

4. Train Operating Issues and Costs

- 4.1 This section of the report summarises the main findings of the analysis of train operating issues and costs. Further details of the analysis undertaken are contained in a separate Report on Rail Operational Issues and Costs. The main objective of the operational analysis described in this section was to demonstrate the theoretical availability of train paths to enable a local WCML train service between Glasgow and Carlisle to operate and further work would be required to establish the optimum operational arrangements.

OPERATIONAL ANALYSIS OF CORE OPTIONS

Base Timetable Assumptions

- 4.2 Discussions held with representatives of Network Rail early in 2003 revealed that the post Pendolino timetable is at an early stage of development. The timetable analysis has therefore been carried out using the best available information on the anticipated future train service patterns. The main timetable assumptions are summarised below:
- ◆ Virgin West Coast Pendolino and Cross Country Services - Information on Virgin West Coast (VWC) Pendolino services has been provided by Network Rail's Strategic Timetable Planning team and takes into account the recently announced reductions in Virgin Cross Country (VCC) services calling at Lockerbie station;
 - ◆ Other Passenger Services - in the absence of more detailed projected service pattern data for the future, the winter 2002/2003 ScotRail local services and Great North Eastern Railway (GNER) Glasgow Central to London Kings' Cross via Carstairs / Edinburgh trains have been assumed to operate;
 - ◆ Freight Services - An hourly freight train has been assumed to operate between Carlisle and Glasgow (in each direction) in a standard path. In addition existing coal train movements between Carlisle and Gretna Junction (which operate to and from the Kilmarnock line) have been assumed to operate; and
 - ◆ Empty Carriage Stock Workings - Empty carriage stock workings have not been taken into account in the analysis as they can usually be fitted around other train movements.

Rolling Stock Provision

- 4.3 Various alternative rolling stock could be used to operate a new local service. Further work would be required to establish the optimum solution. For illustrative purposes it has been assumed that the new local service is operated using class 334 3-car electric multiple units (EMUs) trains. These trains are felt by some to have a superior performance to diesel multiple units (DMUs), including class 158 and class 170 DMUs. These characteristics may be desirable given the capability of Pendolino and Voyager trains which will be operating the majority of other passenger train services on the WCML in the future.

Train Timings

- 4.4 On the basis of core option 1 (i.e. a local train service calling at the three main existing stations on the route), it was calculated that a class 334 EMU could travel between Carlisle to Glasgow in 1 hour 28 minutes and between Glasgow and Carlisle in 1 hour and 32 minutes. The introduction of three additional station stops in core option 2 would increase the journey time between Glasgow and Carlisle by approximately twelve to fourteen minutes (i.e. to around 102 minutes). This includes a four minute recovery time, to allow for both engineering work and 'schedule variation'. On this basis of using class 334 EMUs, a new local service (both core options 1 and 2) can be operated with two train sets if suitable train paths can be identified.

Timetable Development and Analysis

Timing of the First Northbound Train Service

- 4.5 In order to achieve an arrival in Glasgow prior to 08.45 for commuting purposes, a new local train service would need to depart from Carlisle at around 07.15. However, the lack of spare northbound train paths into Glasgow Central station dictates that an earlier arrival time of 08.21 is the only path available which meets this requirement.

Connections with Train Services to Edinburgh

- 4.6 Connection opportunities to Edinburgh can be achieved by ensuring that the first northbound service from Carlisle to Glasgow connects with the existing 07.05 Glasgow Central to North Berwick service which departs from Carstairs station at 07.43.
- 4.7 In the southbound direction, it is less easy to provide a connection in the evening (PM) peak period. The best connection which can be achieved is at Motherwell from the 17.21 from Edinburgh Waverley to Glasgow Central via Shotts service, which is due to arrive at Motherwell at 18.35. Lockerbie passengers do however have the option of using the existing 17.10 VCC service from Edinburgh Waverley. If additional new stations were opened at Symington and Beattock, this train could make an additional call at Symington in order to provide for southbound connections to the local stations. This is considered to be a better option than calling at Carstairs as it does not require trains to reverse.

Connections with Other Train Services at Carlisle

- 4.8 In order to maximise southbound connection opportunities at Carlisle with hourly VWC services and two-hourly VCC services, trains would need to depart from Glasgow at 27 minutes past the 'odd' hour. In the northbound direction, in order to maximise northbound connection opportunities at Carlisle with hourly VWC and two-hourly VCC services, the new local service would need to depart from Carlisle at 25 minutes past the 'odd' hour.

Preferred Timetable

4.9 Taking into account the above requirements, the preferred timetable summarised in Tables 3.1 and 3.2 for core option 1 and Tables 3.3 and 3.4 for core option 2 has been identified. Key features of the timetable are:

- ◆ Trains are timed to leave Carlisle at 25 minutes past the 'odd' hour between 09.25 and 2.125 hours;
- ◆ The first northbound train of the day leaves Carlisle at 06.48/48 (connecting at Carstairs with the 07.05 train from Glasgow Central to Edinburgh Waverley); and
- ◆ Trains are timed to leave Glasgow Central at 27 minutes past the 'odd' hour between 07.27 and 21.27 hours.

Table 4.1 Core Option 1 Timetable (Northbound)

Station								
Carlisle	06.48	09.25	11.25	13.25	15.25	17.25	19.25	21.25
Lockerbie	07.07	09.44	11.44	13.44	15.44	17.44	19.44	21.44
Carstairs arr	07.36	10.19	12.19	14.19	16.19	18.19	20.19	22.19
Carstairs dep	07.42	10.19	12.19	14.19	16.19	18.19	20.19	22.19
Motherwell	07.59	10.35	12.35	14.35	16.35	18.35	20.35	22.35
Glasgow	08.21	10.57	12.57	14.57	16.57	18.57	20.57	22.57
Carstairs	07.43							
Haymarket	08.24							
Edinburgh	08.30							

Table 4.2 Core Option 1 Timetable (Southbound)

Station								
Edinburgh	18.22							
Haymarket	18.26							
Carstairs	19.06							
Glasgow	07.27	09.27	11.27	13.27	15.27	17.27	19.27	21.27
Motherwell	07.45	09.45	11.45	13.45	15.45	17.45	19.45	21.45
Carstairs dep	08.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
Carstairs arr	08.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
Lockerbie	08.36	10.36	12.36	14.36	16.36	18.36	20.36	22.36
Carlisle	08.55	10.55	12.55	14.55	16.55	18.55	20.53	22.55

Table 4.3 Core Option 2 Timetable (Northbound)

Station								
Carlisle	06.38	09.25	11.25	13.25	15.25	17.25	19.25	21.25
Lockerbie	06.57	09.44	11.44	13.44	15.44	17.44	19.44	21.44
Beattock	07.06	09.58	11.58	13.58	15.58	17.58	19.58	21.58
Symington	07.29	10.19	12.19	14.19	16.19	18.19	20.19	22.19
Carstairs arr	07.36	10.27	12.27	14.27	16.27	18.27	20.27	22.27
Carstairs dep	07.42	10.28	12.28	14.28	16.28	18.28	20.28	22.28
Carlisle	07.48	10.39	12.39	14.39	16.39	18.39	20.39	22.39
Motherwell	07.59	10.48	12.48	14.48	16.48	18.48	20.48	22.48
Glasgow	08.21	11.10	13.10	15.10	17.10	19.10	21.10	23.10
Carstairs	07.43							
Haymarket	08.24							
Edinburgh	08.30							

Table 4.4 Core Option 2 Timetable (Southbound)

Station								
Edinburgh							18.22	
Haymarket							18.26	
Carstairs							19.06	
Glasgow	07.27	09.27	11.27	13.27	15.27	17.27	19.27	21.27
Motherwell	07.45	09.45	11.45	13.45	15.45	17.45	19.45	21.45
Carlisle	07.50	09.50	11.50	13.50	15.50	17.50	19.50	21.50
Carstairs dep	08.03	10.03	12.03	14.03	16.03	18.03	20.03	22.03
Carstairs arr	08.04	10.04	12.04	14.04	16.04	18.04	20.04	22.04
Symington	08.12	10.12	12.12	14.12	16.12	18.12	20.12	22.12
Beattock	08.34	10.34	12.34	14.34	16.34	18.34	20.34	22.34
Lockerbie	08.48	10.48	12.48	14.48	16.48	18.48	20.48	22.48
Carlisle	09.07	11.07	13.07	15.07	17.07	19.07	21.07	23.07

- 4.10 The timetable has been developed on the assumption that one of the train sets would be stabled overnight at Carlisle, which would appear to be feasible. It should be noted that it would be possible to operate a later service from Glasgow Central station at say 23.27 hours providing there is a corresponding later northbound service from Carlisle at 23.25.

Implications for the Reliability of Other Train Services

- 4.11 It is recognised that the introduction of an additional local service on the WCML will introduce a greater risk of delay to existing train services, and may have significant performance costs associated with it particularly if longer distance (Inter-city type) trains are affected. Consideration of this key matter lies beyond the scope of this study and would need to be assessed by the SRA.

Implications on Engineering Possessions

- 4.12 The requirement for engineering possessions has not been assumed to be a constraint to the operation of a new local passenger service between Glasgow and Carlisle. Future 'Rules of the Route' will depend on the requirements of passenger and freight train operating companies and a balance will need to be struck between

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future infrastructure maintenance requirements and the requirements of train operators.

OPERATING COSTS

- 4.13 The costs of operating the two core train service options has been estimated taking into account the following elements:
- ◆ Train power/fuel costs – largely a function of the train miles travelled;
 - ◆ Train crew costs – a function of the number of train hours operated;
 - ◆ Train maintenance costs – a function of the train miles travelled;
 - ◆ Track access charges payable to Network Rail – these are split into two elements: a *track usage* charge which is a function of the type of train used and the distance travelled; and a *congestion* charge, which is a function of the route used, the time of day/week and the number of trains run;
 - ◆ Station usage charge – payable to Network Rail and is a function of the type of station (e.g. major interchange or minor unmanned) and the number of services calling at it; and
 - ◆ Train leasing charge – dependent upon the type of train used and to a lesser degree the mileage accrued by that train.
- 4.14 All costs have been estimated at 2002/2003 prices and are summarised in Table 4.5.

Non-Network Rail Costs

Electric Traction Costs

- 4.15 Electric traction costs have been determined based on information published by the Office of the Rail Regulator (ORR) on the electrical charges payable to Network Rail for use of the lines and on the power specification of a 3-car class 334 EMU. 75% of the total power installed in the train has been assumed to be drawn for Core Option 1 and 80% for Core Option 2 (due to the additional three station stops).

Train Maintenance Costs

- 4.16 The cost of 'wear and tear' induced maintenance has been assumed to be 70p/train mile, based on cost data used in previous similar studies.

Station Maintenance Costs

- 4.17 The additional station maintenance costs (QX charges) associated with core options 1 and 2 have been estimated based upon the typical charges incurred at railway stations of a similar size and nature elsewhere on the rail network. The costs cover such items as station cleaning, removal of graffiti, vegetation clearance, painting and renewal/repair of fittings. It should be noted that existing train operators' annual station maintenance costs associated with Carlisle, Carstairs and Lockerbie stations will be reduced as a result of some of these charges being borne by the operator of a new local WCML service.

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Train Crew Costs

- 4.18 An estimate has been made of the required train crew diagrams for both drivers and conductors, taking into account the maximum permissible hours to be worked, as well as the need for regular personal needs breaks. Within these constraints the total number of staff required has been estimated for the two core service options, using industry standard salary costs (covering overheads as well as gross pay).

Train Leasing Costs

- 4.19 Train leasing costs have been estimated based upon advice from the train lessors of class 334 units (£20,000 per month per unit). It has been assumed that spare cover would be made available from the wider ScotRail fleet.

Network Rail Costs

Track Usage Charge

- 4.20 The track usage charge is payable for usage of the rail network, and is based upon the damage caused to the track by different types of trains. It varies by the train's axle weight, with heavier trains being charged more for each mile travelled than lighter trains. For a 3-car class 334 EMU a total cost of 35.8p/train mile has been assumed.

Track Congestion Charge

- 4.21 A track congestion charge is currently applied by Network Rail to all new rail services which operate over and above those running in the summer 1995 timetable. The charge reflects the additional strain placed upon the rail network, and is a function of the time of day and day of week of the operation of each train.

Station Access Charges

- 4.22 Station access charges cover the costs of leasing the station and associated infrastructure from Network Rail. The lease costs are calculated based upon the type of station and the facilities provided. The station access charge is the cost per train for calling at a particular station, and is allocated based upon the number of train vehicles departing a station.

Overall Operating Costs

- 4.23 Table 4.5 summarises the overall costs of operation for the two core service options under consideration. This shows that a new local service would cost in the order of £2.4 million per year to operate and that there is only a small additional cost (approximately £150,000 per annum) associated with serving three additional stations.

Table 4.5 Total Rail Operation Costs

Cost element	Core Service Option 1	Core Service Option 2
Number of trains needed	2	2
Electrical traction costs	£260,000	£316,000
Train maintenance costs	£355,000	£370,000
Station maintenance costs	£49,000*	£75,000*
Staffing/crewing	£865,000	£865,000
Train leasing costs	£480,000	£480,000
Track usage charge	£182,000	£182,000
Track congestion charge	£75,000	£75,000
Station access charges	£108,000	£160,000
Total cost per annum	£2,374,000	£2,523,000

ISSUES ASSOCIATED WITH THE SECONDARY TIMETABLE OPTIONS

Secondary Option A (Serving Additional Stations)

- 4.24 The introduction of further stops would result in the journey time being extended to in the order of 117 minutes. The additional journey time would also result in the need for the local service to be overtaken by other train services, further lengthening the train journey.
- 4.25 The overall resource requirement for this option would be three train sets. Additional staff costs, as well as station access charges at the three new stations, would also be incurred.
- 4.26 Results of the demand forecasting work stream indicated that demand forecasts for this secondary option would only be marginally higher than for core option 2. It is unlikely therefore that the additional operating costs associated with this option could be justified.

Secondary Option B (Serving Edinburgh)

Serving Edinburgh instead of Glasgow

- 4.27 A journey time of approximately 85 minutes between Carlisle and Edinburgh would appear feasible if the train service only called at Lockerbie and Haymarket. The journey time of a local service would increase to around 95 minutes if extra stops are made at Beattock and Symington. Consequently this service option could be operated with two class 334 train sets.
- 4.28 The main barrier to the implementation of this secondary option, however, is the lack of capacity for additional trains into Edinburgh's Waverley and Haymarket stations. This secondary service option is therefore unlikely to be feasible in the short or medium term.

Serving Edinburgh by Means of a Connecting Service

- 4.29 An alternative way of serving demand for travel to/from Edinburgh would be to operate a daytime connecting shuttle service between Carstairs and Edinburgh. This would require an additional train set and, due to the timing of trains at Carstairs, would involve very tight turnarounds at the Waverley end of the operation. A layover of between 25 and 30 minutes would be required at Carstairs in order to feed into and out of the local service.
- 4.30 Again, the current lack of capacity for additional train services into the west end of Waverley station is likely to prevent this option from being implemented in the short and medium term.

Secondary Option C (Service Extensions South of Carlisle)

- 4.31 There is obvious appeal to extend a local train service southwards along either to Leeds via Appleby or to Manchester via the WCML. Whilst the market research work undertaken did indicate that there was some desire for longer distance travel, the operational disadvantages of this operation would seem to far outweigh any extra demand generated. The main problems associated with this secondary option include:
- ◆ The use of EMUs for a new local service would not be possible, as the line between Carlisle and Skipton and between Preston and Manchester is not electrified and, as indicated earlier, the use of DMUs on a new local service between Glasgow and Carlisle would require additional resources to those required if EMUs are used;
 - ◆ Longer distance trains would be operationally less reliable, and may also require additional train sets to operate a new local service and allow for unreliability (i.e. provide for longer turnaround times); and
 - ◆ The need to timetable trains south of Carlisle between existing services is likely to compromise the timetabling of services between Glasgow and Carlisle.
- 4.32 Overall, it is not recommended that the local service is integrated with other longer distance services.

Secondary Option D (Service Extensions to Central Scotland)

- 4.33 Consideration has not been given to the feasibility of providing connections at Motherwell into a rail service to Central Scotland and the Highlands, as the market research work indicated that there is unlikely to be significant demand for such a link to be provided.