

# **PROJECT ORPHEUS PHASE 1B SIFT RECOMMENDATIONS**

**Report**

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## 1. INTRODUCTION

### Context

- 1.1 The purpose of this working note is to present to Nexus and their study partners the recommendations of the Orpheus study team arising from the review process undertaken during the initial stage of the Phase 1B study. The note summarises the potential risks and opportunities in the route-based analysis of the ten shortlisted Orpheus extensions that were identified as being likely to generate significant benefits during Phase 1A, and draws conclusions regarding the case for their continued inclusion in Orpheus. In the final section, two potential approaches to the remainder of the Phase 1B process are set out for discussion, and a number of short-term action recommendations are listed.
- 1.2 This review process is aimed at ensuring that the Phase 1B study is appropriately focused, so that the achievement of the objectives of the Outline Business Case, in delivering renewal and extension of the Metro system, is strengthened by the inclusion of fundable extension proposals. Whilst this note focuses primarily on the potential extensions to Metro, the importance of developing the renewal options for the existing system to the overall Orpheus project is also highlighted.
- 1.3 It is worth noting that whilst the DfT will consider a package of extensions where the economic and financial advantages of doing this are clear, they will still expect each extension to pass the fundability and economic viability thresholds individually. It should be anticipated the DfT will pay close attention to the financial impact of any renewal proposals and when considering extensions the DfT will wish to have confidence in a positive financial case for the extension and the Metro extensions as a whole.
- 1.4 The note builds on the information provided in Working Note 3<sup>1</sup>. It is also informed by a draft report provided by JacobsGibb into potential cost variances within the Phase 1A scheme cost estimates<sup>2</sup>, and further work undertaken by the study team as a whole.

### Summary of Approach and Recommendations

- 1.5 The approach taken in making the recommendations has been informed both by the NATA assessment and also by an assessment of the potential risks to the Outline Business Case both for the Orpheus project as a whole, and for each of the 10 potential extensions individually.
- 1.6 Inevitably, the assessment of risk is largely a matter of the informed judgement of the consortium: however this process has identified some clear differences in levels of risk between the potential extensions, some of these risks being largely outwith the control of the study partners.

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<sup>1</sup> Steer Davies Gleave, 4<sup>th</sup> February 2003. Working Note 3, 1<sup>st</sup> Draft: Potential Impact of Supportive Planning Policy Measures on Economic Appraisal of Orpheus Extensions

<sup>2</sup> JacobsGibb, February 2003. A Consideration of Potential Cost Variances on Shortlisted 1B Routes

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- 1.7 The note makes recommendations that a phased approach to the assessment be considered in order, prior to submission of a bid for funding from the DfT, to:
- i) ensure that resources are appropriately targeted;
  - ii) allow time to explore the implications and attitudes of local authority partners to the nature and detail of potential complementary policy measures and to ensure a satisfactory level of commitment;
  - iii) understand the potential impacts of these complementary policy measures on the case for central Government funding, where appropriate, once the likely impact of these measures is better understood and tested within a overall Local Transport Plan strategy for the study area; and to
  - iv) allow time to fully explore any significant interface or implementation risks with third parties (such as the SRA and Network Rail) so that an understanding can be arrived at with these third parties.

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## 2. ISSUES TO CONSIDER IN APPRAISAL OF PHASE 1A ROUTES

### Phase 1A Pre-feasibility NATA Assessment

- 2.1 The initial economic assessment of the ten shortlisted Orpheus routes was set out in Working Note 3, incorporating recent changes to Government guidance regarding discount rates and treatment of costs (Table 1).
- 2.2 This Working Note indicated that the Phase 1A route sifting and assessment process has identified a number of Metro extensions that clearly merit further examination during the Orpheus study. It should be noted, however, that although all the Phase 1A shortlisted routes are likely to generate important levels of economic benefits, none of the routes clearly demonstrates, at this stage, a Cost:Benefit case which would meet all the criteria set by the DfT for major scheme funding. It should be noted that all ten shortlisted proposals have been selected from a long list of 29 using the NATA appraisal framework as a sifting tool, and thus all ten routes should perform well under the other NATA appraisal headings, although this is not sufficient in itself to achieve central Government funding.
- 2.3 Inevitably in a pre-feasibility study of this nature, the analysis of costs and benefits has been based on illustrative or specimen routes within the corridors identified as being worthy of detailed analysis, and this has guided the interpretation of the economic indicators developed for each potential extension.
- 2.4 In making recommendations regarding the extensions options to be taken forward within Phase 1B, it is prudent to take into account the areas of potential risk and opportunity inherent in the estimation of project costs and forecasts of benefits at this stage in the development process of any such project. These risks and opportunities may have implications for the timing of further development of some of the shortlisted routes. An outline assessment of the extent of potential up-side and down-side factors is set out in this section under the following headings:
- i) Demand and benefit levels;
  - ii) Cost estimates; and
  - iii) Practicality / implementability issues.
- 2.5 Where there are differences in the level of risks and opportunities between the ten shortlisted extensions this is noted: others may apply uniformly to all extensions. The assessment presented here is inevitably subjective, but is based on the combined judgement and experience of the Orpheus project team.

#### ***Demand and Benefit Estimate Risks and Opportunities***

- 2.6 The key areas of risk and opportunity in the demand and benefit estimates relate to the following issues:
- Base year demand levels and patterns. The economic assessment assumes that the travel and land use patterns forecast by the TAMMS study provide an adequate indication of travel volumes and patterns throughout the Tyne & Wear area. This

is likely to be the case for routes centred on the area central to that study, namely Newcastle & Gateshead. Further away from this focus (and particularly for routes in Sunderland, Durham and Northumberland) it is likely to be a less reliable information source. Further work in this area, particularly the collection of new bus trip origin-destination data, will significantly improve confidence in this element of the assessment in the remainder of Phase 1B (and this is a key lesson learnt from the Sunderland Direct development process). The effects, however may equally be upside or downside.

- Future demand levels and patterns. The assessment uses the TAMMS projections of changes in demand and travel patterns to 2011. Following 2011 it has been assumed that public transport growth will occur at a rate of 1% per annum over the project life. While the approach is consistent with other studies, this has not been the recent experience in Tyne & Wear and therefore an assessment using a different level of outturn growth may be required.
- Mode choice and potential competitive position of Orpheus routes. The Phase 1A appraisal has assumed that bus services will not change following introduction of Orpheus. This is seen as a central position, which could be down-side (if new competing services are introduced) or up-side (if the network is redrawn to reduce parallel services). There are, however, some route-specific issues relating to level of segregation (and thus ability to maintain service attractiveness – as implicit in the mode constant and other mode choice parameters - with increasing congestion levels) and to proposals for other services. Further assessment of the potential synergy of Orpheus extensions with other policy measures is set out in the next section. It should also be noted that other initiatives to improve bus services are contained within the Local Transport Plan, and these improvements will need to be taken into account in any future more detailed assessment.
- Potential for additional travel markets not currently included in case. The provision of Park and Ride facilities has been excluded from the analysis undertaken to date in view of the lack of detailed knowledge of site availability and size, but a qualitative assessment (see Working Note 3) indicates that Routes 9, 19 and 21 show potential for park and ride provision.

2.7 A summary of the potential demand and benefit risks as they relate to individual extension is set out in Table 2.1.

**TABLE 2.1 POTENTIAL LEVEL OF RISK TO ECONOMIC CASE ARISING FROM DEMAND AND BENEFIT ESTIMATION**

Route	Base Year Demand	Future year Demand	Segregation Level	Changes to Other Services	Additional Markets
<b>Route 1</b> – Seaham to Sunderland	+/-	-	0	- (Inc. in rail freqs. on Durham Coast)	+
<b>Route 2</b> – Sunderland to Doxford/Ryhope	+/-	-	+/-		+
<b>Routes 5/6</b> – Sunderland to Washington					
via S Hylton	+/-	-	0		+
via Southwick	+/-	-	+/-		+
<b>Route 8</b> – Washington to Gateshead/Heworth	+/-	-	+++/-	- (Leamside Line reopening)	+
<b>Route 9</b> – Team Valley to Gateshead	+/-	-	0		+++

Route	Base Year Demand	Future year Demand	Segregation Level	Changes to Other Services	Additional Markets
Route 12 – West Harton to Biddick Hall	+/-	-	0		0
Route 19 - Gateshead to MetroCentre	+/-	-	0	Centrelink service development	++
<b>Route 21 – West End</b>					
St James to Walbottle	+/-	-	+++/--		+++
St James to MetroCentre	+/-	-	++/--		++
<b>Route 23</b>					
K'worth to 4 Lane Ends	+/-	-	++/--		+
C'lington to 4 Lane Ends	+/-	-	++/--	+ (ECML-driven reductions in local rail services)	+
Route 28 – Byker to Walkergate	+/-	-	+/-		0

Note: Scale runs between --- (risk of significant negative impact) through 0 (neutral) to +++ (risk of significant positive impact)

### Cost Estimate Risks and Opportunities

2.8 JacobsGibb has assessed the potential level of cost risk associated with the extensions under the following headings:

- Alignment (and particularly dependence on parallel Masterplanning work)
- Isolation from existing system (a standalone system likely to be higher cost)
- Rolling stock (need for bespoke vehicles)
- Heavy rail interface (where use of Network Rail alignments may be required)
- Structures (need for, and extent of, structures)
- Utilities (level of cost relating to diversion of Statutory Undertaker's utilities)
- Integration with Metro (if means of access to the existing Metro system is not yet fully established)

2.9 The conclusions of this exercise are set out in the Table overleaf. All risks to the costs have currently been identified as having a down-side effect. Some specific exclusions from the cost estimates have been identified, and (with the general exception of land costs and – potentially - the use of 20% for utility diversions rather than 10% employed here). These are largely route-specific. Examples include amendments to heavy rail signalling and power supply on Network Rail routes, bespoke LRVs for the gradients on Route 21, and additional allowances for difficult structures.

2.10 It should be noted that the application of the Green Book recommendations (and in particular the uplift applied to capital costs to reflect optimism bias<sup>3</sup>) are intended to

<sup>3</sup> The Green Book provides a range of outturn cost overruns for non-standard civil engineering projects. It is not possible at this stage to assess the applicability of a specific value with confidence – however for the purposes of this exercise a factor of 1.66 has been used, representing the top end of the quoted range. As the project definition becomes sharper in scope, and as risk management processes are identified and adopted, it should be possible in later stages of the appraisal to agree a lower figure with the DfT.

account for many of these down-side risks which can be difficult to quantify at this stage of project development. Note therefore that the costs or impacts shown in the Table overleaf are merely for information to show differences by routes – the costs should only be added in addition to the Green Book uplift where there may be omissions from the cost headings.

- 2.11 Any reduction in the level of optimism bias uplift would require evidence of the outcome of quantified risk assessments or particular consideration of key risks or elements of the proposed design which have not been undertaken (or would necessarily be expected to have been undertaken) at this stage of the development of the Orpheus project.

**TABLE 2.2 POTENTIAL LEVEL OF RISK TO ECONOMIC CASE ARISING FROM DEMAND AND BENEFIT ESTIMATION**

Route	Alignment Uncertainty	Isolation	Rolling Stock	Heavy Rail Interface	Structures	Utilities	Integration with Metro	Potential Cost Impact
<b>Route 1</b> – Seaham to Sunderland				--				+10 to 15%
<b>Route 2</b> – Sunderland to Doxford/Ryhope				-- <sup>4</sup>		-	-	+10-15% plus £0.6 - £0.8m
<b>Routes 5/6</b> – Sunderland to Washington								
via S Hylton				--	--			+£3-£4m
via Southwick				-- <sup>4</sup>	--			+£5-£7m
<b>Route 8</b> – Washington to Gateshead/Heworth		-	-		--	--		+£5-6m + 10-20% utils
<b>Route 9</b> – Team Valley to Gateshead				-	--			+£9-£11m
<b>Route 12</b> – West Harton to Biddick Hall				-- <sup>4</sup>				N/a
<b>Route 19</b> - Gateshead to MetroCentre					--			+£9-£11m
<b>Route 21</b> – West End								
St James to Walbottle				--	--	-		+£10-£15m
St James to MetroCentre				--	--	-		+£10-£15m
<b>Route 23</b>								
K'worth to 4 Lane Ends	+ / -				--			N/a
C'lington to 4 Lane Ends	+ / -				--			N/a
<b>Route 28</b> – Byker to Walkergate		-				-	-	N/a

Note: Scale runs between --- (significant negative impact) through 0 (neutral) to +++ (significant positive impact)

<sup>4</sup> If service extended beyond Sunderland

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### ***Practicality / Implementability Risks and Opportunities***

- 2.12 An internal workshop was held by Nexus and the study team on the 27<sup>th</sup> January 2003 to assist in the process of understanding:
- The potential risks in integrating LRT, Metro and Heavy Rail technologies, and
  - Risks relating to asset life and replacement strategy.
- 2.13 Notes of this meeting were issued on the 13<sup>th</sup> February to Nexus, and JacobsGibb is currently preparing a report. The main issues as they relate to the Phase 1B sift relate to costs (considered above) and to implementation risk (often driven by the nature and extent of the interfaces between the Promoter and other interested bodies.)
- 2.14 In the absence of the report, it is possible to make some general points that may affect the Phase 1B sift. In particular, these relate to
- The potential for low floor LRV operation on the existing system; and
  - Whether the project may impact on the capacity (and therefore the performance) of the heavy rail network.
- 2.15 The workshop identified that the potential for operation of low floor LRV through the central area Metro tunnels may involve a considerable risk that the station boxes may need to be extended, and that it is possible that these changes may result in the need to apply the standards of safety applicable to underground stations since the Kings Cross fire. This could result in a significant level of additional cost to the project through, for example, the provision of additional exits from central stations, specialist fire fighting equipment and may require modified working practices. No conclusion on this area of risk has yet been made by the study team, and it is not yet clear whether this may have implications on route selection.
- 2.16 Regarding Orpheus extensions onto heavy rail alignments, the SRA has made two relevant statements recently regarding spending priorities. First, they have indicated that the SRA is interested in assessing options for replacing heavy rail local services with light rail where they are likely to achieve a robust economic case. Although it is understood that Nexus is intending to discuss this further with the SRA, it is thought that at this stage the focus of this interest is likely to be Birmingham and Manchester where there are major rail capacity and/or subsidy issues which light rail could address. In the North East, the options are less obvious, with no lines providing only local rail services and most having significant volumes of freight and/or intercity traffic. Indeed, as part of the Capacity Utilisation Strategy process, local services on the ECML north of Newcastle are believed to be under examination in an attempt to increase capacity for longer-distance services, and there are few opportunities to divert freight services from the Durham Coast and ECML north of Newcastle.
- 2.17 Secondly, the SRA has clearly set out, in the Second Strategic Plan and in the announcement regarding steps to improving rail network performance of 16<sup>th</sup> January 2003, that in the next few years it is unlikely to fund schemes which may add to congestion on the network. In this context, the main conclusions that can be drawn is that the routes involving use of Network Rail infrastructure are likely to involve a considerable level of implementation and institutional risk, and that this risk is likely

to continue through 2003/4 and beyond. Moreover, the de-scoping of ECML upgrade proposals is, in the short to medium term, likely to limit opportunities for enhancing local rail capacity (for shared or sole use) as well as limiting the potential for new local rail services. On the Durham Coast and Hexham lines, however, it may be that potential changes to the level of service in response to the capacity utilisation review could have a positive effect on the case for Orpheus extensions.

- 2.18 The main implication of this for the Phase 1B study is in relation to the timing of any funding submission to Government for routes involving heavy rail alignments (although there may be a cost impact as well), specifically routes 1, 2, 9, 12 and 19 and potentially 5 & 6 (if through-running beyond Park Lane is envisaged). In the case of the Sunderland to Pelaw line, for example, it has been indicated that an additional six paths per hour would be operable were the Durham Coast services to terminate at Sunderland from the south. It may be sensible in this case to establish a dialogue during Phase 1B with the study partners regarding the optimal use of the capacity of this line prior to further work on the transportation case for Orpheus extensions, as the final outcome may affect not only scheme costs but service characteristics (tram type, speeds, frequencies, reliability and so on) and therefore passenger preferences.

**TABLE 2.3 POTENTIAL LEVEL OF RISK RELATING TO INTERFACES WITH NETWORK RAIL**

Route	Network Rail Interface Risk	
<b>Route 1</b> – Seaham to Sunderland	--	Capacity on Sunderland – Pelaw – Seaham
<b>Route 2</b> – Sunderland to Doxford/Ryhope	--	Capacity on Sunderland – Pelaw (if through running)
<b>Routes 5/6</b> – Sunderland to Washington		
via S Hylton	--	Capacity on Sunderland – Pelaw (if through running)
via Southwick	--	Capacity on Sunderland – Pelaw (if through running)
<b>Route 8</b> – Washington to Gateshead/Heworth	N/a	
<b>Route 9</b> – Team Valley to Gateshead	--	Current alignment utilises Hexham - Newcastle line
<b>Route 12</b> – West Harton to Biddick Hall	---	Capacity on Sunderland – Pelaw (if through running). Introduces new conflicts at the south end of the alignment
<b>Route 19</b> - Gateshead to MetroCentre	--	Current alignment utilises Hexham - Newcastle line
<b>Route 21</b> – West End		
St James to Walbottle	N/a	
St James to MetroCentre	N/a	
<b>Route 23</b>		
K'worth to 4 Lane Ends	N/a	
C'lington to 4 Lane Ends	+	Reduction of services to Cramlington could improve case for Orpheus extension
<b>Route 28</b> – Byker to Walkergate	N/a	

Note: Scale runs between --- (significant negative impact) through 0 (neutral) to +++ (significant positive impact)

## Future Potential Changes in Appraisal Guidance

- 2.19 Although the appraisal guidance changes announced with the publication of the Treasury Green Book have already been incorporated into the assessment presented in Working Note 3, further changes are likely.
- 2.20 Further possible changes are set out in the table overleaf. The inclusion of an assessment of distributional impacts may, if translated into guidance, go some way to countering the effects of the optimism bias factors – however the DfT’s position on this is not clear at the present time.

**TABLE 2.4 CHANGES IN APPRAISAL GUIDANCE**

Change	Effect	Source	Status
Accounting for optimism bias	Negative for all schemes at initial stages of development	Treasury Green Book	Confirmed and included in assessment
Discount rate reduced 6% to 3.5%	Positive for all schemes <sup>5</sup>	Treasury Green Book	Confirmed and included in assessment
Appraisal period increased beyond 30 years	Slight Positive for all schemes <sup>6</sup>	Department for Transport	Not confirmed - but likely
Equity considerations in appraisal	Effect varying between schemes and areas, could be positive in North East	Treasury Green Book	Precise application to transport projects under consideration but not confirmed
Economic Impact report (Establishes regeneration impacts)	Effect varying between schemes and areas, could be positive in North East	DfT	Promoter will still need to pass established financial and economic tests

## Potential Synergy between Orpheus Extensions and Other Policy Measures Under Consideration in Achieving Local Transport Plan Objectives

### Potential Impacts

- 2.21 Fiscal measures of road user charging have been assessed (reported in Working Note 3) as having a very broad range of potential effects, with the magnitude of the impact likely to be dependent on the extent to which car travel is currently faster and cheaper than public transport travel (and thus more generally on the levels of traffic congestion in the area).

<sup>5</sup> Unless on-going revenue support is significant

<sup>6</sup> But note that this may have negative implications in terms of the need to incorporate renewal costs

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- 2.22 In areas of limited congestion, the effects of fiscal restraint could be less than a 10% increase in demand for a new public transport scheme. In areas of significant congestion, the effects could be greater, with levels of increase of up to around 50% being forecast in Edinburgh and in the south-east outside London.
- 2.23 It should be noted that with the exception of Route 21, an increase of 20% in the forecast level of benefits for all Orpheus routes does not significantly change the economic Cost:Benefit case for the routes, which remain poor. Furthermore, it is likely that the magnitude of change would be significantly lower for schemes outside Newcastle/Gateshead, given the significantly lower levels of traffic congestion that occur there and the forecast future year network conditions.

### ***Appraisal Issues***

- 2.24 There is undoubted potential for synergy between Orpheus extensions and other potential Local Transport Plan policies. It is difficult to estimate with any certainty the magnitude of this effect at this stage, however. This is due principally to two reasons:
- i) The variety of potential policy measures, particularly those which aim to change the relative balance between the costs of car travel and that of public transport, their differing effects on the market for Orpheus (and on travel generally), and the currently-uncertain implementation routes which some measures may require; and
  - ii) The importance of treating the policy measures within a holistic transport strategy package (and the lack at this stage of a firm plan by the Local Transport Plan partners to implement such measures in a committed minimum scenario against which Orpheus extensions could be compared, compounded by the absence of a tool by which the potentially-supportive measures could be assessed in terms of an overall transport strategy for the Local Transport Plan area.)
- 2.25 Steer Davies Gleave has undertaken further work in attempting to examine the DfT's potential viewpoint on this issue, as it relates particularly to recent evidence in other light rapid transit scheme submissions. The conclusions of this work indicate that:
- The submission of Annex E documentation in which the case depends upon a minimum situation that is not yet committed in the LTP strategy (and that are in line with stated LTP objectives) is unprecedented to date. It is therefore crucial that this issue is explored with the DfT to establish their specific view on this relative to the Orpheus project;
  - Another option would be where a do-something scenario is created that includes certain complementary measures as well as the Orpheus extensions. This approach has been accepted by the DfT in the past, although experience suggests that this is only acceptable if the measure is directly related to construction of the scheme itself (such as physically reducing roadspace along the corridors to be served by Light Rail, rather than any form of fiscal restraint). This would also be worthy of further exploration with the DfT.
  - Regarding integration, the DfT have in the past accepted the reorganisation of the bus network as part of the appraisal of bus transit schemes, but this is not yet been done for a light rail scheme. There are examples, however, of LRT scheme

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appraisals where it has been an accepted assumption that there would be a reduction in frequency of competing bus services in the do-something case on the basis of an agreed view on what would constitute a reasonable competitive response. It is worth noting that for a scheme to qualify for funding it should not be reliant on bus operating cost savings to achieve the necessary economic performance, however.

- 2.26 Overall, it is suggested that it will be necessary to demonstrate commitment to the adopted measures, and to be able to demonstrate an understanding of the broader impacts of the approach. This will enable a coherent holistic package to be presented to the DfT in parallel with the Orpheus funding submissions.

#### ***Metro Financial Performance***

- 2.27 Confidence in the case for extensions to Metro would be enhanced by a more robust financial performance of the existing Metro system. Any programme of renewal is unlikely to be supported by DfT if it results in an increased operating subvention for Metro. Moreover, an enhanced operating performance (with increased revenue and/or reduced operating costs) prior to any enhancement/extension programme would be more than likely to make the case more robust.

#### ***Indicative Timescales for Implementation of Wider Policy Measures***

- 2.28 To inform development of a way forward for Phase 1B, depending on the response from DfT on the above issues, an assessment of the time period that might be required to develop the case for certain complementary measures has been undertaken. This assessment is based on an understanding of the statutory requirements of a promoter of such measures, and any evidence from schemes in preparation or implemented to date (notably London's Congestion Charging scheme).

#### ***Road User Charging options***

- 2.29 The practicalities and timescales for implementing road user charging are uncertain given the lack of examples. However, our first assessment is as follows:
- Road user charging: this is likely to involve a period of three to five years from conception to implementation.
  - Workplace charging: about three to four years.

- 2.30 It is worth noting that the net revenues from both types of charge of must go directly or indirectly to fund local authority transport policies. The likelihood of road user charging in particular being implemented in the near future in the UK will very much depend upon the perceived success of London's scheme, and this is too early to judge.

#### ***Statutory Bus Quality Contracts***

- 2.31 Quality contracts: exclusive rights to serve a corridor or area are granted to one operator. Quality of service is specified in terms of frequency, vehicles type and reliability. The Transport Act establishes what has to be done to implement a Quality Contract and the associated timetable: the timescales for implementation are likely to be at least three years, but as there are no quality contracts in operation in the UK at

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present, it remains unproven. Coventry is currently awaiting a decision from Secretary of State, due in September. If permission is granted then it is likely that there will be a delay to see how this works before any other contracts are approved. Nexus understood that Sunderland, as a designated Centre of Excellence, is currently exploring the possibility of using powers contained under a “Freedoms and Flexibilities” clause in the Local Govt Act 2000. It is possible that further developments in this area may occur in the future: however a funding submission to the DfT that was reliant on efficiency gains through this quality contracts, however, would need to demonstrate local partner commitment and the deliverability of this mechanism.

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### 3. RECOMMENDATIONS

#### Summary

- 3.1 Overall, the analysis undertaken during Phase 1A and in the Phase 1B sifting process indicates that all routes will bring important benefits. However there are a number of very significant risks and opportunities in the development and submission of a funding application (Annex E) for the great majority the shortlisted 10 routes. At present, of the illustrative routes examined within the 10 corridors identified as being worth further analysis, one route (Route 21) appears to have the potential to present a positive economic case under the current appraisal guidelines and within the existing policy framework. It should also be noted that the development of the case for renewal of the Metro, a key part of the Orpheus concept, will in itself deliver significant benefits to all project stakeholders.
- 3.2 Overall, the levels of forecasting, appraisal and implementation risks and opportunities vary considerably between routes. Whilst all routes would perform better in conjunction with other complementary policy measures (albeit some better than others), many of these take time to implement and have high levels of risk, and the DfT will look for clarity from promoters as to means/timescales of implementation. These risks are summarised in the table overleaf.
- 3.3 This table also re-presents the estimated economic benefit to cost ratios for each extension option individually. This is done both with and without the additional allowance on costs required by DfT to allow for potential optimism bias. In the case where no optimism bias adjustment has been applied, the cost estimates represent the latest position set out in JacobsGibb, February 2003 report “A Consideration of Potential Cost Variances on Shortlisted 1B Routes”.
- 3.4 An alternative case for Route 6 is also presented here, assuming that the structures cost for the new Wear crossing that is required for this route can be reduced through advance passive provision within a new structure currently planned by Sunderland City Council independently of the Orpheus scheme. It should be noted that JacobsGibb originally estimated a cost for this structure at £3m.

**TABLE 3.1 POTENTIAL LEVEL OF RISK AND OPPORTUNITY RELATING TO INTERFACES WITH THIRD PARTIES**

Route	Change to Benefits at which NPV = 0		Change to Benefits at which NPV = 0		Level of Risk and Opportunity through					Overall
	BCR		BCR		Demand/benefit Estimate Inputs	Cost Estimates	Implement-ability	Supporting Charging Policies	Network Integration	
	No adjustment to costs to reflect Green Book guidelines		Costs adjusted in line with Green Book guidelines							
Route 1 – Seaham to Sunderland	1.0:1	1%	0.7:1	37%	0 / --	--	--	+	+	--
Route 2 – Sunderland to Doxford/Ryhope	0.8:1	19%	0.6:1	60%	+ / --	--	--	+	+	--
Routes 5/6– Sunderland to Washington										
via S Hylton	0.5:1	112%	0.3:1	208%	+ / -	--	--	+	+	--
via Southwick	0.3:1	208%	0.2:1	352%	+ / -	--	--	+	+	--
via Southwick (excluding cost of Wear Bridge)	0.4:1	190%	0.2:1	342%	+ / -	--	--	+	+	--
Route 8 – Washington to Gateshead/Heworth	0.5:1	105%	0.3:1	210%	++ / -	--	0	++	+	0
Route 9 – Team Valley to Gateshead	0.5:1	106%	0.4:1	170%	+ / -	--	--	++	+	0
Route 12 – West Harton to Biddick Hall	0.6:1	59%	0.5:1	105%	0 / -	--	---	+	+	--
Route 19 - Gateshead to MetroCentre	0.6:1	59%	0.5:1	113%	+ / -	-	-	++	+	0
Route 21 – West End						--				
St James to Walbottle	1.3:1	N/a	0.9:1	9%	++ / --	--	0	++	+	+
St James to MetroCentre	1.2:1	N/a	0.9:1	12%	++ / --	--	0	++	+	+
Route 23										
K'worth to 4 Lane Ends	0.8:1	28%	0.5:1	92%	+ / -	-	0	++	+	+
C'lington to 4 Lane Ends	0.7:1	51%	0.4:1	123%	+ / -	-	+	++	+	+
Route 28 – Byker to Walkergate	0.7:1	41%	0.5:1	116%	+ / -	--	0	++	+	0

Note: Scale runs between --- (significant negative impact) through 0 (neutral) to +++ (significant positive impact)




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- 3.5 In view of these conclusions, it is suggested that there are two main options for Phase 1B of Project Orpheus, as follows:
- i) Submission of funding applications during Phase 1B should be staged, with routes that appear to have the potential to be justified without complementary policy change, and which are unlikely to face serious unresolved interface/implementation risks, are developed first. Funding applications in Autumn 2003 would then constitute the first phase of a longer-term implementation plan. These areas of risk would be assessed in more detail in parallel with this exercise and the development of the funding case for remaining routes being progressed later during 2003 and into 2004 as parallel workstream timescales dictate; or
  - ii) The overall Phase 1B stage is extended considerably to encompass the development of a holistic transport and demand management strategy, to be enshrined within the forthcoming Local Transport Plan 2006-11 and containing a wider assessment of the potential contribution of Orpheus extensions within the overall local and regional plans for transport in the region.
- 3.6 The second approach would have the advantage of considering the Orpheus project in parallel with other LTP schemes, but would introduce a major delay in project development that may be unacceptable.
- 3.7 On the basis of the first option, therefore, it is suggested here that Route 21 should be taken forward to an Annex E submission during 2003 (with both the two identified western variants and with Route 28 as an eastern variant), as originally envisaged, subject to a valid case being developed during the remainder of 2003. The case for route 23 appears the most likely to be assisted by complementary planning measures, and there may therefore be some merit in considering these within a more holistic assessment when the precise nature of these measures is understood and has local and regional acceptance. However further work on investigation of alternative alignments for this route may also improve the position of this route and it is recommended that work on this route therefore continues in parallel with that for Route 21, with a decision being taken on whether to proceed with an Annex E submission in 2003 as the case develops. For both of these options, the work programme will include the development of a lower cost alternative as a comparator.
- 3.8 Amongst the other routes, Routes 1, 2 & 12 in Sunderland/South Tyneside/Durham show the potential to generate useful levels of benefits, but these routes are subject to considerable implementation risks, largely dependent on an interface with Network Rail that in the current policy framework may not be feasible in the short term, and also are likely to benefit less than routes in more congested areas from parallel policy measures to increase the relative costs of car travel. Routes 9 & 19 could also merit further examination, but are also considered to be at risk from the interface with Network Rail (and potentially also from serious cost risks, especially the tunnel section).
- 3.9 It is therefore proposed that in view of the high level of risk to Nexus and partners in further developing the case for these extensions at this stage routes 1, 2, 9, 12 and 19

should form part of a later stage of the Orpheus project. This phase would also encompass the process of choosing and developing complementary measures by the Local Transport Plan partners, on the basis of their contribution to the objectives of the 2006 – 11 Tyne & Wear Local Transport Plan.

3.10 It does not appear likely that a satisfactory case for routes 5, 6 & 8 is foreseeable within the current timescales, even with supportive policy measures, and it is therefore recommended that alternative solutions are sought to the transport problems for areas served by these routes. A final view on Route 8 if treated as an extension of Route 9 through Team Valley as requested by Gateshead, would then form part of the development of the case for Route 9 if the first assessment of this option appears favourable.

3.11 An indicative programme for the two-stage approach is set out in the table.

**TABLE 3.2 INDICATIVE PHASING FOR STAGED ORPHEUS ROUTE DEVELOPMENT OPTION**

Year	2003			2004				2005				2006			
Quarter	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Original Orpheus Phasing	Phase 1B			Phase 2				Phase 3							
Orpheus Stage 1 Development case for Routes 21, 23 and potential variants (including lower cost alternatives)	Develop Annex E Submission			OBC Submission		TWA Process				Potential Procurement Start					
Development of Local Transport Plan Strategy Complementary Measures	Explore policy framework changes, Summer 2003 APR			Define Strategies				Implement Strategies							
Assessment of Implementation risks and capacity issues on Network rail routes	Explore capacity utilisation and Third Party Interface Risks and Opportunities 														
Orpheus Stage 2 – Potential development of Funding Case for Routes 1, 2, 9, & 19	Preparatory works on Funding Case for Routes 1, 2, 9 & 19 			Develop Annex E Submission(s) and OBC 				TWA Process commences							

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### **Asset Renewal Issues**

- 3.12 During the early development of routes in the first stage of Phase 1B during 2003, it will be crucial that the technical development of the asset replacement strategy for Metro considers impacts on the potential second stage routes in order that the impacts of any technology decisions on future extensions are fully understood and accepted.

### **Recommended Short-term Phase 1B Actions**

- 3.13 Some early recommended actions for the Orpheus Team arising have been identified as follows:
- Continued development of potential do-minimum scenarios for the existing Metro system including consideration of a range of renewal options;
  - Early discussions with DfT regarding the do-minimum scenarios and local stakeholders' proposals for the development of supporting policy measures and potential interaction with the eventual Local Transport Plan strategy and the case for Orpheus extensions (including feeder options which may improve the financial performance of the existing Metro system);
  - Travel demand data collection to be carried out in corridors serving routes 9, 19, 21, 23 and 28 and in March 2003 (according to timescale and resource constraints), to be followed by additional data collection for 1 & 2 in late April/May;
  - Establishment of a forum for considering the options for future utilisation of capacity on the Sunderland – Pelaw and Newcastle – MetroCentre heavy rail routes, and potential levels of interface risks;
  - Establishment of a working group to establish guidelines and principles for the detailed development of route alignments and specifications, urban design prior to further detailed technical or transport planning feasibility work on individual corridors – this should include conclusions on the potential costs and benefits of low-floor LRV operation in the central Newcastle tunnels and in Sunderland;
  - Finally, establishment of route-specific working groups to develop the alignment and service proposals in conjunction with study partners.

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## CONTROL SHEET

Project/Proposal Name: Project Orpheus

Document Title: PROJECT ORPHEUS PHASE 1B SIFT  
RECOMMENDATIONS

Client Contract/Project Number:

Document Number: See footer

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Sign: Approved remotely

## ISSUE HISTORY

Issue No.	Date	Details
1	19 / 02 / 03	First Preliminary Draft
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3	06 / 03 / 03	Final

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