Government Office for the South West

London to South West and South Wales
Multi Modal Study
Corridor Plan: Bristol – Exeter
Final Report
May 2002

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
20	0	Plan Report: Bristol-Exeter Corridor - DRAFT	Mar'02	MBr / GW
20	1	Plan Report : Bristol-Exeter Corridor – Final Draft	Apr '02	MBr
20	2	Plan Report : Bristol-Exeter Corridor – Final Report	May '02	MBr

The Preferred Strategy will go to the Regional Assemblies for the South West and South East of England, and the Welsh Assembly Government, to consider their recommendations and as an input to the revision of the Regional Transport Strategies in Regional Planning Guidance for the South West and the South East.

These bodies will consider whether they wish to support the strategy. They will then, in turn, make recommendations to Ministers. Only then will any decisions be taken on the addition of schemes to investment programmes.

The study has been taken forward in an open and consultative manner and the possible options discussed publicly. Many of the proposals are at an early stage in the planning process and if the recommendations were accepted, further work would be required to prepare and consult on detailed designs and route alignments. This will allow specific impacts to be identified.

Contents

Executive Summary: Bristol – Exeter Corridor Plan

Context

E.1 The Bristol to Exeter Plan covers the main rail line between Bristol and Exeter and the M5. The Plan area excludes:

- the area north of Weston-super-Mare (covered in the Greater Bristol Area Plan);
- the area around Taunton (covered in the London to Exeter Plan); and
- the area around Exeter (covered in the Exeter to Penzance Plan).

E.2 There are a number of transport-related problems and issues pertinent to this Plan, including:

- congestion on the trunk road network, albeit that most congestion on this corridor is experienced around Bristol, Taunton and Exeter (covered in other Plans);
- congestion on the M5 is particularly acute on summer holiday weekends with significant amounts of traffic leading to/from the holiday resorts in Devon and Cornwall in particular;
- the existing rail and road links are not sufficient to overcome the peripherality of Devon and Cornwall;
- journey time reliability on rail is a particular concern, and
- whilst rail and coach services operate along the corridor, they do so at irregular and/or long intervals.

The Preferred Strategy

E.3 The Preferred Strategy is summarised in Figure 1.

E.4 The Bristol-Exeter Plan contains a Preferred Strategy which is truly multi-modal; it contains significant investment in the rail infrastructure and services, coach and express buses, interchanges, rural public transport schemes, new highway schemes and ITS measures.

E.5 A number of additional passenger rail services are proposed for the Bristol-Exeter corridor rail line. These include:

- Great Western Main Line services extended beyond Bristol (see the London-Bristol Plan) and enhanced direct Paddington-South West services via the Berks & Hants (see London-Exeter Plan);
- Services centred on Bristol, including cross-city services between Taunton and Gloucester and Exeter and Cardiff (see the Bristol area Plan); and
- Services centred on Exeter and further west are discussed in the Exeter-Penzance corridor Plan.

E.6 'Cross-country' services between the South West and northern England and Scotland are subject to significant improvements through Virgin's commitment to introduce new rolling stock and a 'clock-face' timetable in 2003. No further upgrades to these services are proposed in this strategy.

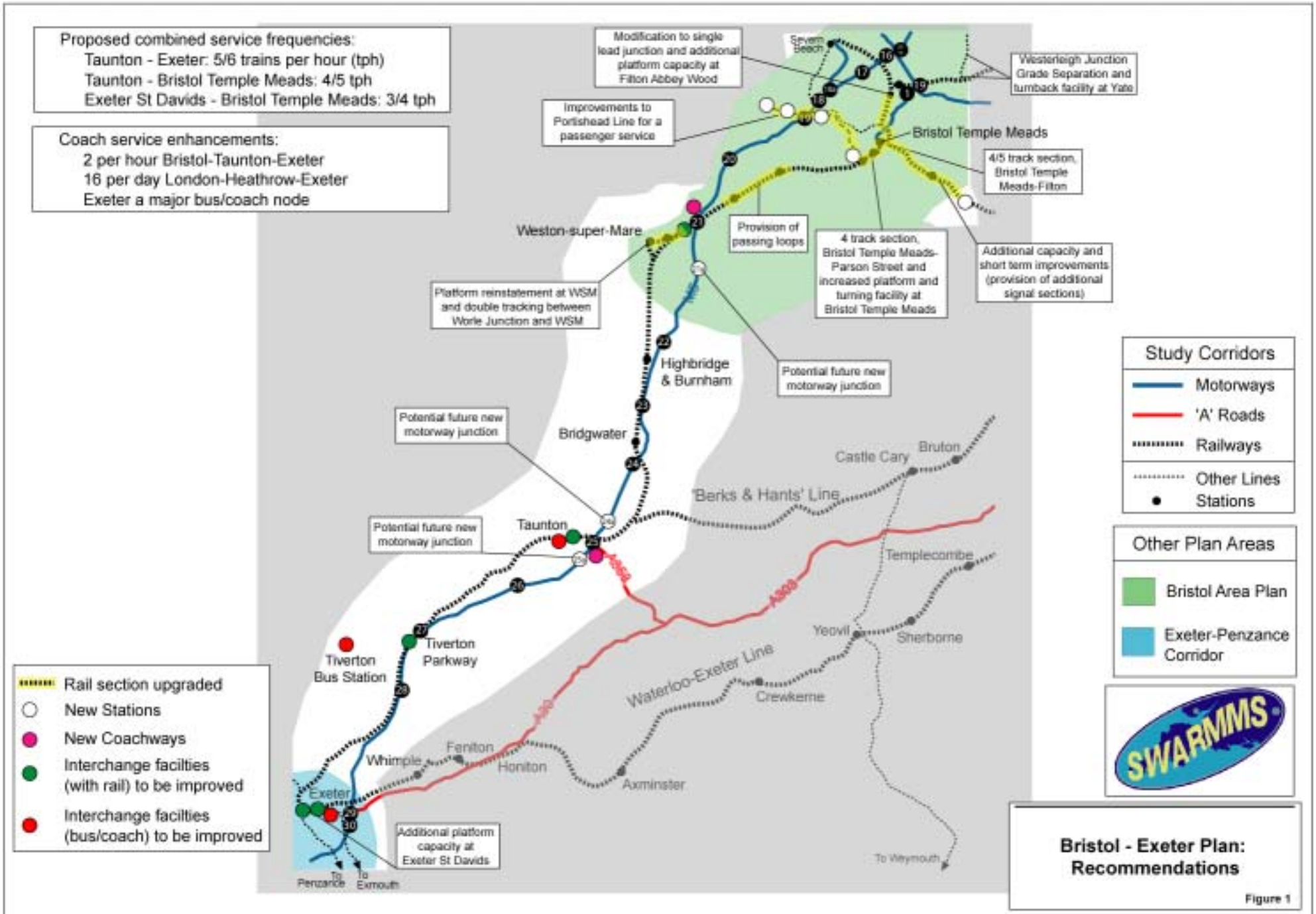
E.7 The Bristol-Exeter line is capable of straightforward (and relatively cost effective) upgrade to cater for enhanced loading gauges for inter-modal freight services.

E.8 The Preferred Strategy also includes a major enhancement to the coach network serving the Bristol-Exeter corridor and connecting settlements. The proposals are ambitious but, if implemented, would provide both significantly improved accessibility for those who rely on public transport and an increased frequency and improved reliability which will be of value to all potential travellers. Despite the focus of SWARMMS on the main corridors through the region (M5 between Bristol and Exeter), the express bus network proposed also provides significant enhancement for connecting movements off the main corridors (see London-Exeter Plan).

E.9 A comprehensive programme of upgrading existing public transport interchanges (both rail and coach/bus) is also proposed. A first class transport system demands that travellers have levels of comfort, security and information which are above those which currently exist in many locations. The upgrading of interchanges can have a major impact on people's perception of public transport and is a central part of the Preferred Strategy.

E.10 Reference is also made to the rural public transport schemes developed in the Rural Access to the Transport System Plan. When implemented, they will start to address some of the key problems of social exclusion in rural areas for those without access to a car.

E.11 A new Intelligent Transport System (ITS) is also proposed for the M5 corridor. This will particularly assist in reducing the number of accidents along the route as well as providing better information at times of congestion. Minor junction improvements are also proposed.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Exeter St Davids - Bristol Temple Meads: 3/4 tph
Coach service enhancements:
2 per hour Bristol-Taunton-Exeter
16 per day London-Heathrow-Exeter
Exeter a major bus/coach node
Modification to single lead junction and additional platform capacity at Filton Abbey Wood
Improvements to Portishead Line for a passenger service
Westerleigh Junction Grade Separation and turnback facility at Yate
Bristol Temple Meads
4/5 track section, Bristol Temple Meads-Filton
Provision of passing loops
4 track section, Bristol Temple Meads-Parson Street and increased platform and turning facility at Bristol Temple Meads
Additional capacity and short term improvements (provision of additional signal sections)
Weston-super-Mare
Platform reinstatement at WSM and double tracking between Worle Junction and WSM
Highbridge & Burnham
Potential future new motorway junction
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Bridgwater
Potential future new motorway junction
Taunton
Castle Cary
Bruton
'Berks & Hants' Line
Templecombe
A303
Yeovil
Sherborne
Waterloo-Exeter Line
A30
Crewkerne
Tiverton Bus Station
Tiverton Parkway
Whimple
Feniton
Honiton
Axminster
Exeter
Additional platform capacity at Exeter St Davids
To Penzance
To Exmouth
To Weymouth
Rail section upgraded
New Stations
New Coachways
Interchange facilties (with rail) to be improved
Interchange facilties (bus/coach) to be improved
Study Corridors
Motorways
'A' Roads
Railways
Other Lines
Stations
Other Plan Areas
Bristol Area Plan
Exeter-Penzance Corridor
SWARMMS
Bristol - Exeter Plan: Recommendations
Figure 1

1 Introduction

1.1 *Background*

1.1.1 Halcrow was appointed by the Government Office for the South West (GOSW) in March 2000 to undertake the London to South West and South Wales Multi-Modal Study ('SWARMMS' – South West Area Multi-Modal Study). The overall aim of the study is to make recommendations for a long-term strategy to address passenger and freight transport needs within the key transport corridors between London and the South West of England and South Wales (M3, M4, M5, A303, A30, A38 and the parallel rail routes). The SWARMMS study area is shown in Figure 1.1.

Figure 1.1: Map of the SWARMMS Study Area

1.1.2 This will include, as and where appropriate, plans of specific interventions to address existing and predicted strategic transport problems in the study area, looking in particular at opportunities for reducing congestion by better management and modal shift, as well as options for taking forward focused improvements.

1.1.3 This Plan is one of ten being produced for SWARMMS. The ten plans comprise:

Four Multi-Modal Transport Corridor Plans

- (London) Reading-Bristol/Severn Estuary (including the Great Western Main Line and the M4)
- (London) Reading/Basingstoke-Exeter (including the Berks & Hants and Waterloo-Exeter rail lines and the M3/A303/A30)
- Bristol-Exeter (including the Bristol-Exeter railway and the M5)
- Exeter-Penzance (including the Exeter-Penzance railway, the A30 and the A38)

Two Principal Urban Area (PUA) Plans

- Greater Bristol
- Swindon

Four Study-Wide Theme Plans

- Reducing the growth in travel demand
- Tourism
- Inter-modal freight
- Rural access to the transport system

1.2 Contents of the Report

1.2.1 This report details the findings of the Bristol-Exeter corridor Plan. A series of specific recommendations for the strategy is made in terms of:

- rail measures;
- other public transport (including coach and interchanges); and
- highway measures (including traffic control measures and new road schemes).

1.2.2 Chapter 2 sets the context for the Plan. Chapters 3 to 5 then describe the detailed schemes and measures which are included in the Preferred Strategy. Chapter 6 provides a summary of findings.

1.3 Interaction with other Plans

1.3.1 There is a degree of interaction between all ten Plans being produced by SWARMMS. By definition, the four corridor Plans interact by reason of

geography as shown in Figure 1.2, and specific links are referenced throughout each Plan.

Figure 1.2: Coverage of Geographic Plans

1.3.2 The four study-wide theme Plans also interact, both with each other and with the geographic-based Plans. This Bristol to Exeter Plan is particularly influenced by the Plan to reduce the growth in travel demand (as are all Plans) and tourism (with the M5 being the only motorway into the South West and a key holiday route from the Midlands, and the North of England.

2 Context

2.1 *Introduction*

2.1.1 This chapter sets the context for the Bristol-Exeter Plan, the geographic area for which is shown in Figure 2.1. It begins by presenting some basic travel data for the main transport links within the corridor. It lists the 16 key problems and issues identified at an earlier stage in the study which apply to the whole of the SWARMMS area, going on to explain those of particular relevance for this Plan. The chapter continues by summarising the finding of earlier work which led Halcrow to pursue the general structure of the Preferred Strategy.

2.2 *Travel Data*

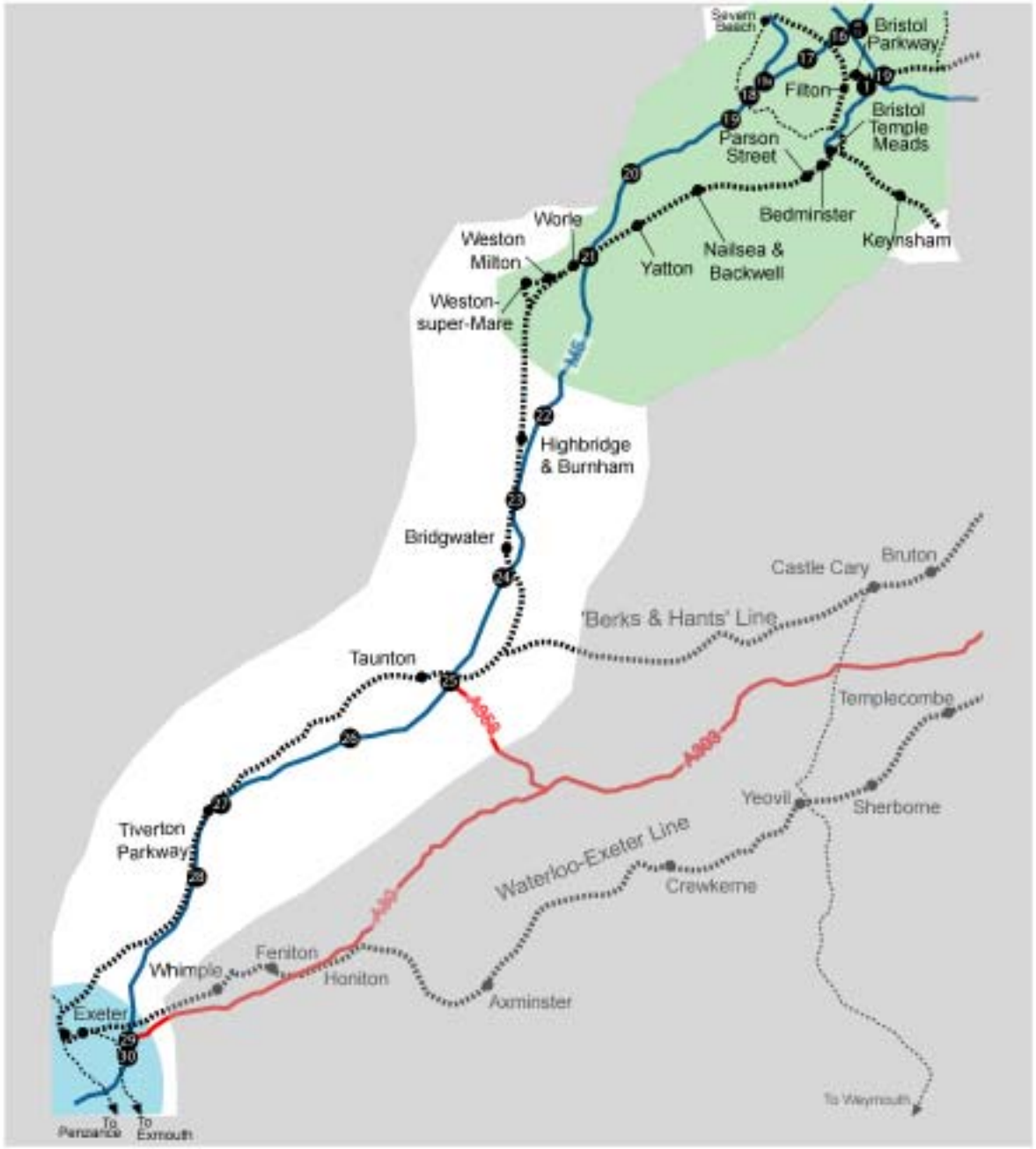
2.2.1 Figure 2.2 presents some basic transport data for the Bristol-Exeter corridor. It can be seen that the M5 traffic flows are highest at its northern end, reaching some 86,000 vehicles AADT (2000) between Weston-super-Mare and Bristol. South of Weston-super-Mare, flows reduce to some 60,000-70,000 vehicles AADT near Taunton and then to around 55,000 vehicles AADT immediately north of Exeter (J29).

2.2.2 Seasonal variation in traffic flow along the M5 is significant. Typically peak daily flows in August can be 30-35% higher than the AADT figure.

2.2.3 The M5 caters for a significantly higher mode share than the railway. Indeed, rail typically caters for about 5% of the travel movements along the corridor.

2.3 *Problems and Issues*

2.3.1 The key problems identified earlier in the study, which apply to the whole of the SWARMMS study area, are shown in Figure 2.3.



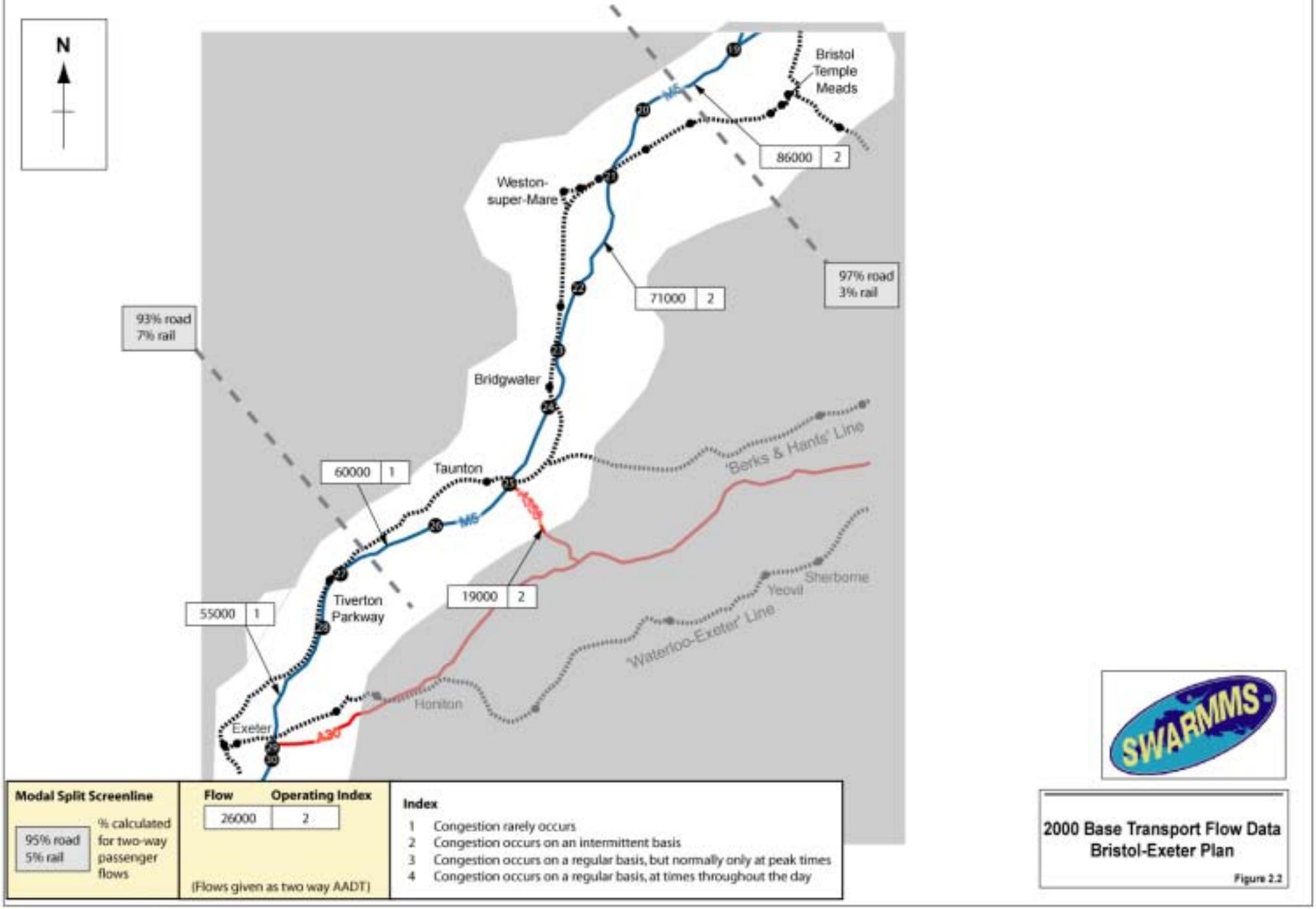
Study Corridors
- Motorways
- 'A' Roads
- Railways
- Other Lines
- Stations

Other Plan Areas
- Bristol Area Plan
- Exeter-Penzance Corridor

SWARMMS

Bristol - Exeter Plan Area

Figure 2.1

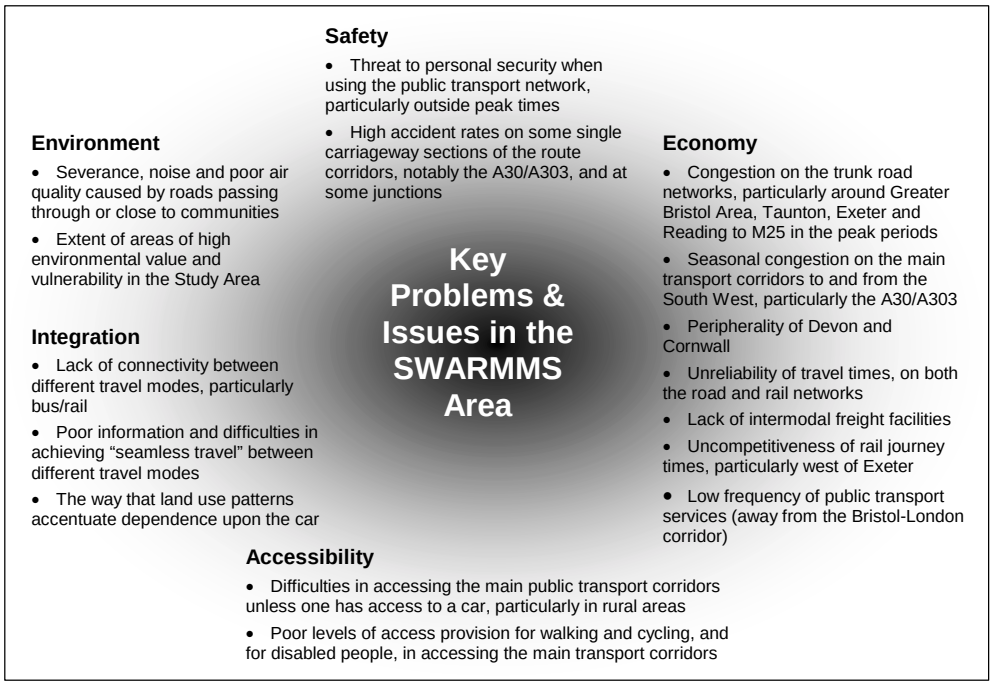


SWARMMS

2000 Base Transport Flow Data
Bristol-Exeter Plan

Figure 2.2

Figure 2.3: Key Problems and Issues in the SWARMMS Area



2.3.2 Whilst to a greater or lesser extent each of these problems and issues applies to the Bristol-Exeter corridor, those of particular relevance are as follows:

Economy

- The congestion on the trunk road network, particularly around Bristol, Taunton, Exeter and Reading to M25 in the peak periods – Bristol and Exeter are the extremities of the corridor, and issues of detail are discussed in the Greater Bristol Area Plan and the Exeter-Penzance Plan respectively. Taunton is centrally located on the corridor, and experiences regular peak hour congestion at M5 Junction 25.
- The seasonal congestion on the main transport corridors to and from the South West, particularly the A30/A303 – The M5 represents the only motorway south west of Bristol, and as such is a major route into the South West. Congestion is especially acute on summer holiday weekends with significant amounts of traffic heading to/from the holiday resorts in Devon and Cornwall (in particular).
- The peripherality of Devon and Cornwall – The Bristol-Exeter corridor is the key link from the South West to the significant markets in the

Midlands and further north, and also serves as an important link from the South West to London and the South East.

- Unreliability of travel times, on both the road and rail networks.
- The low frequency of public transport services (away from the main corridors) – Rail and coach services are available but operate at irregular and/or long intervals.

Integration

- Lack of connectivity between different travel modes, particularly bus/rail – Interchange is difficult at many locations along the corridor.

2.3.3 The purpose of the Preferred Strategy is to address these problems in a satisfactory manner.

2.4 Structure of the Preferred Strategy

2.4.1 Various scheme and strategy tests were carried out earlier in the study to establish the extent to which the key problems and issues could be addressed by different approaches. Although accepting that more detailed work was required at the Plan stage these tests led Halcrow to conclude that the Bristol-Exeter corridor should have:

- significantly upgraded rail services and facilities (see Chapter 3);
- a significantly enhanced network of coach services (see Chapter 4);
- significantly enhanced public transport interchanges (also see Chapter 4);
- a variety of highway measures (including ITS and local safety schemes – see Chapter 5);
- a number of new and innovative public transport schemes in the rural areas (see Rural Access to the Transport System Plan); and
- all the above to be nested within a proactive strategy to reduce the growth in travel demand and encourage mode-shift for some tourism-related journeys (see Reducing the Growth in Travel Demand Plan and the Tourism Plan).

3 Rail Measures

3.1 *Introduction*

3.1.1 This chapter describes the SWARMMS proposals for enhancing rail services and infrastructure along the strategic rail route between Bristol and Exeter via Taunton, with an ancillary single-track loop serving Weston-s-Mare and Weston Milton. Many of the rail services using the line run beyond Exeter to/from locations in Devon and Cornwall, and others operate beyond Bristol to the Midlands and further north, South Wales or London. As such, there is significant overlap with the proposals for the Exeter-Penzance Corridor and Bristol Area. There is also some overlap with the proposals for London – Bristol and London –Exeter.

3.1.2 Taken together, there are no rail measures associated with this Corridor Plan that do not form part of one of the other Plans. The following sections therefore are a consolidation of those rail elements from other Plans that affect the Bristol – Exeter corridor.

3.2 *Route Description*

3.2.1 This route follows the main Great Western line between Bristol and Exeter. It is essentially a two-track route throughout, with limited opportunities for faster express services to pass local stopping services. In general, the route alignment is quite straight and level, with much of this route crossing the Somerset Levels. As a result, linespeeds are not generally limited by track alignment.

3.2.2 Travelling south from Bristol, a loop branchline leaves the mainline at Worle (north east of Weston-super-Mare) serving Weston Milton and Weston-super-Mare before rejoining the mainline at Uphill junction. This loop effectively provides an overtaking facility with slower stopping services routeing via Weston-super-Mare and express services able to pass on the main line. However, as the Weston-super-Mare loop is of single track standard with a passing loop at Weston-super-Mare station operational flexibility is limited.

3.2.3 At Cogload just north of Taunton, the Berks & Hants line re-joins the GWML by way of a grade-separated junction. As a result, there is additional train path pressure on the route south of Cogload junction due to requirements of the London - Devon/Cornwall services. Some additional passing opportunities have

recently been created at Taunton station in order to relieve this pressure, with the re-opening of the island platforms.

3.3 Problems and Issues

Overview

3.3.1 The main problems and issues associated with the rail line between Bristol and Exeter can be summarised as follows:

- Conflicts between stopping and express services;
- Problems arising from single track sections on the Weston-super-Mare loop;
- Platform capacity at Exeter St Davids;
- Aspirations to develop new stations; and
- Flooding at Cowley Bridge and Staffords Bridge

3.3.2 The following sections describe each of these issues.

Conflicts between Stopping and Express Services

3.3.3 The route section between Bristol and Exeter carries a wide variety of passenger services including, long distance services from London – Devon/Cornwall (First Great Western), long distance services from the Midlands/North to Devon and Cornwall (Virgin) and a range of local/regional services operating from origins such as Bristol, Cardiff and Gloucester to Weston-super-Mare, Taunton, Exeter and Plymouth. The variation in operating speeds creates significant pathing constraints and these constraints will be increased when the proposed Virgin services come into operation later this year and in 2003.

3.3.4 In addition, there is some demand for rail freight paths on this line, which add to the operational pressures.

Weston-super-Mare Single Track Loop

3.3.5 The existing loop line serving Weston-super-Mare is essentially a single-track line with the only opportunity for trains to pass being at Weston-super-Mare station itself. This single-track section is used by a range of services and is a major operational constraint. As a result, any Weston-super-Mare service running late or out of sequence can cause substantial knock-on effects across the regional network.

3.3.6 With the proposals to expand services between Weston-super-Mare and Bristol, and more general increases in services between Bristol and Exeter, it is proposed that the northern part of the loop line be returned to double track formation. Further details are provided in the Bristol Area Plan.

Platform capacity at Exeter St Davids

3.3.7 Exeter St Davids is the gateway for all services to/from the south west. As a result, platform capacity at the station is a major factor when considering increased service frequency on the Bristol – Exeter corridor. Existing commitments by Virgin Trains to increase service frequencies through Exeter St Davids will heighten pressure on platform space. Such increases in frequency will consume remaining capacity and result in limited flexibility to deal with out of course running and operational disruption.

3.3.8 To ease matters, additional infrastructure on the south side of the main line (to the east of the station) would allow trains to access Cowley Bridge junction more directly (using a bi-directional single line) and avoid conflicts on the Main Lines. An upgrade of Waterloo Yard and the shunt spur might be possible to improve capacity and additional platform faces or an amended infrastructure layout at Exeter would also assist train flows. Further more detailed analysis would be required to assess the work required, although costs are likely to be significant.

New Station Aspirations

3.3.9 In spite of some of the identified operational difficulties described in the previous sections, there are aspirations to develop a range of new or upgraded stations within the Bristol – Exeter corridor. The main ones are as follows:

- Flax Bourton/Long Ashton – identified as potential Park & Ride stations close to the A370 in order to ease peak hour congestion on this major commuter route to Bristol. Also considered to have some potential for serving Bristol International Airport
- Worle – plans have been developed for upgrading the station to create a Parkway facility, with the main objective being to reduce traffic pressures on M5 J21 and commuter routes to/from the Bristol area.
- Wellington/Cullompton – there have been aspirations to develop additional stations between Taunton and Exeter, to serve local communities.

3.3.10 In general, proposals for these new stations are at an early stage with some patronage forecasting having been carried out but with limited rail engineering assessment.

Flooding at Cowley Bridge and Staffords Bridge

3.3.11 Over recent years, there have been a number of problems with flooding of the line at both Cowley Bridge and Staffords Bridge north of Exeter, resulting in line closure. Works are being carried out to attempt to stabilise the line at these locations and protect it from future damage.

3.4 Proposed Services

Overview

3.4.1 A series of proposed rail service patterns have been developed for the Bristol – Exeter based on the problems and issues set out in the previous section, in combination with the requirements of the neighbouring Corridor Plans.

3.4.2 A key feature of the proposed services is the need to move towards a regular hourly (or in some cases 2-hourly) service pattern. This is proposed to make services more understandable and attractive to passengers but also to facilitate connections with other services that operate on a clockface pattern.

3.4.3 The main services which are proposed for this route are:

- An hourly service from London Paddington to Paignton (Calling at Reading, Swindon, Bath, Bristol Temple Meads, Worle Parkway, Weston-super-Mare, Taunton, Exeter St Davids, Newton Abbot, Torquay).
- An hourly service from Bristol to Penzance calling at all main stations;
- Two services per hour from Yate to Weston-super-Mare (calling at Bristol Parkway, Filton Abbeywood, Bristol Temple Meads, Nailsea, Yatton, Worle Parkway, Weston Milton);
- An hourly service Gloucester – Taunton (calling at Cam & Dursley, Yate, Bristol Parkway, Filton Abbeywood, Bristol Temple Meads, Worle Parkway, Weston-super-Mare, Highbridge & Burnham, Bridgwater);
- One/two services per hour Midlands – South West (Virgin) generally calling at Bristol Temple Meads, Taunton, Tiverton Parkway, and Exeter St Davids in this Corridor;

- An hourly service from London Paddington – Penzance via the Berks & Hants Line joining this corridor at Cogload junction (just north of Taunton); and
- An hourly service from London Paddington – Exeter St Davids via the Berks & Hants line joining this corridor at Cogload junction (just north of Taunton).

More details of the final two bullet points are provided in the London-Exeter plan report.

3.4.4 The service patterns that have been developed are based on the need to increase service frequencies at key stations, to make services more attractive, develop a pattern of fast and semi fast services to reduce journey times and increase passenger capacity to reduce overcrowding.

3.5 ***New Stations***

3.5.1 Having reviewed the potential new/improved stations on this line, it is concluded that the station with the strongest case is the upgrade of the station at Worle. This is considered particularly valuable for addressing existing congestion problems associated with outward commuting from the Weston-super-Mare area to the Bristol area.

3.5.2 Whilst all of the other potential new stations have merit, they all present difficulties due to their locations on stretches of the corridor where rail capacity is very limited and additional station stops will cause significant operational problems. Further work will be required to determine whether any of these stations might be successfully accommodated as an 'offline' station in order to overcome the operational difficulties. In the long term some of these problems may be overcome by the construction of additional rail infrastructure but this is likely to be beyond the timeframe for the SWARMMS study.

3.6 ***Infrastructure Requirements***

Overview

3.6.1 The proposed changes to service patterns on the Bristol – Exeter corridor will require some changes to rail infrastructure. These infrastructure changes are dealt with in other Corridor/Area Plans but can be summarised as:

- Re-doubling of northern part of Weston-s-Mare loop, including modification of Worle junction;

- Provision of passing loop facilities at a location between Worle and Nailsea;
- Conversion to 4-tracks of route section between Parson Street and Bristol Temple Meads;
- Provision of additional platform capacity at Exeter St Davids;
- Enhancement of Worle Station to create a Parkway facility; and
- Stabilise and protect Cowley Bridge and Staffords Bridge from flood damage.

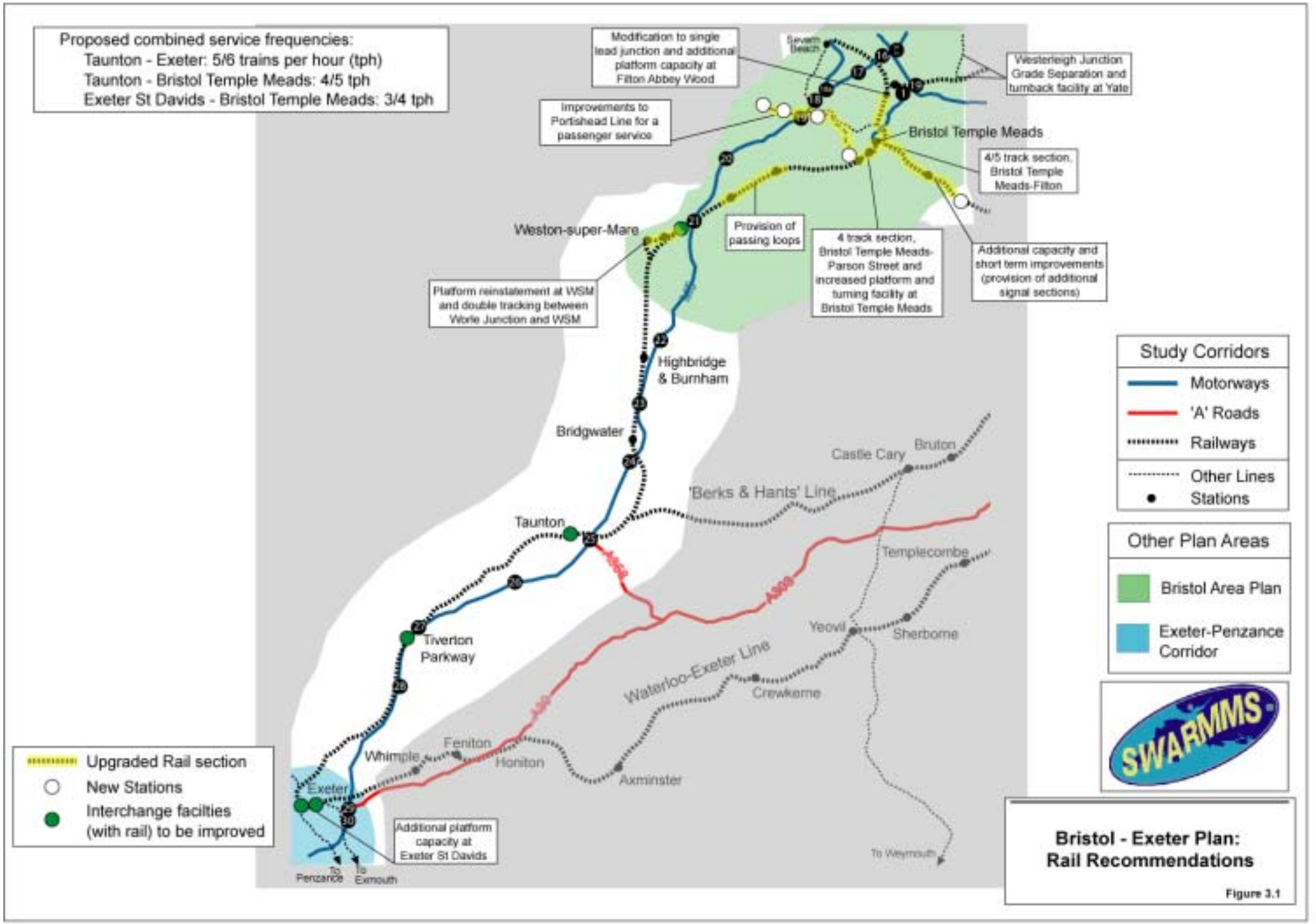
3.7 Costs Patronage and Revenue Forecasts

3.7.1 The costs, patronage and revenue changes associated with the rail proposals are all set out in the Plans for neighbouring Corridors/Areas.

3.8 Summary of Key Benefits

3.8.1 Figure 3.1 shows rail measures in outline. The key benefits of the rail measures proposed in this Plan are as follows:

- To make rail an attractive alternative to the private car for commuting to/from the Greater Bristol area, with particular reference to outward commuting from the Weston-super-Mare area;
- To improve service frequencies for long-distance services between Devon/Cornwall and London, and between Devon/Cornwall and the Midlands/North;
- To make rail services more reliable by the provision of increased rail capacity and operational flexibility;
- To move towards a clockface timetable improving passenger understanding of service patterns and facilitating the scheduling of connecting services; and
- To reduce overcrowding on peak period services, particularly to/from the Bristol area.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Stations
Other Plan Areas
Bristol Area Plan
Exeter-Penzance Corridor
SWARMMS
Upgraded Rail section
New Stations
Interchange facilities (with rail) to be improved
Bristol - Exeter Plan: Rail Recommendations
Figure 3.1

4 Other Public Transport Measures

4.1 *Introduction*

4.1.1 This chapter describes the variety of other public transport schemes and measures relevant to the Bristol-Exeter corridor which are included in the Preferred Strategy. These comprise:

- Development of expanded coach services within the corridor;
- Development of proposals to enhance transport interchanges at Taunton, Exeter and Tiverton; and
- Proposals for improving public transport access to the main transport corridors.

4.1.2 Figure 4.1 shows the measures in outline.

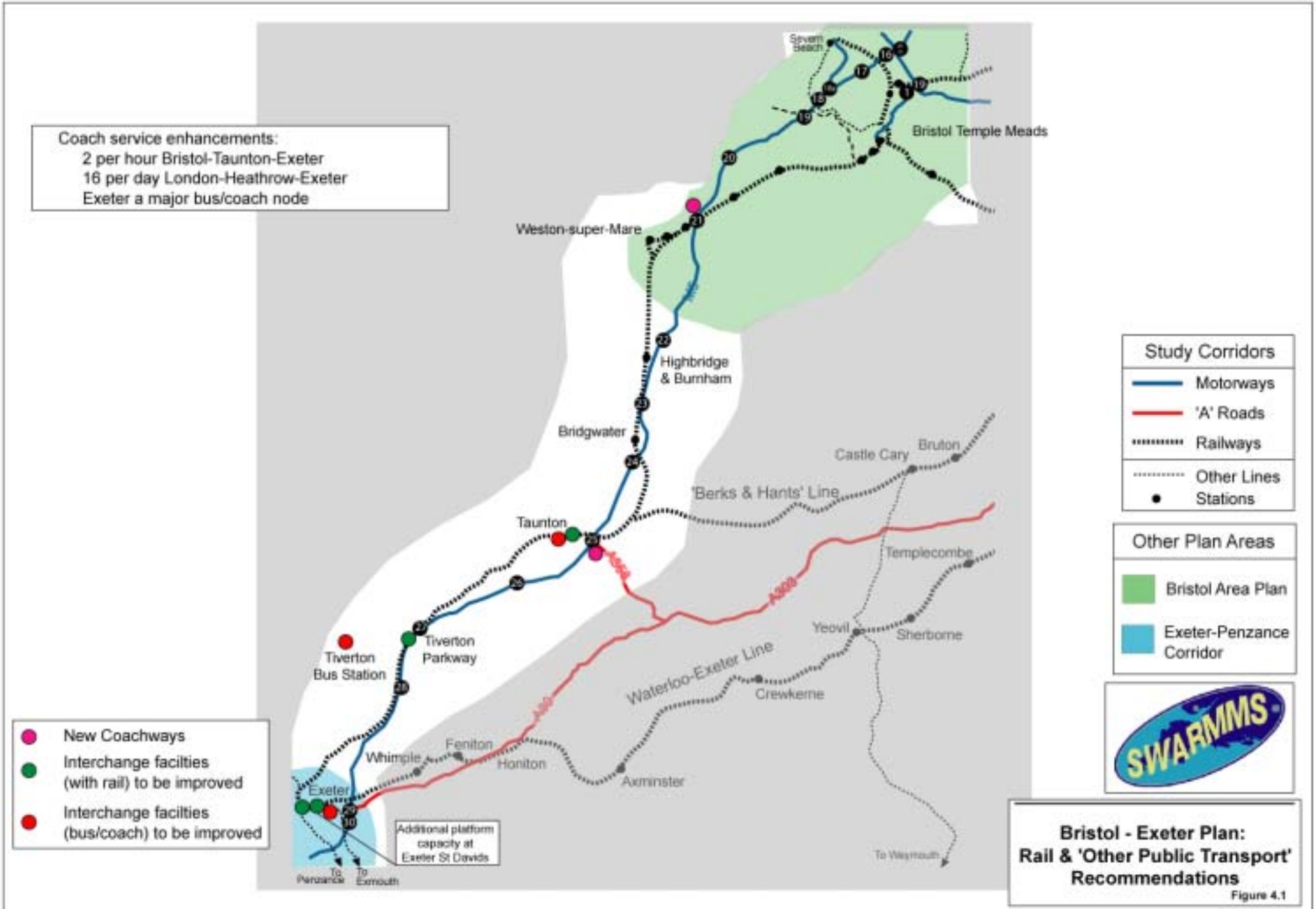
4.2 *Coach & Express Bus Network*

Development of Scheduled Coach & Express Bus Strategy

4.2.1 During the early stages of SWARMMS information was gathered on the problems faced by scheduled coach and express bus users and operators. These problems have been used in combination with consultation with operators and feedback from public workshops to help develop a strategy which provides a high quality network of coach and inter-urban express bus services. The aim has been to provide an integrated public transport network which will offer a realistic alternative to the car for a range of journey purposes in the SWARMMS area (Appendix A sets out the characteristics of coach users, including typical journey purposes). The London-Exeter Plan contains details of the express bus network between the Bristol-Exeter and London-Exeter corridors.

The Corridor

4.2.2 This corridor is a key part of the trunk haul scheduled coach network. Scheduled coach services between London, Heathrow and the South West and cross-country services between the North and the South West operate via this corridor. In excess of 20 coaches per day per direction (cpd) operate over the section of M5 south of Bristol.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Bristol Temple Meads
Weston-super-Mare
Highbridge & Burnham
Bridgwater
Taunton
Castle Cary
Bruton
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Additional platform capacity at Exeter St Davids
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To Exmouth
To Weymouth
New Coachways
Interchange facilties (with rail) to be improved
Interchange facilties (bus/coach) to be improved
Study Corridors
Motorways
'A' Roads
Railways
Other Lines
Stations
Other Plan Areas
Bristol Area Plan
Exeter-Penzance Corridor
SWARMMS
Bristol - Exeter Plan:
Rail & 'Other Public Transport' Recommendations
Figure 4.1

4.2.3 A significant proportion of these coach services are long distance routes between London/Heathrow/the North and the South West. These have few if any stops over the section of the M5 between Bristol and Exeter. This results in low levels of scheduled coach service to/from some intermediate locations between Bristol and Exeter.

4.2.4 Coach scheduled journey times over this section of the M5 vary between periods in response to the effects of traffic delays, particularly during peak periods. Scheduled average speeds are usually less than 50mph and sometimes less than 40mph. While these extended journey times enable the majority of coach services to operate to the schedule, it means that it is difficult for coaches to offer an attractive service to the time sensitive travel market.

4.2.5 The coach users surveys undertaken earlier in the SWARMMS study have shown that whilst the majority of scheduled coach users along this corridor are travelling on leisure related journey purposes, a small proportion travel on work related journeys. There is potential for scheduled coach services to grow the work related journey market if it can improve overall journey times and increase the quality of the vehicles and on-board facilities for passengers.

4.2.6 Better protection of coaches from the journey time and reliability effects of traffic congestion would also help long distance coach services, in particular on the approaches to Exeter and Bristol. The provision of new Coachway coach stops, strategically located to increase the catchment area of the coach network and aimed in particular at the Park & Ride and 'meeters & greeters' market segments could, in conjunction with reduced journey times and increased levels of service, encourage mode switching from car to coach.

4.2.7 The SWARMMS strategy for this corridor involves:

- Increased level of coach services to provide increased opportunities to use coach for journeys along this corridor.
- Introduction of Coachways at Taunton, Weston-super-Mare and Cribbs Causeway on the M5 to increase the catchment area of and improve access to the scheduled coach network. The Cribbs Causeway Coachway would form part of a public transport hub on the edge of Bristol and will enable a proportion of long distance coach services to serve Bristol without diverting via the city centre. The Taunton and Weston-super-Mare

Coachways would provide a similar role enabling these towns to be served without diversion of many trunk haul coach services.

- Reducing journey times through the provision of priority measures.

4.2.8 Proposals in the Greater Bristol area (including the Cribbs Causeway and Weston-super-Mare coachways and priority measures) are discussed in the Greater Bristol Area Plan. In terms of the Taunton Coachway, a potential location would be immediately adjacent, to the south, of the A358 just before M5 Junction 25. This site ('Cambria Farm') is one that has been suggested as a potential Park & Ride facility serving Taunton. There is thus scope for the site to be a major road-based public transport interchange, with joint use of the site by coach/bus services and Park & Ride bus services, as well as providing a car park. Future access to/from the site would need to be consistent with the proposals to dual the A358 (see London-Exeter Plan).

Coachway Catchment Assessment

4.2.9 The Coachway Catchment Assessment is based on analysis of coach user surveys undertaken for SWARMMS and as part of other Halcrow studies. This data has provided an understanding of the characteristics of passengers who use a Coachway, in particular their access mode and access time, which in turn provides an understanding of the potential scale of the coach network catchment along this corridor.

4.2.10 The Coachway catchment area identified through these surveys has been used to define the potential geographical catchment for car to coach transfer at Coachways. The surveys showed that the access time profile for Coachways differs from those of coach stations in urban areas. Indeed, nearly 35% of those accessing Coachways by car travel more than 30 minutes to access the facility compared with 20% or less for urban coach stations. Over 60% of Coachway users travel for more than 20 minutes to access their coach service in comparison with approximately 40% for coach stations located in urban areas. The longer access times are consistent with a wider geographical spread of users.

4.2.11 Even allowing for the effects of traffic delays on the road network feeding the surveyed Coachways, it is apparent that these facilities have a larger catchment area than traditional urban centre coach stations.

4.2.12 Examination of the catchment areas indicates that there is a degree of overlap between individual Coachways, particularly within the Bristol area. The catchment

areas of Cribbs Causeway and Weston-super-Mare Coachways cover the majority of the M5 corridor between Bridgwater to the south and Gloucester to the north. In theory the catchment extends into South Wales and towards Bath, but the availability of alternative coach boarding points means that these Coachways are unlikely to attract demand from these areas. Further details of these Coachways can be found in the Greater Bristol Area Plan.

4.2.13 The Taunton Coachway catchment area extends west toward Minehead and Barnstaple. There are several important settlements within the 45-minute car access time catchment, including Minehead, Bridgwater, Tiverton, Exeter and Yeovil.

Proposed Service Patterns

4.2.14 Based on the operation of successful coach services elsewhere in the UK, the proposed service pattern has been developed to meet the following criteria:

- Increased service frequencies (minimum of 2cph) for key movements including:
  - Exeter <> Bristol;
  - Taunton <> Exeter;
  - Taunton <> Bristol;
  - WSM <> Bristol.
- Closer integration between local bus services and the coach network in rural areas, with local bus schedules arranged to minimise waiting times for passengers and to ensure reliable connections.
- Improved coach services to Bristol Airport to meet travel demand generated by the introduction of low cost carrier services and the general growth in air travel.
- Higher quality coaches with air conditioning, increased legroom and luggage space, and with capacity for at least 70 passengers (will require double-deck and/or articulated coaches).

4.2.15 The proposals involve a significant reworking of the existing service pattern, the key changes include:

- A new Exeter-Bristol (-Bristol Airport) Express Coach Shuttle service operating every 30 minutes through the core part of the day. This service would run between Exeter and Bristol Bus Stations, call at Taunton and

Weston-super-Mare Coachways only, with alternate journeys extended from central Bristol to Bristol Airport and Cribbs Causeway Coachway.

- The majority of South West-London coach services routed via Cribbs Causeway Coachway to minimise the journey time penalty associated with serving Bristol Marlborough Street Bus Station.

4.2.16 The proposals involve the maintenance of existing levels of coach service provision to the centres of Taunton and Weston-super-Mare whilst improving the opportunity to access coach services through the provision of the new Coachways on the edge of these towns.

4.2.17 The service pattern has been developed such that the long distance coach services between the South West and Heathrow/London and the Midlands/North of England continue to operate largely non-stop along the M5 north of Exeter. The intermediate stops between Exeter and Bristol would be served by a combination of the proposed new Exeter-Bristol shuttle service and selected longer distance services.

4.2.18 Table 4.1 shows the proposed levels of service and destinations served from Taunton Coachway.

Table 4.1: Indicative Levels of Service and destinations served from Taunton Coachway

Service	per day
Nottingham/York/Newcastle	1
Manchester	1
Birmingham	3
Cribbs Causeway Coachway	20
Bristol	23
Bristol Airport	17
Weston-super-Mare	14

Service	per day
Calcot Coachway	2
Heathrow	7
London	7
Exeter	26
Plymouth	5
Penzance	4

Proposed Service Frequencies

4.2.19 In developing the service frequencies, the aim has been to have a minimum of 2 coaches per hour (cph) between key locations along the corridor. The key locations have been identified through examination of travel demand across all modes. At key public transport hubs such as Bristol Marlborough Street Bus Station and Exeter Bus Station the combined service frequency will be significant.

4.2.20 The existing and proposed levels of service at key locations (excluding the Bristol area) corridor are summarised in Table 4.2 below.

Table 4.2: Existing and Proposed Levels of Service at Key Locations

Location	Coach Service Level (coaches / day / direction)	
	Existing	Proposed
Bristol Bus Station	12	42
Cribbs Causeway	-	42
Bristol Airport	-	22
Weston-s-M Coachway	-	31
Weston-super-Mare	7	7
Bridgwater	9	9
Taunton Coachway	-	31
Taunton Bus Station	13	13
Exeter Bus Station	13	43

Note: Bristol figures only include services using the Bristol-Exeter corridor

4.2.21 Cribbs Causeway Coachway would be served by a number of long distance coach services which operate from the South West along the M4 corridor and northbound on the M5. These services currently bypass Bristol due to the significant journey time penalty associated with serving Bristol Marlborough Street Bus Station. The proposed combined service frequencies to Bristol via Cribbs Causeway Coachway or Bristol Marlborough Street would be considerable, with 84 coaches per day (cpd).

4.2.22 The proposed service patterns also provide reasonable coach frequencies between key intermediate points along the corridor, such as Taunton and Weston-super-Mare Coachways which would be served by at least 31 cpd.

4.2.23 The strategy for the Bristol-Exeter corridor develops coach services to Bristol International Airport. Proposed service patterns will provide an hourly Exeter-Bristol Airport-Bristol shuttle service and divert a number of long distance coach services which operate between the South West and the Midlands / the North of England to the Airport.

Proposed Coach Journey Times

4.2.24 Earlier work within SWARMMS highlighted the impact of traffic congestion on coach journey times. It also highlighted that, in terms of total journey times, coach

travel is significantly slower than car along this corridor. Table 4.3 summarises the existing and estimated future scheduled coach journey times between Bristol and Exeter.

Table 4.3: Existing and Proposed Coach Journey Times

Location	Typical Journey Times from Bristol (mins)	
	Existing	Proposed
Bristol Cribbs Causeway	-	24
Bristol Airport	30	21
Weston-SM Coachway	-	36
Weston-Super-Mare	60	48
Bridgewater	85	91
Taunton Coachway	-	62
Taunton Bus Station	70	75
Exeter Bus Station	118	102

4.2.25 The future journey times have been developed assuming that priority measures (see later) are introduced to protect coaches and buses from the impacts of traffic congestion on the approaches to urban centres. Despite the forecast reduction in journey times and increase in service frequencies of coaches, rail will retain its significant advantage over coach in terms of journey times. It is likely, however, that coach will remain the favoured public transport mode of price sensitive market segments.

Coach Operating Cost

4.2.26 The suggested improvements in coach levels of service will lead to increases in operating costs. These have been assessed using the Halcrow OpCost model which employs unit costs agreed with National Express. Table 4.4 summarises the results of the analysis for those routes which use the Exeter to Bristol corridor for some part of their journey.

Table 4.4: Existing and Forecast Operating Costs (£'000s)

Coach Service	Estimated Annual Operating Costs (£'000s)		Change (%)
	Existing	Proposed	
324	354	353	-0.3%
328	295	298	1.0%
330	382	380	-0.5%
336	654	656	-0.2%

Coach Service	Estimated Annual Operating Costs (£'000s)		Change (%)
	Existing	Proposed	
337	263	260	-1.1%
339	420	422	0.4%
341	352	353	0.3%
347	431	430	-0.4%
404	326	327	0.2%
500	940	908	-3.4%
501	1,556	1,566	0.6%
502	755	759	0.5%
504	618	620	0.4%
505	302	303	0.5%
531	459	460	0.1%
London Flyer	471	428	-9.0%
Superfast 2	299	336	12.6%
Shuttle Service	n/a	2,314	n/a
Total	8,880	11,173	26%

Notes:

324 – Paignton – Birmingham – Leeds
328 – Plymouth – Birmingham – Manchester
330 – Penzance – Birmingham – Nottingham
336 – Penzance – Birmingham – Edinburgh
337 – Paignton – Rugby
339 – Bideford – Birmingham
341 – Totnes – Birmingham – Rochdale
347 – Plymouth – Great Yarmouth
404 – Penzance – London
500/501/502/504/505 – South West – London
531 – Penzance – Birmingham – Newcastle
London Flyer – Weston-super-Mare – London
Superfast 1 – Tiverton – Taunton – London (via M5 and M4)
Superfast 2 – Tiverton – Taunton – London (via A358 and A303)

4.2.27 It should be noted that the costs will be 'upper-end' estimates as they assume that new vehicles will be acquired to operate the services, the full cost of vehicle depreciation is allocated to the services and there is no inter-working between separate coach routes. The latter can result in significant reductions in overall vehicle requirements. In addition, the level of services have not been optimised in the light of demand forecasts. This iterative process would be likely to lead to

changes in levels of service to maximise operating surplus (or minimise operating deficit).

4.2.28 The table shows an overall increase in operating costs of approximately 26%. The majority of the increase in operating costs is attributable to the development of the new Bristol to Exeter Shuttle. Further marginal increases in operating costs are estimated where services are diverted into the proposed Coachways or via Bristol International Airport.

4.2.29 Where the service frequency and routeing are unchanged between the existing and forecast scenarios a small reduction in operating cost is forecast due to the effect of journey time reductions brought about by priority measures.

Passenger Demand Necessary to Cover Operating Costs

4.2.30 The iterative process of optimising coach service levels to demand has not been undertaken for the Plan Stage work; however, an assessment has been undertaken of the coach demand required to cover the forecast operating costs. This uses an average fare based on an assessment of the coach user surveys undertaken in 2000 upgraded to 2001 prices. The average fare used in the assessment is £9.50 per single journey, which is a representative average fare on the SWARMMS coach network.

4.2.31 Table 4.5 summarises the results of the assessment for those coach routes operating on the Exeter to Bristol Corridor. This shows that the number of passenger journeys required to cover coach operating costs increases from around 0.9 million to approximately 1.2 million per annum ($^1/_3$ increase) with the average number of passengers per coach vehicle journey decreasing from 40 to 26 passengers.

Table 4.5: Estimated Coach Demand (to cover operating costs)

Coach Service	Est Demand per annum ('000s)		Est Demand per vehicle / journey	
	Existing	Proposed	Existing	Proposed
324	38	37	51.2	51.0
328	31	31	42.7	43.1
330	40	40	55.2	54.9
336	69	69	95.0	94.8
337	28	27	38.0	37.6
339	44	44	30.4	30.5

Coach Service	Est Demand per annum ('000s)		Est Demand per vehicle / journey	
	Existing	Proposed	Existing	Proposed
341	37	37	50.8	51.0
347	45	45	62.4	62.1
404	34	34	47.2	47.3
500	99	96	45.3	43.8
501	164	165	32.1	32.3
502	80	80	36.4	36.6
504	65	65	44.7	44.8
505	32	32	43.6	43.9
531	48	48	66.4	66.5
London Flyer	50	45	22.7	20.6
Superfast 2	31	35	21.6	24.3
Shuttle Service	-	244	-	11.2
Total	935	1,177	40.1	26.0

4.2.32 The significant reduction in average demand per vehicle journey is not reflected across all coach services. Further examination of Table 4.4 indicates that coach demand requirements per vehicle journey for current coach services are generally comparable in the existing and proposed scenario. Indeed, some coach services have a slight reduction in the required load factors to cover operating costs. Therefore, it is envisaged that existing coach services are likely to attain the necessary coach passenger demand to cover forecast operating costs.

4.2.33 The development of the Bristol to Exeter shuttle service has a relatively low load factor required to cover operating costs, which consequentially results in the significant reduction in the required average demand per vehicle journey. Previous research suggests that there is indeed potential demand for a Bristol to Exeter Shuttle service; however, further investigation would be required to establish if the required scale of passenger demand can be met in full.

4.2.34 The necessary scale of growth in demand will require changes in the methods of promoting coach travel and in the public perception of coach as an alternative to car travel. There are a number of examples of best practice where a coach service or network of services are effectively promoted as a real alternative to car. These include frequent shuttle-type coach services such as the Oxford Tube (Oxford – London) and the National Express Airlink services to major airports. The frequency and reliability, and relatively low cost, combine to make such services a success. All are run on a commercial basis.

Priority Measures

4.2.35 An outline assessment has been made of the locations where priority measures will be required to protect coaches from the effects of traffic congestion, particularly on the non-motorway and trunk road links on the approaches to and in urban areas. In these sorts of locations there is often significant traffic congestion where priority measures would improve coach journey time reliability. Routes into Bristol and Exeter have been identified as particular problem areas.

4.3 ***Interchanges***

4.3.1 An essential component of the public transport strategy is the development of high quality transport interchanges where seamless passenger transfers can occur between the local bus/express bus/coach and rail network. In addition, key interchange locations also represent primary nodal points in the network, and as such, enhancement of their facilities would also improve the start and/or end of journeys that do not involve interchange. Consequently, improvements to interchange facilities and bus/coach priority measures are required at a number of key locations, along the corridor, including:

- Exeter Bus Station
- Exeter Central Rail Station
- Exeter St David's Rail Station
- Taunton Bus Station
- Taunton Rail Station
- Tiverton Bus Station
- Tiverton Rail Station

4.3.2 From a review of the existing form and facilities in these locations, packages of improvements have been developed. The improvements have been defined under five main headings, namely:

- Waiting environment
- Levels of facilities
- Level of information
- Visible staff presence
- Physical linkage for next stage of journey

4.3.3 The following sections describe the packages of improvements required at each of the interchanges. (It is recognised that there are aspirations to upgrade and/or

relocate some of the interchanges described below. The proposed improvements are not intended to prejudice such schemes taking place).

Exeter Bus Station

- Waiting Environment – Install a small waiting room, should have adequate seating, be well heated, lit, have passenger information and toilets.
- Levels of Facilities – Ensure toilets are well signed and have full disabled access. Ensure these are well signed. Upgrade to a modern eating area with good buffet facilities. Add CCTV.
- Level of Information – Add real time information to screens.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

Exeter Central Rail Station

- Waiting Environment – Extend the waiting area to include adequate seating, passenger information, and ensure it is well lit and heated.
- Levels of Facilities – Upgrade to a modern eating area with good buffet facilities. Toilets should also be available in the waiting area and should have full disabled access. Ensure payphones are well signed.
- Level of Information – Add real time information to screens.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

Exeter St.David's Rail Station

- Waiting Environment – Ensure waiting areas are well lit and heated, and that they provide adequate seating, passenger information boards/screens, toilets and payphones.
- Levels of Facilities – Ensure lift is well maintained and working at all times. Upgrade to a modern eating area with good buffet facilities. Ensure toilets are well signed and have full disabled access. Ensure payphones are well signed.
- Level of Information – Add real time information to screens.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

Taunton Bus Station

- Waiting Environment – Ensure that all benches at stops are covered. Extend waiting area to provide adequate seating and also passenger information, toilets and payphones.
- Levels of Facilities – Ensure toilets are well signed and have full disabled access. Payphone should be relocated to the waiting area. Upgrade to a modern eating area with good buffet facilities. Add CCTV.
- Level of Information – Provide audio announcements. Install automatic information displays.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

Taunton Rail Station

- Waiting Environment – Extend waiting area to provide adequate seating and also passenger information, toilets and payphones.
- Levels of Facilities – Ensure toilets are well signed and have full disabled access. Ensure payphones are well signed. Upgrade to a modern eating area with good buffet facilities. Ensure the route to the car park is well lit and signed. Ensure that the cycle racks are well lit and covered.
- Level of Information – Add real time information to screens.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – Ensure regular bus service to centre continues/enhanced.

Tiverton Bus Station

- Waiting Environment – Install a small waiting room, should have adequate seating, be well heated, lit, have passenger information, toilets and payphones.
- Levels of Facilities – Toilets and payphone should be relocated to the waiting areas. A small shop/café should be opened near to the waiting area serving hot & cold food/drinks. Ensure designated walk routes to the bus station are well lit and signed. Add CCTV.
- Level of Information – Full timetables should be provided in the waiting areas. Provide audio announcements. Install automatic information displays.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

Tiverton Rail Station

- Waiting Environment – No measures identified.
- Levels of Facilities – No measures identified.
- Level of Information – Add real time information to screens.
- Visible Staff Presence – Ensure that station is staffed at all times it is open.
- Physical Linkage – No measures identified.

4.3.4 New interchanges (such as the proposed coachways at Taunton and Weston-super-Mare) facilities should be designed to incorporate the features and facilities that represent best practice in interchange design.

4.4 ***Rural Access to the Transport System***

4.4.1 The study-wide theme Plan on Rural Access to the Transport System contains a number of proposals which will assist in improving access from rural areas to the main public transport interchanges on the Bristol-Exeter corridor. Promoted primarily for reason of social inclusion, these proposals include:

- fixed-route bus services;
- a limited number of flexible bus services;
- dedicate private hire connecting services; and
- fixed-rate taxi/private hire services which can also serve public transport hubs as well as other purposes.

4.5 ***Costs***

4.5.1 Table 4.6 provides the indicative costs of implementing the public transport measures described in this chapter. Figure 4.1 shows the measures in outline.

Table 4.6: Indicative Costs of other Public Transport Measures (2001 prices)

Scheme/Measure	Cost (£m)
Enhanced Coach Network	Commercial
Coachway (Taunton)	0.5
Bus Priority Measures	1
Interchanges (1)	2
Rural Transport Measures (2)	4
Total	7.5

Notes:

(1) 7 interchanges at average of £300,000

(2) 10% of £40 million total

5 Highway Measures

5.1 *Introduction*

5.1.1 This chapter begins by describing the characteristics of the M5 road corridor from Bristol to Exeter. It goes on to describe the variety of highway measures proposed for the corridor, section-by-section.

5.1.2 It should be noted that whilst this corridor Plan is titled the Bristol-Exeter Plan, some sections of the M5 are covered elsewhere, namely:

- M5 Junction 15 to M5 Junction 21 inclusive: see the Greater Bristol Area Plan;
- M5 Junction 25 at Taunton: see the London-Exeter Plan; and
- M5 Junction 29 to M5 Junction 31 inclusive: see the Exeter-Penzance Plan.

5.2 *Characteristics of the Corridor*

5.2.1 The route is 3-lane motorway standard throughout (D3M).

5.2.2 As shown on Figure 2.1, traffic flows in 2000 on the M5 vary from 55,000 vehicles AADT (2-way flows) between Junctions 27(A361) and 29(A30), and about 71,000 vehicles 2000 AADT between Junctions 21 (Weston-super-Mare) and 22 (A38 Burnham-on-Sea). Traffic generally flows well on these sections of motorway, although there is greater congestion at either end (around Bristol and Exeter) and in the central section (around Taunton). Elsewhere daily congestion is generally limited to the morning and evening peak periods at some junctions.

5.2.3 The M5 on this section does however experience congestion at peak holiday times, and August average flows can be up to 35% higher than AADT.

5.2.4 Accident rates on this section of the M5 are well below national average levels for motorway links. Junctions in the corridor generally have low accident numbers and severity rates.

5.2.5 Traffic flows are expected to grow on the M5 in the future, and this will place additional pressure on operating conditions. The extent of growth and its impact

upon operating conditions will, at least in part, be influenced by the Preferred Strategy for this corridor. This is discussed later in this chapter.

5.3 *M5 Junction 21 (A370) to Junction 22 (A38 Burnham-on-Sea)*

Key Problems and Issues

5.3.1 Flows on this section are about 71,000 vehicles AADT (2000). However, average August flows can increase this by up to 32%. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.3.2 There are no particular link-based accident problems and the accident rate is less than half the national average for D3M.

Proposed Measures

5.3.3 No measures are proposed.

5.4 *M5 Junction 22 (A38 Burnham on Sea)*

Key Problems and Issues

5.4.1 The junction operates satisfactorily and no particular problems have been identified.

5.4.2 There have been a total of 25 injury accidents at this junction in the 5 year period from 1996-2000. Of these there have been only 1 fatal and 3 serious injury accidents giving a low severity index for the junction of 0.14.

Proposed Measures

5.4.3 Whilst the accident severity index is low, the number of accidents has been such that a detailed accident review of the junction is recommended, with a view to minor remedial safety works at the junction.

5.5 *M5 Junction 22 (A38 Burnham on Sea) to Junction 23 (A38 Bridgwater)*

Key Problems and Issues

5.5.1 Flows on this section are about 67,000 vehicles AADT (2000). However, average August flows can increase this by up to 34%. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.5.2 There are no particular link-based accident problems and the accident rate is only slightly more than half the national average for D3M.

Proposed Measures

5.5.3 No measures are proposed.

5.6 ***M5 Junction 23 (A38 Bridgwater North)***

Key Problems and Issues

5.6.1 The junction operates satisfactorily and no particular problems have been identified.

5.6.2 There have only been a total of 11 injury accidents at this junction in the 5 year period from 1996-2000. Of these there have been no fatal and only 1 serious injury accidents giving a low severity index for the junction of 0.09.

Proposed Measures

5.6.3 No measures are proposed.

5.7 ***M5 Junction 23 (A38 Bridgewater north) to Junction 24 (A38 North Petherton)***

Key Problems and Issues

5.7.1 Flows on this section are about 65,000 vehicles AADT (2000). However, average August flows are about 30% higher. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.7.2 There are no particular link-based accident problems and the accident rate is less than half the national average for D3M.

Proposed Measures

5.7.3 No measures are proposed.

5.8 ***M5 Junction 24 (A38 North Petherton)***

Key Problems and Issues

5.8.1 The junction operates satisfactorily and no particular problems have been identified.

5.8.2 There have been a total of only 6 injury accidents at this junction in the 5 year period from 1996-2000. All of these have been slight injury accidents.

Proposed Measures

5.8.3 No measures are proposed.

5.9 ***M5 Junction 24 (A38 North Petherton) to M5 Junction 25 (A358)***

Key Problems and Issues

5.9.1 Flows on this section are about 61,000 vehicles AADT (2000). However, average August flows can increase this by up to 35%. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.9.2 There are no particular link-based accident problems and the accident rate is less than half the national average for D3M.

Proposed Measures

5.9.3 No measures are proposed.

5.10 ***M5 Junction 25 (A358)***

5.10.1 This junction, as well as other motorway issues in the Taunton area, is discussed in the London-Exeter Plan report.

5.11 ***M5 Junction 25 (A358) to M5 Junction 26 (A38 Wellington)***

Key Problems and Issues

5.11.1 Flows on this section are about 57,000 vehicles AADT (2000). However, average August flows can increase this by up to 34%. Again, although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.11.2 There are no particular link-based accident problems and the accident rate is only just over half the national average for D3M.

Proposed Measures

5.11.3 No measures are proposed.

5.12 ***M5 Junction 26 (A38 Wellington)***

Key Problems and Issues

5.12.1 The junction operates satisfactorily and no particular problems have been identified.

5.12.2 There have only been 11 injury accidents at this junction in the 5 year period from 1996-2000. Of these there have been 2 fatal and 1 serious injury accidents giving a severity index for the junction of 0.27.

Proposed Measures

5.12.3 No improvements are proposed.

5.13 ***M5 Junction 26 (A38 Wellington) to M5 Junction 27 (A361)***

Key Problems and Issues

5.13.1 Flows on this section are about 60,000 vehicles AADT (2000). However, average August flows can increase this by up to 32%. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.13.2 There are no particular link-based accident problems and the accident rate is about half the national average for D3M.

Proposed Measures

5.13.3 No measures are proposed.

5.14 ***M5 Junction 27 (A361)***

Key Problems and Issues

5.14.1 The junction generally operates satisfactorily and no particular problems have been identified, although there is occasional peak congestion.

5.14.2 There have been a total of 18 injury accidents at this junction in the 5 year period from 1996-2000. Of these there have been no fatal and 5 serious injury accidents giving a severity index for the junction of 0.22.

Proposed Measures

5.14.3 No major improvements are proposed. Whilst the accident severity index is low, with occasional peak congestion occurring, a detailed review of the junction is recommended, with a view to minor remedial works at the junction.

5.15 ***M5 Junction 27 (A361) to Junction 28 (A373)***

Key Problems and Issues

5.15.1 Flows on this section are about 51,000 vehicles AADT (2000). However, average August flows can increase this by up to 32%. Although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.15.2 There are no particular link-based accident problems and the accident rate is less than half the national average for D3M.

Proposed Measures

5.15.3 No measures are proposed.

5.16 ***M5 Junction 28 (A373)***

Key Problems and Issues

5.16.1 The junction operates satisfactorily and no particular problems have been identified.

5.16.2 There have been a total of only 6 injury accidents at this junction in the 5 year period from 1996-2000. Of these there have been no fatal and 2 serious injury accidents, which gives a relatively high severity index for the junction of 0.33, although this reflects a low overall number of accidents.

Proposed Measures

5.16.3 No measures are proposed.

5.17 ***M5 Junction 28 (A373) to Junction 29 (A30)***

Key Problems and Issues

5.17.1 Flows on this section are about 55,000 vehicles AADT (2000). August flows are around 30% higher, but again, although busy at peak holiday times, the motorway's operation is generally satisfactory.

5.17.2 There are no particular link-based accident problems and the accident rate is around two thirds of the national average for D3M.

Proposed Measures

5.17.3 No measures are proposed.

5.18 ***Traffic Control (ITS)***

5.18.1 The M5 motorway in the Bristol-Exeter corridor currently has an operational motorway communications system comprising emergency telephones and matrix signals. For the majority of this section of motorway the matrix signals are central reserve signals located at approximately 3km intervals. In the Bristol and Exeter areas there are some gantry mounted signals. CCTV is only installed in the Bristol area (to Junction 21) and not at the other junctions.

MIDAS

5.18.2 A MIDAS system is proposed for the full length of the M4/M5 interchange to the end of the M5 at Junction 31. Along the A38, the MIDAS system should be extended to Haldon/Telegraph Hill (A38/A380) as this section currently exhibits congestion and accident problems (see the Exeter-Penzance Plan). The system should include:

- Traffic monitoring every 500 metres; and
- Variable message signs at each junction and at least every 1500 metre spacing between junctions. Signs to be mounted on gantries and/or verge mounted as appropriate.

5.18.3 The MIDAS system will continuously monitor the traffic flows and automatically set advisory speed limits and queue warning messages on the signs when congestion or incidents on the motorway is detected.

5.18.4 The variable message signing installed as part of the MIDAS system would perform supplementary functions, giving hazard warnings such as ice, high winds and diversion information. Hazard warnings and local diversion requirements would be under the control of the local police control centre with strategic/wider network diversions being under the control of the Highways Agency Traffic Control Centre (TCC).

Controlled Motorway

5.18.5 Controlled Motorway facilities are proposed on:

- the section of motorway north of M4/M5 interchange to south of Junction 21 in the Bristol Area at the north of this corridor (see Greater Bristol Area Plan); and

- the section of the motorway north of Junction 29 to the south of the motorway at Junction 31 in the Exeter Area (see Exeter-Penzance Plan).

5.18.6 The controlled motorway will require the gantry matrix signs to be changed to incorporate the 'red ring' required for compulsory speed limit definition and the installation of 'enforcement' equipment. Additional gantries will need to be installed in the Exeter section of Controlled Motorway Area to supplement the existing gantries.

5.18.7 The Controlled Motorway facility extends the features of the MIDAS system by analysing the traffic flows and, prior to congestion forming, reducing the speed limit to achieve constant traffic flow thus delaying the onset of stop-start traffic flow breakdown.

Traffic Data Dissemination

5.18.8 The installation of MIDAS and other traffic monitoring equipment along the motorway will provide a wealth of 'real time' data on the status of the motorway and its junctions. This data is available in the Police Control Centres to enable them to undertake the local incident responses and also passed on to the TCC, which is currently under development, to make any strategic response. Within the TCC framework this data is to be made available to the traffic organisations, broadcasters, route guidance system operators and the public domain. Development of the data dissemination facilities should be progressed to provide and improve the capabilities for businesses and the general public to make better informed journey planning decisions before and during their journeys.

5.19 ***Future Traffic Volumes***

5.19.1 The impact of the Preferred Strategy upon future traffic volumes and operating conditions along the corridor is shown in Figure 5.1. Along with the Base 2000 traffic flows, two future scenarios are also presented; the '2016 Do Minimum' presents flow estimates if only the committed schemes and interventions (across all modes) were provided, and the '2016 Preferred Strategy' presents estimates if all parts of the Preferred Strategy (again across all modes) were provided.

5.19.2 Figure 5.1 shows that there will be significant growth on all parts of the corridor, for both the Do Minimum and Preferred Strategy. This is due to the projected increase in movements throughout the travelling population, plus the specific effects of development proposals contained within Regional Planning Guidance.

The largest increases are at the northern end of the corridor, between Weston-super-Mare and Bristol.

5.19.3 Also shown on Figure 5.1 is an 'Operating Index' which reflects 2016 operating conditions on the highway network.

5.19.4 It can be seen from Figure 5.1 that there will be reasonable operating conditions with the Preferred Strategy in place. Typically, congestion will continue to occur only on an intermittent basis.

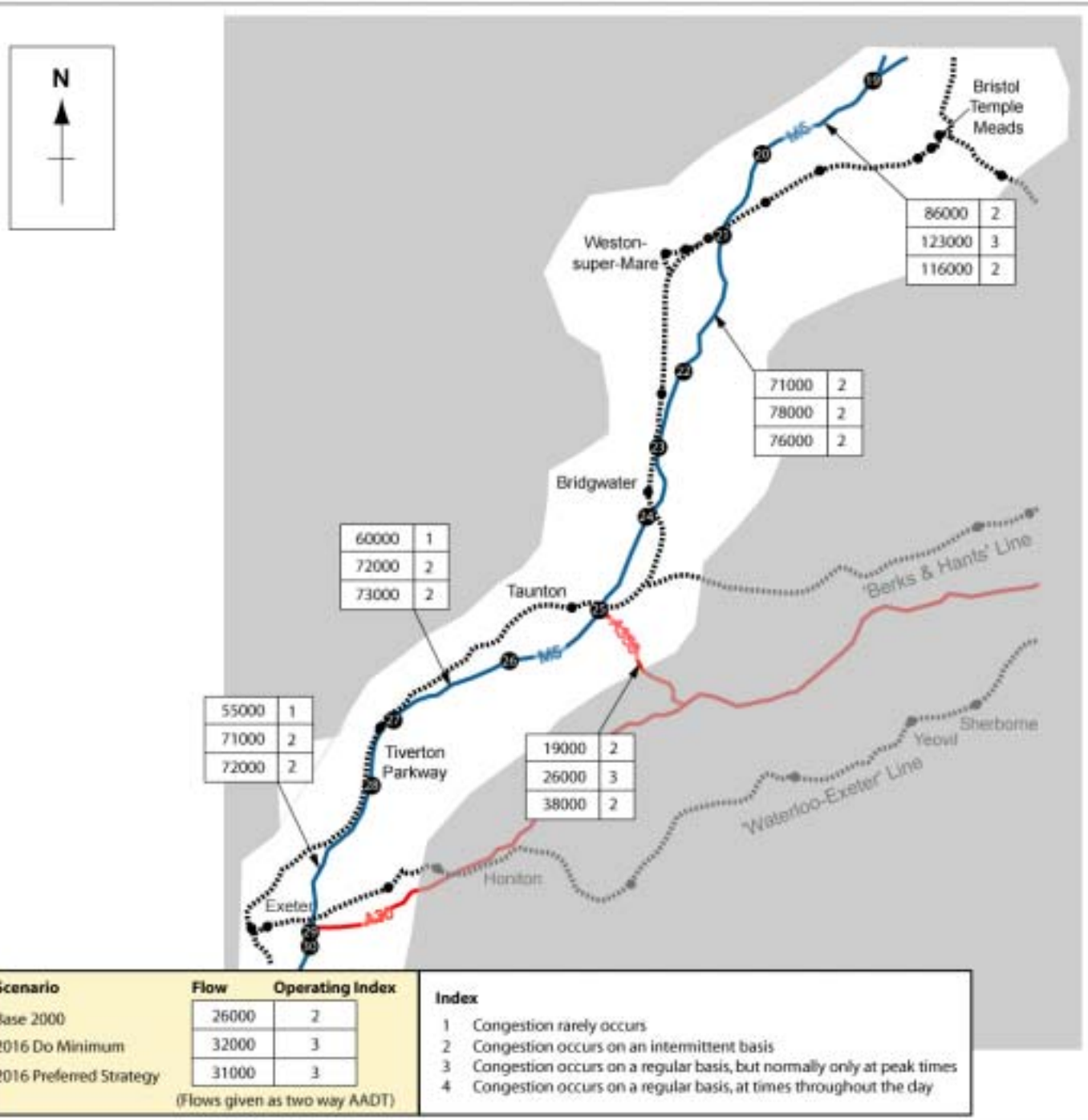
5.19.5 The corridor will be placed under greatest pressure at periods of peak summer flows. During these periods there will continue to be a significant congestion on the busiest days. On most days during the summer period, however, traffic flows will continue to operate with low levels of congestion.

5.20 ***Costs***

5.20.1 Table 5.1 provides the indicative costs of implementing the measures described in this chapter.

Table 5.1: Indicative Costs of Highway Measures (@ Q3 2001 prices)

Scheme/Measure	Cost (£m)
Junction Improvements (various)	£2
ITS Measures (including information dissemination)	£45
Total (est)	**£47**



Scenario	Flow	Operating Index
Base 2000	26000	2
2016 Do Minimum	32000	3
2016 Preferred Strategy	31000	3

(Flows given as two way AADT)

Index

1 Congestion rarely occurs
2 Congestion occurs on an intermittent basis
3 Congestion occurs on a regular basis, but normally only at peak times
4 Congestion occurs on a regular basis, at times throughout the day

SWARMMS

Traffic Flow Data
Bristol-Exeter Plan

Figure 5.1

6 Summary of Findings

6.1 ***Conclusions***

6.1.1 The Bristol-Exeter Plan contains a Preferred Strategy which is truly multi-modal; it contains significant investment in the rail infrastructure and services, coach and express buses, interchanges, rural public transport schemes, new highway schemes and ITS measures.

6.1.2 A number of additional passenger rail services are proposed for the Bristol-Exeter corridor rail line. These include:

- Great Western Main Line services extended beyond Bristol (see the London-Bristol Plan) and enhanced direct Paddington-South West services via the Berks & Hants (see London-Exeter Plan);
- Services centred on Bristol, including cross-city services between Taunton and Gloucester and Exeter and Cardiff (see the Bristol area Plan); and
- Services centred on Exeter and further west are discussed in the Exeter-Penzance corridor Plan.

6.1.3 'Cross-country' services between the South West and northern England and Scotland are subject to significant improvements through Virgin's commitment to introduce new rolling stock and a 'clock-face' timetable in 2003. No further upgrades to these services are proposed in this strategy.

6.1.4 The Bristol-Exeter line is capable of straightforward (and relatively cost effective) upgrade to cater for enhanced loading gauges for inter-modal freight services.

6.1.5 The Preferred Strategy also includes a major enhancement to the coach network serving the Bristol-Exeter corridor and connecting settlements. The proposals are ambitious but, if implemented, would provide both significantly improved accessibility for those who rely on public transport and an increased frequency and improved reliability which will be of value to all potential travellers. Despite the focus of SWARMMS on the main corridors through the region (M5 between Bristol and Exeter), the express bus network proposed also provides significant enhancement for connecting movements off the main corridors (see London-Exeter Plan).

6.1.6 A comprehensive programme of upgrading existing public transport interchanges (both rail and coach/bus) is also proposed. A first class transport system demands that travellers have levels of comfort, security and information which are above those which currently exist in many locations. The upgrading of interchanges can have a major impact on people's perception of public transport and is a central part of the Preferred Strategy.

6.1.7 Reference is also made to the rural public transport schemes developed in the Rural Access to the Transport System Plan. When implemented, they will start to address some of the key problems of social exclusion in rural areas for those without access to a car.

6.1.8 A new Intelligent Transport System (ITS) is also proposed for the M5 corridor. This will particularly assist in reducing the number of accidents along the route as well as providing better information at times of congestion. Minor junction improvements are also proposed.

Appendix A

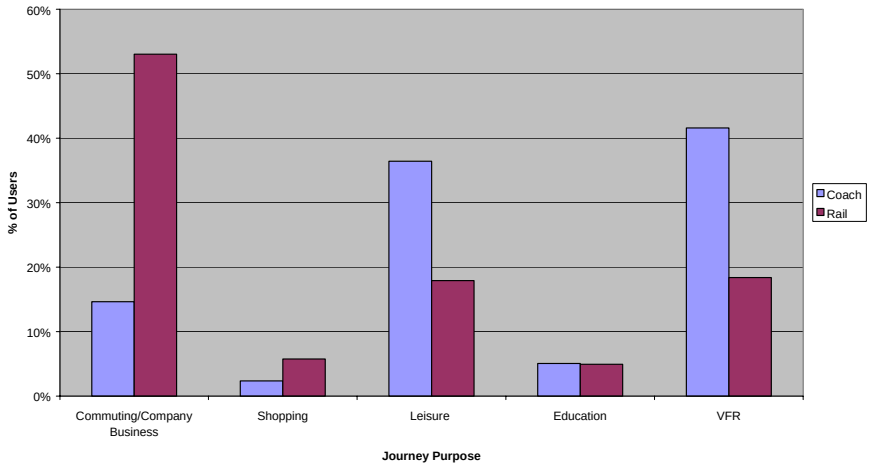
Characteristics of Coach Users

A Development of Scheduled Coach & Express Bus Strategy

Characteristics of Coach Users

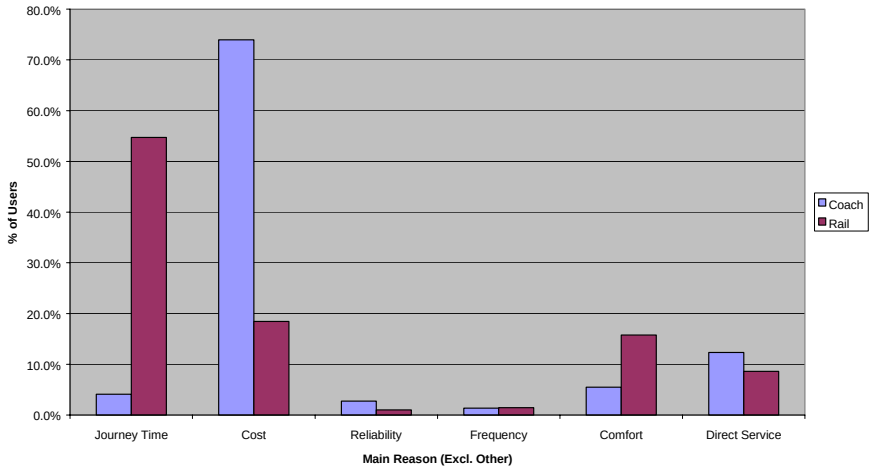
A.1 Research undertaken as part of this (and other studies) has shown that there is a significant difference between the characteristics of rail and coach users. Figure A.1 illustrates the distribution of journey purpose of rail and coach users derived from surveys undertaken in June 2000 as part of SWARMMS. This shows a clear difference between the journey purposes of users of the two modes; in particular it emphasises the predominantly leisure journey purpose of coach users and the commuting/company business journey purpose of rail users.

Figure A.1: Coach and Rail User Journey Purpose Comparison



A.2 Commuters and those travelling on company business tend to be more time sensitive than those travelling for leisure journey purposes. This is supported by the reasons given by users in the SWARMMS area for choosing coach or rail modes. This is illustrated in Figure A.2 which shows that journey time is the main reason for choosing to travel by rail while for coach cost is the dominant reason. These results are supported by the findings of other surveys into coach and rail travel.

Figure A.2: Main Reason for Choosing Rail or Coach



A.3 Coach and rail users also differ in terms of the availability of a car for their journey. The SWARMMS coach and rail user surveys showed that approximately 33% of coach passengers said that they had a car available for the journey they were making by coach. This compares with 52% for rail users. However, only 3% of those with a car available said that it was a company car. This compares with more than 10% for rail users. This tends to suggest that improving the level of coach service will result in more journeys being made by non-car owners (and those without access to a car for a particular journey), although there will also be a degree of mode switching. In contrast, the survey results tend to confirm that rail is better able to encourage mode switching from car, although this will depend on the total journey time, parking availability and cost, fares etc. characteristics pertaining at each location/corridor.

A.4 As such, the primary modal effect of improving the quality of coach and express bus services will be to increase the public transport choice for car users rather than abstracting a significant amount of rail demand. This is consistent with the current policy of improving the quality of sustainable transport modes and increasing public transport accessibility.