4 METHODOLOGY AND ASSUMPTIONS

4.1 Option Appraisal

The economic and financial appraisal of the identified options covers the full duration of the Greater Western franchise, including the extension period, i.e. to 2015/16, discounted to 2004/5. Costs, revenues and benefits are at 2004/5 prices and a discount rate of 3.5% has been adopted in line with SRA practice.

Revenue and un-priced benefits for each option have been modelled using the SRA Western version of Moira, containing revenue for 2003/4, with each option evaluated within Moira against a base of the December 2004 timetable. The December 2004 version of Moira has been obtained from the First Group "bid" option that was supplied by the SRA. This has been amended to reflect the know changes on the North Cotswold route. Prices have been uplifted to 2004/5 levels assuming an annual RPI rate of 2.5%.

4.1.1 Demand Growth

Demand growth is based on the SDG GW RUS forecasts (using PDFH4-based methodology). Demand growth rates between 2002/3 and 2016/7 have been converted into average annual growth rates by broad geographical area as shown in Table 1 below.

Table 1 Average Annual Demand Growth (all ticket types)

Orig	Dest: Cll London	W London	Berkshire	Oxfordshire	Bristol Area	South Wales	South West	Cotswolds	Wiltshire	External	Total
Cll London	0.0%	2.8%	1.7%	1.5%	2.9%	2.8%	3.3%	2.9%	2.7%	0.0%	2.4%
W London	2.1%	2.8%	1.5%	1.3%	2.4%	2.1%	2.3%	2.4%	1.8%	1.8%	2.1%
Berkshire	2.8%	2.9%	2.1%	1.8%	0.9%	1.4%	1.5%	1.2%	1.9%	2.1%	2.5%
Oxfordshire	2.8%	2.7%	2.2%	1.9%	0.8%	0.9%	1.4%	1.4%	1.5%	1.5%	2.2%
Bristol Area	3.2%	1.7%	1.1%	0.6%	0.9%	0.8%	1.0%	1.4%	1.3%	1.2%	1.5%
South Wales	2.8%	1.4%	1.2%	0.6%	0.6%	0.6%	1.0%	0.9%	1.1%	1.0%	0.8%
South West	3.3%	1.4%	1.3%	1.1%	0.8%	1.0%	1.2%	1.1%	1.1%	1.4%	1.5%
Cotswolds	3.0%	1.9%	1.2%	0.7%	0.8%	0.9%	1.1%	1.4%	1.4%	0.9%	1.6%
Wiltshire	2.5%	2.2%	2.0%	0.7%	0.9%	0.7%	1.0%	0.8%	1.5%	1.3%	1.8%
External	0.0%	2.1%	2.3%	1.8%	1.2%	0.9%	1.6%	1.4%	1.5%	0.0%	1.7%
Total	2.6%	2.7%	2.0%	1.6%	1.2%	0.8%	1.5%	1.6%	1.8%	1.5%	1.9%

Specifically each option has been mapped to the appropriate Origin-Destination growth rates (weighted by 2002/3 volumes) in the table to arrive at a suitable annual growth figure for each option. Note that for Peak service options, season ticket growth was used rather than overall growth.

4.1.2 Revenue

The demand forecasts assume that real pricing of 1% p.a. is achieved over the forecast period, and the demand forecasts are already adjusted for price elasticity effects. For each option revenue is assumed to grow at 1% p.a. above the specific option demand growth.

4.1.3 Unpriced Benefits

(a) User Benefits

Calculated user benefits for each option consists of the user Value of Time and the crowding cost.

Value of Time growth follows TEN, section 2.15, i.e. 2.19% pa between 2000 and 2005, thereafter 2.03% pa.

Crowding Costs – in order to appraise the crowding benefits (or disbenefits) for each option, the escaped (or worsened) economic costs of crowding have been calculated. Crowding levels were calculated on a train-by-train basis using Moira with loads, with the resultant future year crowding cost change compared to the base year calculated using PDFH 4 crowding cost values.

(b) Non-User Benefits

Non-user benefits have been calculated on a flow basis using outputs from Moira. Key assumptions are that half of new users have transferred from road, with a car occupancy rate of 1.5 and a decongestion value of 15 pence per kilometre (assumed to be at 2003/4 prices). These values are consistent with SRA advice on recent proposals.

4.2 Cost Modelling

Each option has been assessed using a generic cost model. Each option has a specification, which details changes to the timetable and/or resources. From this specification the following input data are derived:

- Change in units and HST vehicles leased by unit type
- Change in train mileage by unit type
- Change in train hours by unit type

The change in units has been evaluated by timetable analysis. The train mileages and train hours have been calculated from Moira outputs.

The national rail revenue change attributable to the option is also calculated. The input data are entered into an operating cost model, which calculates incremental costs in the following categories:

- ROSCO costs (where additional units are required)
- Servicing and light maintenance
- Diesel fuel costs
- Cleaning
- Staff Costs
- Network Rail usage costs
- Station charges
- Marginal station running costs
- Retailing costs
- Revenue driven overheads
- Traincrew management and HQ overheads

Unit cost data for each of these cost categories is derived from benchmark values Jacobs have access to from previous studies. The following assumptions are made in calculating these values, based on our experience and knowledge of the businesses concerned.

- Average empty train mileage is assumed as 1.5% train mileage for Thames and Great Western services and 4% for Wessex. On a few options where this is significantly different this has been overwritten by option. Fleet availability is assumed as:

- HST 76%
- HST additional coach 88%
- Adelante 71%
- Voyager 80%
- Thames 82%
- Wessex 84%
- Staff productivity as a %age of train hours is 56.25%. Staff requirements for the train formations are assumed as:
- HST Driver, conductor and 2 on-board staff.
- Adelante and Voyager Driver, conductor and 1 on-board staff
- Thames Turbo, a driver only operation is assumed for Thames Inners and a view on driver / conductor and driver only mix has been taken from timetable analysis for Thames Outers.
- Wessex Driver and Conductor
- Retailing costs average 9% of revenue (standard retail commission rate)
- Other revenue driven costs average 3%
- Train crew and HQ overheads average 10% of controllable costs

4.3 Qualitative criteria driven by the overall objectives for the franchise

(a) To improve efficiency (unit costs) and overall cost of the franchise (subsidy reduction)

Pursuit of this objective will need to ensure achievement of the affordability constraint.

Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better
Significant increase in net costs incurred (over £5m PV over 10 years)	Some modest additional net costs (under £5m PV over 10 years)	No material net cost impact likely (+/- £0.5m PV over 10 years)	Some modest reduction in net cost likely (under £5m PV over 10 years)	Significant net cost reduction anticipated (over £5m PV over 10 years)

(b) To improve performance (punctuality and reliability)

The objective is to improve PPM for the franchise overall.

Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better
Significant deterioration in train performance likely to occur (potential to adversely affect Gtr W service group PPM significantly (i.e. by 1% or more)	Some modest deterioration in train performance likely to occur (unlikely to adversely affect service group PPM significantly (i.e. by 1%)	No material train performance impact likely.	Some modest improvement in train performance likely to occur (unlikely to affect service group PPM significantly (i.e. by 1%)	Significant financial improvement anticipated (Potential to improve service group PPM significantly (i.e. by 1% or more)

(c) To provide value for money

For new activity, transport economic benefit:cost ratio with a pass mark of [2:1]
For reduction or withdrawal, a net cost saving to transport economic disbenefit ratio of greater than [2:1]. Very lightly used services and station calls should be identified and reviewed as part of this franchise replacement specification process.

We suggest two measures, firstly the scale of net economic benefit:

Substantial disbenefit	Slight disbenefit	Neutral	Slight benefit	Substantial benefit
Substantial economic NPV loss (over £5m PV over 10 years)	Some negative economic NPV (up to £5m PV over 10 years)	No material transport economic NPV impact likely (+/- £0.5m PV over 10 years)	Some negative economic NPV (up to £5m PV over 10 years)	Substantial economic NPV gain (over £5m PV over 10 years)

Secondly as a test of value for money, a benefit / cost ratio measure. This depends on whether the option delivers service enhancement or retrenchment, and whether it incurs costs increase or decrease.

Value for Money test		
For service enhancement schemes		For service retrenchment schemes
Positive Benefit with some cost increase	Positive Benefit and cost reduction	Cost reduction with some economic disbenefits
BCR 2:1 or higher	Negative BCR (x:-y)	Cost reduction to benefits foregone ratio of 2:1 or higher

(d) To develop rail's contribution in the transport market in the region

Options should be developed with the aim of enabling rail to achieve it's potential for underlying passenger demand growth in existing markets and penetration of new markets. Given the difficulty in obtaining market share information, the measure proposed is the contribution to demand growth projections for existing markets and the assessment of market potential for new markets.

Substantial negative contribution to growing rail's contribution in the region	Slight negative contribution to growing rail's contribution	Neutral	Slight positive contribution to growing rail's contribution	Substantial positive contribution to growing rail's contribution
Retrenchment withdraws rail from a material existing market	Retrenchment likely to inhibit achievement of underlying passenger growth	No material impact	Enhancement likely to facilitate achievement of underlying passenger growth	Enhancement achieves entry into new market for rail or significant greater penetration of existing market

(e) To manage growth

Overcrowding will be measured by calculating economic crowding costs, and by applying criteria for passengers in excess of capacity (PIXC).

Substantial negative contribution to managing growth	Slight negative contribution to managing growth	Neutral	Slight positive contribution to growing rail's contribution	Substantial positive contribution to growing rail's contribution
Significant worsening of crowding on routes expected to experience substantial overcrowding	Some worsening of crowding costs	No material impact	Some improvement in reducing crowding costs	Significant reduction of crowding on routes expected to experience substantial overcrowding

(f) To operate within the NATA 5- point framework:

(i) environment

To build and protect the **environment**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(g) Safety

To improve **safety**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(h) Sustainable economy

To achieve a **sustainable economy**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(i) Accessibility & social inclusion

To improve **accessibility** & improve **social inclusion**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(j) Transport integration

To improve **transport integration**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(k) Improve station accessibility to train services

Specific objective to improve access at stations as the gateway to the train services, including car parking.

To improve **station accessibility to train services**				
Substantially worse	Slightly worse	Neutral	Slightly better	Substantially better

(l) Affordability

- An overall reduction in farebox subsidy / increased premium payments is almost certainly required. SRA to advise the target level for the GW franchise overall.

Affordability: How affordable is the option, e.g. in terms of scale of any initial capital investment funding and ongoing farebox subsidy				
Substantial affordability problem likely: i.e. very heavy initial capex, and / or substantial opex subsidy (over £20m PV)	Some likelihood that option would cause an affordability problem, either in terms of capital funding or ongoing funding commitment (under £20m PV)	Neutral: No material impact.	Some avoidance of existing significant funding commitment (under £20m PV)	Avoidance of substantial existing funding obligation (over £20m PV)

(m) Stakeholder Objectives

The opportunities, problems and proposals identified by key stakeholders will need to be considered and evaluated to enable SRA to provide a credible response.

Option's fit with stakeholder objectives and aspirations				
Diametrically opposed to stakeholders objectives /aspirations	**Partial move away from** stakeholder objectives / aspirations	**Neutral**	**Partially meets** stakeholder objectives / aspirations	**Fully addresses** specific stakeholder objectives/ aspirations

(n) To ensure a deliverable and effective rolling stock strategy that:

- Identifies fleet replacement needs and change in the quantum of vehicle requirements
- Identifies scope for reallocation of existing vehicles in the franchise
- Informs scope for transfer in/out of the franchise

Option's fit with a deliverable and effective rolling stock strategy				
Poor fit	**Somewhat Worse**	**Neutral**	**Somewhat Better**	**Perfect Solution**
Inconsistent with a deliverable and effective rolling stock strategy – e.g. requires significant new build rolling stock and premature redundancy of existing stock	Option causes sub-optimal deployment of rolling stock on the route in question &/or other routes	No material change	Option provides better fit of suitable rolling stock on the route in question &/or other routes	Options provides solution to rolling stock replacement / coping with growth without incurring new build vehicles consistent with plans for other franchises

(o) Freight Paths

- To ensure appropriate provision of freight paths. e.g. on the Reading to Oxford corridor

Option's fit with freight or other operator's path requirements and aspirations				
Totally incompatible with freight/ other operator's requirements and aspirations	**Partially inhibits** freight/ other operator's requirements / aspirations	**Neutral**	**Partially enables** freight / other operator's requirements / aspirations	**Specifically delivers** important freight/ other operator's requirements/ aspirations

(p) Engineering access

To achieve lowest industry net cost for maintenance activities and major renewals schemes, including major track and signalling renewal schemes.

Option's fit with engineering access requirements and aspirations				
Totally incompatible with engineering access requirements and aspirations	**Partially inhibits** engineering access requirements / aspirations	**Neutral**	**Partially enables** engineering access requirements and aspirations	**Specifically delivers** important engineering access requirement / aspiration

(q) Deliverability / Ease of achievement

Very difficult	Some difficulty	Neutral	Relatively easy	Easier than status quo
Substantial deliverability issues which are likely to prove very difficult to overcome	Some significant issues to be resolved which should prove possible	**No difficulty anticipated** Some issues to address but none anticipated to be difficult	No significant deliverability / achievement difficulties likely	Avoids a difficulty in continuing to attempt to deliver the base case

(r) Risk

Key risk areas include business risk i.e. revenue risk, cost risk. Performance and deliverability are scored elsewhere.

Imports substantially increased risk	Slight increase in net risk	Neutral	Slight net reduction in risk	Substantially reduces risk