the most expensive scheme option.

The "value engineering" exercise is now quite advanced and has succeeded in identifying a lower cost scheme that can fit within the defined funding available for the scheme which still preserves the essence of the route.

The elements of the scheme that have been amended are as follows:

- Re base-lining of all scheme costs to reflect the latest available rates. This removes inflation assumptions and provides lower risk to the project;
- Re-examining the length and quality of the proposed Rapid Transit Platforms;
- Reducing the Maintenance Track from four to three metres in width;
- Relocating the Silbury Road stop platform away from the bridge crossing Colliter's Brook;
- Removal of the cantilevered pedestrian / cycle facility on Ashton Avenue Swing Bridge and provision of "shuttle" traffic signal working for Rapid Transit vehicles;
- Curtailing the Bristol Harbour Railway terminus spur to avoid the demolition of the tin shed at "A" Bond; and
- Reducing the specification of the proposed temporary structure to be provided whilst Prince Street Bridge is closed to traffic for strengthening.

Whilst the combination of these measures is felt to provide a suitable reduction in capital costs, work remains to be done on the following elements to finalise the design before submitting the final request for funding:

- Further design assessment of the platforms and infrastructure is required;
- Detailed costs of the proposed public utility works will be obtained;
- A visual model will need to be built to demonstrate that the operation of the scheme is not compromised, and
- A quantified risk assessment will be undertaken to confirm all current assumptions, and confirm the risk allocation required for the project.

One advantage of the carrying out this exercise is that it has been possible to integrate measures to remove some objections to the TWAO. The final piece of work will be the revised costed construction programme (including the final outturn costs), together with a review of the current inflation assumptions for the scheme.

2 Background

In March 2009 the project submitted a Major Scheme Business Case (MSBC) to the DfT for consideration. On 10 June 2010, the project submitted a Transport and Works Act Order (TWAO) application to the Secretary of State for Transport for the "corridor section".

Immediately following the submission of the TWAO application, the Government announced that further progress would depend on the outcome of the Comprehensive Spending Review (CSR). The scheme was placed in the "development pool" which is defined as "value for money confirmed but not all will be affordable. Subject to further analysis, consultation and revised funding offers from Local Authorities, decisions are expected by the end of 2011 on which of these will be funded."

The Expression of Interest (EoI) to the DfT confirmed the West of England's intent to continue to promote the scheme and their intent to reduce the bid to DfT for scheme funding. To support this, a value engineering workshop identified those elements of the scheme that could potentially be reduced or removed to provide a rapid transit scheme that delivered most of the original scheme benefits for a reduced capital costs.

The project team is now preparing a Best and Final Bid (BAFB) for submission to DfT by 9 September 2011. As part of this process, Halcrow will be producing "value engineered" drawings for the "corridor section" together with revised costings. These plans have now been prepared to demonstrate the design concept that forms Design Freeze A.

3 Purpose of this report

The purpose of this report is to describe the detail of the recent value engineering undertaken by Halcrow on the "corridor section" of the Ashton Vale to Temple Meads Rapid Transit System and by the Bristol Engineering Consultancy team for the city centre section. This exercise has identified a scheme that is able to fit within the

defined funding envelope and provides a description of all of the elements that have been re-engineered to meet the revised funding of £27,241,000 works costs (net of risk and inflation).

Following agreement in principle, by the project team, of the work to be value engineered, an amended design has been undertaken and a set of detailed Design Freeze A: drawings prepared. These show the potential reduced cost Central Case. An alternative design has also been prepared which involves removing the access ramp from the Cumberland Bridge area. This option not recommended as it is considered less desirable and whilst slightly lower in cost, it requires an outbound BRT service to run on-street between Prince Street Bridge and Avon Crescent. This would and significantly separate the proposed stops to serve M Shed and the local area. Issues identified in response to the TWA consultation relating to parking along Cumberland Road would be exacerbated with this option.

Both options have now been costed and a revised set of scheme costs prepared. These are significantly lower than those included in the Major Scheme Business Case (MSBC) and currently fit within the funding targets suggested in the EoI.

4 Value Engineering

Value Engineering forms two main types of cost reducing activity. The first stage is to rebase the previous cost assumptions to current levels, thus reducing the historic inflationary elements and reassessing the risks remaining on the project. This is then followed by the amendment of the scheme design required to further reduce costs. At the value engineering workshop, held in November 2010, the following elements of the scheme were identified as being those that might be reduced or removed:

a) Re-baseline of costs, risks and programme;

b) Platforms (length of);

c) Platforms (type of);

d) Reducing the maintenance track to 3 metres;

e) Remove guidance from the corridor busway;

f) Relocating the Silbury Road stop away from the bridge over Colliter's Brook;

g) Re-design of the scheme to allow for single deck buses only;

h) Removal of the proposed cantilevered pedestrian / cycle facility on Ashton Avenue Swing Bridge and provision of "shuttle" traffic signal working for BRT;

i) Removal of Cumberland Road access ramp;

j) Removal of guideway on shared alignment with Bristol Harbour Railway;

k) Curtailing the Bristol Harbour Railway terminus spur to avoid the demolition of the tin shed at "A" Bond;

l) Removal of the proposed temporary Prince Street Bridge structure;

m) Reducing the specification of the temporary Prince Street Bridge structure;

n) Drop the alignment skirting the proposed BCFC stadium;

o) Reducing the specification of the proposed off bus ticket machines;

p) Reducing the specification / quantity of the acoustic barrier;

q) Reducing the proposed ITS infrastructure to platform only CCTV and simple communication networks; and

r) Removing the carriageway widening providing an extra lane through The Haymarket.

The Revised Value Engineered Central Case Scheme

Following a review by the project team of each of the options identified under paragraph 3.1, Halcrow recommend a package of measures to reduce costs.

TABLE 3.1: Revised Central Case Scheme

Item	Description	Effect on Published Environmental Statement	Level of Cost Saving
(a) Re-baseline of costs, risks and programme	The costs have been rebased from 2008 rates with an uplift to 2010 prices, to a full quarter four 2010 basis based on comparable outturn contact prices. This is applied to all sections and options to give a higher confidence in the construction costs. These are currently quoted as capital plus appropriate contingency which will be replaced when the full QRA is carried out	Neutral effect on ES	£ 493,000
(b and c) Platforms (length and type of)	There is currently a cost comparison exercise between the bespoke designed prefabricated option for platforms, proposed by the visual identity guide and a traditionally built generic stop. This exercise will recommend alternative cost options that can be applied to the final design in the appropriate places	May result in a reduction of the visual impact of the scheme. Potential beneficial effect on the ES	Awaiting the final results of the cost comparison exercise
(d) Reducing the maintenance track to 3 metres	The maintenance track that runs alongside the route between Long Ashton Park and Ride and Ashton Avenue Swing Bridge has been reduced in width from 4 metres to 3 metres	Would result in a reduction of embankment height and width and less land required within floodplain. Beneficial effect on ES.	£ 716,000

TABLE 3.1: Revised Central Case Scheme			
(f) Relocating the Silbury Road stop away from the bridge over Colliter's Brook	The Ashton Vale stop has been relocated from the proposed new bridge at the end of Silbury Road to a location alongside the residential development that is to be constructed as part of the new football stadium project in the scenario that the BCFC stadium proposal proceeds	Reduced effect on woodland, watercourse and existing residential properties. Neutral effect on proposed BCFC residential properties. Beneficial effect on ES	£ 460,000
(h) Removal of the proposed cantilevered pedestrian / cycle facility on Ashton Avenue Swing Bridge and provision of "shuttle" traffic signal working for BRT	BRT shuttle working across Ashton Avenue Swing Bridge, controlled by traffic signals, has been introduced to the scheme. A preliminary design of this option indicates that there is sufficient width available within the envelope of the structure to safely accommodate pedestrians and cyclists, thus removing the need to construct the cantilevered bridge to the east of Ashton Avenue Swing Bridge. This will be illustrated by a visual model demonstrating the capacity effects of the scheme. Adopting this option also avoids the need to remove the upper deck brackets from the structure which is the one remaining outstanding objection/mitigation request from English Heritage to the Transport and Works Act Order application	Should remove one of the most significant environmental objections to the scheme from English Heritage. Beneficial effect on ES	£ 350,000
(k) Curtailing the Bristol Harbour Railway terminus spur to avoid the demolition of the tin shed at "A" Bond	In order to provide a two-way rapid transit link around the back of A Bond, it will be necessary to re-align the western end of the Harbour Railway and re-locate the existing platform from its current position at Butterfly Junction. The original re-alignment of the Harbour Railway has been shortened such that it is no longer necessary to acquire and demolish the 'tin shed' which is owned by Bristol City Council but on a long lease to Bristol No. 3 Diving Club. This revision should prompt the diving club to withdraw their objection to the Transport and Works Act Order application	Demolition consent would not be required for this structure in a Conservation Area. Neutral to beneficial effect on ES	£ 180,000

TABLE 3.1: Revised Central Case Scheme			
(m) Reducing the specification of the temporary Prince Street Bridge structure	It will be necessary to close Prince Street Bridge for a considerable period of time in order to undertake strengthening works. A replacement structure for pedestrians and cyclists will be required for the duration of the works. We have investigated temporary structures but this task has been made more difficult as any temporary structure would need to either swing or lift to enable water borne traffic to navigate the Floating Harbour. When Prince Street Bridge was previously closed, a temporary structure constructed from scaffolding was erected and we propose that this be reintroduced, and constructed at a height that means that it does not need to lift or swing to allow unimpeded navigation of the Floating Harbour. Note this is considered within environmental costs	The temporary bridge structure will still function as that assessed in the ES. Neutral effect on ES	£ 100,000
(o) Reducing the specification of the proposed off bus ticket machines	Originally it was planned to provide high specification ticket machines at all platforms. The machines would accept all forms of payment and would give change. It is now proposed that a high specification machine be provided at the Long Ashton Park and Ride with all other stops being equipped with a lower specification machine in an attempt to move towards cashless payments with change being provided by voucher	Neutral effect on ES	£ 580,000
(q) Reducing the proposed ITS infrastructure to platform only CCTV and simple communication networks	The initial design included CCTV along the entire route, this has now been limited to provision of CCTV on each platform	Neutral effect on ES	£ 90,000

5 Summary and Conclusions

The measures above can be contained within the defined capital works cost as submitted in the EOI document.

Further design of the platforms and preparation of a visual model to demonstrate that the operation of the system is not compromised is being undertaken. This, and the re-running of risks on a more detailed assessment for the QRA, will be required between now and the submission of the BAFB. The design will also be further refined during the preparation of a scheme proposal for Design Freeze B and ultimately the final drawings to support the Best and Final Funding Bid.

Further work to address issues and remove objections to the TWA Order are also ongoing, theses will provide further refinements of cost and potentially reduce risk elements. Costs are also being sought from public utility companies to provide full costs and programme for the works. A revised construction programme will also be available indicating the final outturn costs. A review of the current inflation assumptions will be required given current general inflationary measures.

A more detailed assessment of the implications of each of the measures considered is contained in Appendix A. This includes other potential elements that could be applied in the event that scheme costs are required to be lowered further or should alternative scheme options (next best or low cost alternatives) be requested.

Appendix A

Appendix A: Likely Impact on Scheme, Cost Saving and Recommendations

Appendix A

Likely Impact on Scheme, Cost Saving and Recommendations

This section considers in greater detail the likely impact on the scheme of those elements that could be value engineered out of the scope. This includes the potential cost savings and a recommendation as to which package of measures should be taken forward.

A.1 Re-baseline of costs, risks and programme

Description: the original detailed design drawings were costed using 2008 rates with uplift allowances. The value engineering exercise has revised these costs and re-baselined all prices to 2010 prices.

Likely impact on scheme: the revised costs for the scheme are now lower than the previous estimate. This comes from the increased level of design undertaken under the TWA design package. The current QRA provision along the route as a whole is £6m. The scheme would also benefit from investigative surveys such as geotechnical testing and more detailed (C3 and C4) utility enquiries as this will provide a greater certainty over the construction costs by removing / mitigating risks. C3 and C4 utility enquiries will have to be undertaken as some stage of the project, merely proposed to bring them forward in the process. There is no additional cost to the project and there are no programme implications.

The scheme would further benefit from a review of construction inflation and temporary land requirements (and therefore compensation). Taking into account the sensitivities of the scheme, only limited geotechnical investigations are likely to be acceptable. These should however include contaminated land tests along the railway corridors and reviewing the geotechnical survey of the stadium site.

Cost saving: scheme costs have been brought in line with current designs. This provides lower overall costs and a higher degree of confidence in the construction costs.

Recommendation: Undertake limited investigative surveys and more detailed (C3 and C4) utility enquiries to refine the scheme costs

A.2 Platforms (length and type of)

Description: the original scheme has been designed to accommodate both a rapid transit vehicle and the current service vehicles (single and double deck buses) that operate on routes originating from North Somerset. This resulted in platforms that were 40 metres in length, where possible. A further work package (jointly between the Bristol Urban design team and Halcrow) will be examining the most appropriate method to service these requirements and to provide detailed engineering options in line with the route design guide.

This will take into account that some stops have been reduced to 18 metres in length to fit into the available environment. Options for high, medium and low cost

platforms are being sought with different lengths and qualities being considered. This study will recommend measures for inclusion in the design that forms Design Freeze B.

Likely impact on scheme: an 18 metre long platform will only accommodate a single rapid transit vehicle so there is the possibility that a rapid transit vehicle may be delayed whilst waiting for a double deck bus to vacate the platform. The impact on the branding of the route could be affected as shorter platforms will not have the same impact on users. **However, 18 metre long platforms will only be considered where there is a limited risk to causing delay.**

Potentially there may be a reduction in the visual impact of the scheme.

Cost Savings: Awaiting the results of the final cost comparison exercise

Recommendation: Re-assess the provision of platforms for the entire scheme

A.3 Reducing the maintenance track to 3 metres

Description: the design prepared for the Major Scheme stage included a 4 metre wide maintenance track running alongside both the guided and unguided sections of the route between Long Ashton Park and Ride site and Ashton Avenue Swing Bridge. This would enable authorised vehicles to undertake routine maintenance and attend any broken down vehicle along the route. This track would also be open for use by pedestrians and cyclists. As a part of the value engineering the "maintenance track" has been reduced to 3 metres in width which will be adequate to safely accommodate appropriate works vehicles and pedestrians and cyclists.

Likely impact on scheme: narrowing the maintenance track by 1 metre will reduce the size of the embankments required, the amount of fill necessary to construct them, the amount of material required to construct the maintenance track and also narrow the bridges and other structures that it runs across, without being detrimental to the safety of pedestrians and cyclists. **It should be noted that the provision of a 3 metre "maintenance track" accords with national guidance regarding the minimum width of a track to be safely shared between pedestrians and cyclists.**

Cost Savings: £ 716,000

Recommendation: Reduce the width of the "maintenance track" from 4 to 3 metres

A.4 Remove guidance from the corridor busway

Description: currently 2,281 metres (45%) of the "corridor section" is guided. This ensures that the rapid transit vehicle locks into the guideway, increasing the quality of the ride. The guideway is designed such that unauthorised vehicles, such as private motor vehicles, cannot easily gain access. The guideway is also self-draining, which saves on the construction and maintenance of a positive system of drainage.

Likely impact on scheme: removing the guideway would require the scheme to follow a different process to gain powers to build and operate as a TWAO applies only to guided systems. It would also remove the requirement for a maintenance

track as maintenance vehicle would simply use the busway, and would require significant additional engineering works, such as a system of positive drainage.

The sensitivity surrounding the removal of the guided sections from the "corridor section" and the low cost savings, mean that we cannot recommend this option. It would negate the TWAO application.

Cost saving: £ 38,000

Recommendation: Retain the guidance of the scheme

A.5 Relocating the Silbury Road stop away from the bridge over Colliter's Brook

Description: the original design scenario sited the Ashton Vale stops on the bridge over Colliter's Brook, proposed near to the end of Silbury Road. Following detailed discussions with Bristol City Football Club, the location of these stops are being repositioned closer to the residential development proposed as part of the stadium planning application. The new position of the stops is likely to attract more patronage as well as reducing the size, complexity and cost of the structure. It also enables a more effective alignment for BRT.

Likely impact on scheme: relocating the stops is likely to attract more patronage, given its proximity to the new development. Reocating the stops also means that the width of the new bridge to be constructed at the end of Silbury Road will be reduced as it will not have to accommodate stops and it will be more consistent with the plans of Bristol City Football Club.

Cost saving: £ 460,000

Recommendation: Relocate the Silbury Road stops nearer to the proposed residential development

A.6 Re-design of the scheme to allow for single deck buses only

Description: the current scheme design includes allowing some North Somerset services to use the rapid transit corridor, some of which are currently served by double deck vehicles. To continue to allow the future operator to optimise these services by using the appropriate vehicle / frequency combination, it is considered beneficial to include by design the ability to use double deck buses. To accommodate these vehicles along the "corridor section" requires works to listed structures.

It should be noted that without removing the upper deck supports, a clearance of 4.450 metres can be achieved and this may mean that First has to run lower double deck vehicles to avoid damage.

Likely impact on scheme: overall there would be a cost saving if the scheme were to be re-designed to accommodate only single deck buses. It would, however, dilute the patronage benefits, compromising the overall scheme performance. It is also unlikely to be politically acceptable.

Savings would be recognised as the proposed flood mitigation trough at the Cumberland Road over-bridge would not be required as the section levels would remain at the existing level. Removing high vehicles would also remove the requirement to remove the upper deck support brackets from Ashton Avenue Swing Bridge, which is currently a remaining objection from English Heritage. There would also be no need raise the Vauxhall Bridge level to achieve suitable clearance.

Cost saving: £ 210,000

Recommendation: Retain the provision of a suitable corridor for double deck buses originating from North Somerset

A.7 Removal of the proposed cantilevered pedestrian / cycle facility on Ashton Avenue Swing Bridge and provision of "shuttle" traffic signal working for BRT

Description: the previous scheme design includes two-way working across Ashton Avenue Swing Bridge for both rapid transit vehicles and double deck vehicles. This would require the removal of the (now redundant) upper deck support brackets to achieve the required clearance, as the BRT vehicles will require all the space within the envelope of the existing structure. It is also proposed to construct a cantilevered structure to the east of the bridge to provide for pedestrians and cyclists.

Shuttle traffic signal working was previously considered but was rejected due to the perception that it would cause increased delays to BRT services. However, further investigation, including modelling of this scenario, concluded that any delay would be minimal and that this could be adequately managed through linking the traffic signals at the bridge to those at the Cumberland Road highway bridge.

Likely impact on scheme: shuttle signal working across Ashton Avenue Swing Bridge would result in a cost saving. Rapid transit and double deck vehicles could be accommodated without the need to remove the upper deck support brackets, which in turn would potentially remove a major concern from English Heritage. A preliminary design of this option indicates that there would be sufficient space within the envelope of the existing structure to accommodate pedestrians and cyclists, which removes the need to construct the cantilevered structure. The only additional costs would be for a further set of traffic signals linked to the signal junction at the north end of the structure.

Providing traffic signals at Ashton Avenue Swing Bridge also gives the opportunity to better manage the section between the bridge and Museum Street, which will keep delay to an absolute minimum. This however will require a visual model using micro-simulation to prove there will be no significant delays to rapid transit and local service vehicles.

Cost saving: £ 350,000

Recommendation: Further design to confirm there is no negative impact from the provision of shuttle traffic signal working across Ashton Avenue Swing Bridge

A.8 Removal of Cumberland Road access ramp

Description: the section of the scheme that runs along Cumberland Road has been designed as the inbound sharing the Bristol Harbour Railway and outbound having an access ramp to take the vehicles up to Cumberland Road to connect to the proposed bus lane. Near to the Cumberland Road highway bridge.

Likely impact on scheme: removal of the ramp, whilst representing a cost saving, would have a negative impact on the reliability of the outbound service and on the residents of Cumberland Road. The outbound service, in this scenario, would cross Prince Street Bridge and continue south along Wapping Road before turning right along Cumberland Road. The rapid transit vehicle would then run on-street along Cumberland Road, sharing the outbound lane with general traffic, until it reached a dedicated bus lane just east of the Cumberland Road highway bridge.

There is current on-street parking on the south side of Cumberland Road which is mainly used by residents who do not have any off-street provision, which causes a short section of the highway to operate as an informal shuttle working system, especially when larger vehicles oppose one another. This option would require the removal of parking to prevent delays the rapid transit vehicle along this section of the highway.

This would have a negative impact on the local residents, many of whom have already objected to the Transport and Works Act Order application on the grounds of the amount of on-street parking that is affected by the scheme. There is also the possibility that this could be regarded as a significant alteration to the scheme which may require the consultation process to be undertaken again, inviting further objections.

On the positive side the inbound operation only along Museum Street would remove the requirement to acquire and demolish Jubilee House which would remove the owner's objection to the Transport and Works Act Order application.

It may also be necessary to amend the existing Environmental Statement and Transport Assessment and is likely to require an ES addendum.

Cost saving: £ 852,000

Recommendation: Retain the current Cumberland Road ramp design

A.9 Removal of guideway on shared alignment with Bristol Harbour Railway

Description: as described in the "likely impact on scheme" for option 8 above, the inbound rapid transit service shares the Bristol Heritage Railway. On the infrequent occasions when the railway is operational, inbound BRT services will be routed along Cumberland Road. This is considered to be acceptable given that Cumberland Road is lightly trafficked on Sundays thus minimising the risk of delay.

Likely impact on scheme: should the guideway be removed from the Heritage Railway for the in-bound service, it would mean on-street running into the city centre along the entire length of Cumberland Road on all days including periods that Cumberland Road is congested. This is likely to have a significant adverse impact on the journey time and reliability of the rapid transit vehicles. There remains the issue

regarding the on-street parking causing delay to the service. The implications in terms of removing the on-street parking, re-activating the consultation process and impact on the existing Environmental Statement and Transport Assessment are as per those outlined above.

More importantly, this option falls outside of the set Limits of Deviation and will therefore impact on the scheme description in the Transport and Works Act Order application. Traffic models would be required together with an amendment to the Environmental Statement and the Transport Assessment. It is highly unlikely that this option would be politically acceptable as the route ceases to be a guided busway.

Cost saving: £ 2,762,000

Recommendation: Do not remove the guideway from the Bristol Heritage Railway

A.10 Curtailing the Bristol Harbour Railway terminus spur to avoid the demolition of the tin shed at "A" Bond

Description: the current design includes a two-way rapid transit corridor around the back of A Bond which requires diversion of the western end of the Bristol Harbour Railway and relocation of the platform from its current location at Butterfly Junction to a new location to the east of A Bond. The relocation of the platform requires the acquisition and demolition of a tin shed directly to the east of A Bond which is owned by Bristol City Council, but leased on a long-term basis to Bristol No.3 Diving Club.

Likely impact on scheme: it is possible to shorten the Bristol Harbour Railway alignment at its western end but this would provide a shorter section of railway line removing the need to acquire and demolish the tin shed. Confirmation that this will allow acceptable operation of the Bristol Harbour Railway will be required.

This design change is also likely to remove the current objection from the diving club to the Transport and Works Act Order application.

The preferred option would be for the railway rolling stock and equipment stored in the shed under Smeaton Road to be relocated to M Shed and for it to be opened up a pedestrian and cycle link to encourage patronage from the Hotwells area of the city.

Cost saving: £ 180,000

Recommendation: Shorten the Heritage Railway alignment, retain the tin shed and open the shed under Smeaton Road as a pedestrian and cycle link

A.11 Removal of the proposed temporary Prince Street Bridge structure

Description: this option would remove the proposed temporary pedestrian and cycle structure from Prince Street Bridge. This would have an impact on access to Wapping Wharf and the Cumberland road area.

Likely impact on scheme: it is unlikely to be politically acceptable to remove the temporary structure however a lower cost alternative could be provided as defined below.

Cost saving: £ 185,000

Recommendation: N/A

A.12 Reducing the specification of the temporary Prince Street Bridge structure

Description: to enable the proposed strengthening works Prince Street Bridge will be swung into is open position, and therefore closed to vehicle traffic for around 6 months. Halcrow has researched the alternatives for providing a temporary structure for pedestrians and cyclists but this has been made more difficult as the temporary structure would need to allow water traffic to pass through the Floating Harbour.

During previous works when Prince Street Bridge was not in use, a temporary structure constructed from scaffolding was erected. It is considered that this would be an acceptable alternative for the duration of the strengthening works as it could be constructed to a suitable height to allow some water traffic to pass through the Floating Harbour without swinging and be occasionally and quickly removed and replaced if necessary. The only design issue would whether it is possible for this structure to comply with the requirements of the Disability Discrimination Act within a reasonable cost.

Likely impact on scheme: there is likely to be a positive impact on the cost by reducing the specification of the temporary Prince Street Bridge structure, but further investigation and cost comparison is required.

Cost saving: £ 100,000

Recommendation: Reduce the specification of the temporary Prince Street Bridge structure

A.13 Drop the alignment skirting the proposed BCFC stadium

Description: the current scheme has three scenarios: without a stadium; with a stadium and the stadium is built first; and with a stadium but BRT is constructed first. The only way that we could remove the two with stadium options is if the stadium were never built. The stadium has planning permission but further progress is held in abeyance until an application for Ashton Fields to be designated as a Town and Village Green is resolved.

At the time of drafting this Technical Note, there is no indication from the football club that they are to abandon their plans for a new stadium on Ashton Fields.

Likely impact on scheme: dropping the BCFC alignment would remove the two with stadium scenarios from the Transport and Works Act Order submission, without adversely affecting the submission.

Cost saving: TBA

Recommendation: At this time continue to consider the three scenarios set out above, including the two "with stadium" options

A.14 Reducing the specification of the proposed off bus ticket machines

Description: to ensure the reliability of the rapid transit route, off bus ticket machines are proposed to speed up the boarding of passengers. Originally it was proposed that each machine would accept smart cards, credit cards, coins and notes and provide change. The provision of change in particular results in these machines being costly. Consideration is being given to reducing the specification of these machines. This specification is being investigated and will be confirmed in Design Freeze B.

Likely impact on scheme: by simplifying the specification of the ticket machines provided at all stops, with the exception of Long Ashton Park and Ride given the anticipated greater levels of patronage, cost savings of up to £30,000 per machine could be achieved.

Cost saving: £ 580,000

Recommendation: Simplify ticket machines where appropriate

A.15 Reducing the specification / quantity of the acoustic barrier

Description: an acoustic barrier is required in the general vicinity of Silbury Road to protect existing residential and business properties from noise caused by rapid transit vehicles and double deck buses.

Likely impact on scheme: reducing the specification of the acoustic barrier will have a cost saving but may impact on the planning application and require a revision to the Environmental Statement and planning statement. The specification of the Acoustic barrier has already been reduced any further reduction could have a risk as a reduced size or specification of barrier could prove ineffective resulting in significant post operative claims.

Cost saving: N/A

Recommendation: Retain the current acoustic barrier

A.16 Reducing the proposed ITS infrastructure to platform only CCTV and simple communication networks

Description: the original design included continuous CCTV coverage of the route. This could be amended to limit CCTV provision to the stops.

Likely impact on scheme: a reduction in the proposed CCTV coverage could affect secondary users of the scheme such as cyclists and pedestrians as this can provide extra security for users. As the proposal still includes CCTV at stops there would be no increased risk to the rapid transit passengers. There would also be a saving in

CCTV maintenance costs with less cameras and associated equipment needing to be maintained and replaced.

Cost saving: £ 90,000

Recommendation: Reduce the level of CCTV provision

A.17 Removing the carriageway widening providing an extra lane through The Haymarket

Description: the original design included carriageway widening through The Haymarket to provide for a Bus Lane along the south eastern kerbline.

Likely impact on scheme: should the widening be removed from The Haymarket for the City Centre Loop, it would mean the rapid transit vehicle running in the current bus lane between St James' Barton Roundabout and Bridewell Street which has bus stops situated along its length. Retaining the current situation will mean vehicles are forced out of the bus lane into the general traffic lane when other buses are waiting at the bus stops and this is likely to have an adverse impact on the journey time and reliability of the rapid transit vehicles.

Cost saving: £ 1,286,000

Recommendation: Retain the widening at The Haymarket

Appendix B

Costing Spreadsheets

APPENDIX B: Costing Spreadsheets

West of England Rapid Transit: Ashton Vale to Temple Meads and Bristol City Centre
Capital Cost Estimate: Revised Value Engineered Central Case Scheme

April 2011 Estimate

Works Cost: Preferred Scheme	Q4 2010 Prices £				
Estimate Base: Q4 2010	**Segregated Corridor**	**City Centre**	**Land**	**Other**	**TOTAL**
Series 100: Traffic Management	494,722	1,007,866			1,502,587
Series 200: Site Clearance	643,059	197,415			840,474
Series 300: Fencing	251,300	57,800			309,100
Series 500: Drainage	499,095	12,950			512,045
Series 600: Earthworks	1,579,123	82,724			1,661,847
Series 700: Pavements	2,813,688	264,669			3,078,357
Series 1100: Kerbing and Footways	561,829	121,666			683,495
Series 1200: Traffic Signs and Road Markings	851,324	972,330			1,823,654
Series 1300: Street Lighting and Electrical Works	364,015	41,400			405,415
Series 1700: Structures	10,001,300	28,000			10,029,300
Series 2400 : Brickwork, Blockwork and Stone Work	20,500	-			20,500
Series 2500: Special Structures					-
Series 2700: Statutory Undertakers	500,000	256,500			756,500
Series 3000: Landscaping and Ecology	49,863	211,000			260,863
Rogues	218,000	657,843			875,843
ITS Costs	885,333	235,000			1,120,333
Estimating Tollerance	897,655	134,698			1,032,352
SUB-TOTAL ENGINEERING WORKS	**20,630,804**	**4,281,860**	**-**	**-**	**24,912,665**
	83%	17%			
Land			2,134,701		2,134,701
Environment		193,634			193,634
TOTAL EXCLUDING RISK	**20,630,805**	**4,475,495**	**2,134,701**	**-**	**27,241,000**
	76%	16%	8%	0%	

Excluding contingency **27,241,000**

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West of England Rapid Transit: Ashton Vale to Temple Meads and Bristol City Centre
Capital Cost Estimate: Revised Value Engineered Next Best Scheme

April 2011 Estimate

Works Cost: Preferred Scheme	Q4 2010 Prices £				
Estimate Base: Q4 2010	**Segregated Corridor**	**City Centre**	**Land**	**Other**	**TOTAL**
Series 100: Traffic Management	478,006	1,007,866			1,485,872
Series 200: Site Clearance	643,059	197,415			840,474
Series 300: Fencing	251,300	57,800			309,100
Series 500: Drainage	499,095	12,950			512,045
Series 600: Earthworks	1,585,994	82,724			1,668,718
Series 700: Pavements	2,766,288	264,669			3,030,957
Series 1100: Kerbing and Footways	561,829	121,666			683,495
Series 1200: Traffic Signs and Road Markings	851,324	972,330			1,823,654
Series 1300: Street Lighting and Electrical Works	368,815	41,400			410,215
Series 1700: Structures	9,281,300	28,000			9,309,300
Series 2400 : Brickwork, Blockwork and Stone Work	20,500	-			20,500
Series 2500: Special Structures					-
Series 2700: Statutory Undertakers	500,000	256,500			756,500
Series 3000: Landscaping and Ecology	49,863	211,000			260,863
Rogues	218,000	657,843			875,843
ITS Costs	843,090	235,000			1,078,090
Estimating Tollerance	859,868	134,698			994,566
SUB-TOTAL ENGINEERING WORKS	**19,778,331**	**4,281,860**	**-**	**-**	**24,060,191**
Land	-	-	2,134,701	-	2,134,701
Environment		193,634			193,634
TOTAL EXCLUDING RISK	**19,778,331**	**4,475,495**	**2,134,701**	**-**	**26,388,526**
	75%	17%	8%	0%	
Excluding contingency					**26,388,526**

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Appendix C

Revised Value Engineered Central Case Scheme

APPENDIX C: Revised Value Engineered Central Case Scheme

Appendix C -Ashton Vale to Temple Meads BRT (Page 1 of 3)
Revised Value Engineered Central Case Scheme

April 2011 Estimate

Works Cost: Central Case					
EOI Drawing Reference Numbers	Section A - Ch 700.919 to 1319.177 (Long Ashton Park & Ride)	Section A1 - Ch 1319.177 to 1645.442 (Stadium)	Section B - Ch 1645.442 to 1887.73 (New Wedlock Way)	Section C - Ch 1887.763 to 2029.608 (Section under New Wedlock Way Footbridge)	Section D - Ch 2029.608 to 2357.522 (Ashton Gate)
Series 0100: Traffic Safety & Management	£ -	£ -	£ -	£ -	£ 100,000.00
Series 0200: Site Clearance	£ 37,926.00	£ 21,948.00	£ 11,880.00	£ 7,185.00	£ 53,876.00
Series 0300: Fencing & Steps	£ 64,400.00	£ 103,950.00	£ 82,950.00	£ -	£ -
Series 0500: Drainage	£ 73,420.00	£ 45,738.33	£ 30,945.00	£ 19,956.67	£ 1,750.00
Series 0600: Earthworks	£ 621,304.11	£ 208,256.31	£ 136,810.23	£ 40,810.12	£ -
Series 0700: Pavements	£ 296,678.00	£ 188,060.00	£ 19,000.00	£ 117,290.00	£ 4,801.50
Series 1100: Kerbs, Footways and Paved Areas	£ 78,136.50	£ 59,043.00	£ 40,090.00	£ 20,131.00	£ 22,960.00
Series 1200: Traffic Signs and Road Markings	£ 118,058.50	£ 22,048.33	£ 111,851.50	£ 8,351.50	£ 27,064.50
Series 1300: Street Lighting and Electrical Works	£ 53,116.00	£ 32,462.20	£ 12,321.90	£ 18,470.20	£ 23,759.10
Series 1700: Structures	£ 1,615,000.00	£ 540,000.00	£ -	£ 93,500.00	£ 4,300,000.00
Series 2400: Brickwork, Blockwork and Stone Work	£ -	£ -	£ -	£ -	£ -
Series 3000: Landscaping and Ecology	£ 25,436.88	£ 13,059.60	£ 7,811.52	£ 3,554.70	£ -
Series: Rogues	£ 3,000.00	£ -	£ -	£ -	£ 200,000.00
Other Items					
Restricted Working					
Utilities					£ 83,333.33
Estimating Tollerance (5%)	£ 149,323.80	£ 61,728.29	£ 22,683.01	£ 16,462.46	£ 236,710.56
ITS Costs	£ 64,693.65	£ 64,693.65	£ 64,693.65	£ 64,693.65	£ 104,426.40
Preliminaries	£ 27,564.62	£ 27,564.62	£ 27,564.62	£ 27,564.62	£ 47,410.53
SUB-TOTAL ENGINEERING WORKS	£ 3,228,058.05	£ 1,388,552.33	£ 568,601.42	£ 437,969.91	£ 5,206,091.92
TOTAL	£ 3,228,058.05	£ 1,388,552.33	£ 568,601.42	£ 437,969.91	£ 5,206,091.92
ROUTE TOTAL					

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Ashton Vale to Temple Meads BRT (Page 2 of 3)
Revised Value Engineered Central Case Scheme

April 2011 Estimate

Works Cost: Central Case								
Section E - Ch 2357.522 to 2984.000 (Brunel Way)	Section F - Ch 2984.000 to 3325.119 (Ashton Avenue Swing Bridge & Create Centre)	Section G - Ch 3325.119 to 4227.384 (Cumberland Road)	Section H - Ch 4227.384 to 4633.515 (Museum)	Section I - Ch 4633.515 to 5000.000 (Prince St Bridge)	Area A - Arnolfini	Area B - Grove / Redcliffe Way	Area C - Temple Circus
£ -	£ -	£ -	£ -	£ -	£ 2,000.00	£ 2,000.00	£ 40,000.00
£ 32,669.00	£ 158,900.00	£ 163,520.00	£ 142,795.00	£ 12,360.00	£ 12,480.00	£ 3,980.00	£ 59,850.00
£ -	£ -	£ -	£ -	£ -	£ 3,000.00	£ 50,000.00	£ 1,600.00
£ 84,756.67	£ 40,042.62	£ 101,322.22	£ 59,612.50	£ 41,551.11	£ 2,800.00	£ 700.00	£ 700.00
£ 74,600.00	£ 155,060.17	£ 133,638.63	£ 98,100.00	£ 110,543.13	£ 20,592.00	£ 300.00	£ 19,040.00
£ 754,490.00	£ 195,120.00	£ 750,727.25	£ 252,000.00	£ 235,521.00	£ 63,957.50	£ 472.50	£ 34,240.00
£ 110,571.20	£ 55,085.30	£ 51,892.00	£ 59,360.20	£ 64,560.00	£ 8,056.00	£ 1,280.00	£ 34,220.00
£ 38,373.00	£ 130,650.33	£ 222,770.00	£ 42,437.00	£ 129,719.33	£ 212,970.00	£ 15,720.00	£ 167,540.00
£ 28,274.50	£ 47,247.70	£ 80,908.00	£ 41,836.50	£ 25,618.40	£ 7,200.00	£ -	£ 5,400.00
£ -	£ 1,016,800.00	£ 1,346,000.00	£ 90,000.00	£ 1,000,000.00	£ -	£ -	£ -
£ -	£ 20,500.00	£ -	£ -	£ -	£ -	£ -	£ -
£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
£ -	£ 3,000.00	£ 3,000.00	£ 3,000.00	£ 6,000.00	£ 40,000.00	£ -	£ 10,000.00
					£ 55,958.33	£ 11,167.88	£ 55,888.50
					£ 37,305.55	£ 18,613.13	£ 55,888.50
£ 83,333.33	£ 83,333.33	£ 83,333.33	£ 83,333.33	£ 83,333.33	£ 15,000.00	£ 500.00	£ 50,000.00
£ 56,186.72	£ 91,120.31	£ 142,688.90	£ 39,457.06	£ 81,293.65	£ 20,902.78	£ 3,722.63	£ 22,629.50
£ 104,426.40	£ 104,426.40	£ 104,426.40	£ 104,426.40	£ 104,426.40	£ 45,000.00	£ -	£ 80,000.00
£ 47,410.53	£ 47,410.53	£ 47,410.53	£ 47,410.53	£ 47,410.53	£ 55,958.33	£ 11,167.88	£ 55,888.50
£ 1,415,091.35	£ 2,148,696.69	£ 3,231,637.26	£ 1,063,768.52	£ 1,942,336.88	£ 603,180.48	£ 119,624.00	£ 692,885.00
£ 1,415,091.35	£ 2,148,696.69	£ 3,231,637.26	£ 1,063,768.52	£ 1,942,336.88	£ 603,180.48	£ 119,624.00	£ 692,885.00

Ashton Vale to Temple Meads BRT (Page 3 of 3)
Revised Value Engineered Central Case Scheme

April 2011 Estimate

Works Cost: Central Case							
Area D - Temple Way	Area E - Bond Street South	Area F - Bond Street North	Area G - Haymarket & Rupert Street	Area H - Centre North	Area I - Centre South	Area J - Prince Street	
£ 20,000.00	£ 2,000.00	£ 5,000.00	£ 100,000.00	£ 5,000.00	£ 2,000.00	£ 2,000.00	
£ 31,655.00	£ 2,600.00	£ 18,350.00	£ 53,400.00	£ 5,900.00	£ 7,200.00	£ 2,000.00	
£ 3,200.00	£ -	£ -	£ -	£ -	£ -	£ -	
£ 4,900.00	£ -	£ 700.00	£ 2,450.00	£ 350.00	£ 350.00	£ -	
£ 11,800.00	£ -	£ 1,520.00	£ 27,120.00	£ 432.00	£ 1,920.00	£ -	
£ 40,261.25	£ -	£ 11,075.00	£ 105,742.50	£ 5,612.50	£ 3,307.50	£ -	
£ 13,466.00	£ -	£ 8,588.00	£ 42,528.00	£ 2,712.00	£ 10,816.00	£ -	
£ 36,900.00	£ 158,130.00	£ 102,850.00	£ 106,520.00	£ 9,900.00	£ 152,500.00	£ 9,300.00	
£ 7,200.00	£ 1,800.00	£ 3,600.00	£ 10,800.00	£ 1,800.00	£ 3,600.00	£ -	
£ -	£ -	£ -	£ 28,000.00	£ -	£ -	£ -	
£ -	£ -	£ -	£ -	£ -	£ -	£ -	
£ 60,000.00	£ -	£ 75,000.00	£ 31,000.00	£ -	£ 45,000.00	£ -	
£ 5,000.00	£ 1,000.00	£ 2,000.00	£ 220,000.00	£ 1,000.00	£ 10,000.00	£ -	
£ 35,157.34	£ 24,829.50	£ 34,302.45	£ 109,134.08	£ 4,905.98	£ 35,504.03	£ 1,995.00	
£ 58,595.56	£ 41,382.50	£ 57,170.75	£ 181,890.13	£ 8,176.63	£ -	£ -	
£ 51,000.00	£ 5,000.00	£ 10,000.00	£ 100,000.00	£ 20,000.00	£ 5,000.00	£ -	
£ 12,219.11	£ 8,776.50	£ 11,434.15	£ 37,378.03	£ 4,135.33	£ 12,834.68	£ 665.00	
£ 10,000.00	£ 10,000.00	£ -	£ 20,000.00	£ 50,000.00	£ 20,000.00	£ -	
£ 35,157.34	£ 24,829.50	£ 34,302.45	£ 109,134.08	£ 4,905.98	£ 35,504.03	£ 1,995.00	
£ 436,511.60	£ 280,348.00	£ 375,892.80	£ 1,285,096.80	£ 124,830.40	£ 345,536.23	£ 17,955.00	
£ 436,511.60	£ 280,348.00	£ 375,892.80	£ 1,285,096.80	£ 124,830.40	£ 345,536.23	£ 17,955.00	
							£ 24,912,664.63