

**Evaluation of Zonal Fares Trial
in South London**

Final Report

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EXECUTIVE SUMMARY

Study background and objectives

Trial of a simplified, zonal fares structure for point-to-point tickets has been taking place since January 2005 on Southern TOC routes in the Greater London area, with the aim of achieving a readily understood and more communicable fares offer. As well as benefiting from the simplification overall, passengers experienced fares level changes as the fares on individual flows were brought into line within the zonal structure.

The study was required to develop an understanding of the passenger valuation of a simplified zonal fares structure. The findings in relation to Southern were intended to inform understanding of the impact of a potential extension of the trial scheme to cover all of the London Travelcard area.

The main deliverable was to be an **evaluation of the trial Southern scheme**, taking into account the estimated passenger value of the simplified structure, changes to actual fare levels, and possible effects in terms of TOC retail transaction and marketing costs and passenger crowding costs.

The evaluation comprised a number of workstreams supporting a demand model assessment of the earnings and other impacts on Southern. The workstreams included:

- Literature review;
- Southern internal preliminary sales analysis
- Statistical analysis of passenger volume data;
- Rail user market research;
- Non-user market research; and
- Retailing implications review.

Headline findings from the workstreams are included in the main Final Report, with full details (including the derivation of forecasting parameters from the market research results) reported in Technical Notes 1 and 2, published separately.

Supporting Information

The literature review of existing evidence on fares simplification was carried out by Professor Peter Bonsall, with his colleague Jeremy Shires, from the University of Leeds Institute for Transport Studies (ITS) and confirmed that simplification is inherently beneficial, aiding the supplier in promoting the product and the consumer in making it easier to comprehend. Examples of demand growth in UK bus networks were observed, including London (2000) where a 1.5% increase in overall volume was ascribed to the simplification impacts of fares restructuring and Brighton and Hove (2001) where a flat fare and associated marketing had generated 8.5% year-on-year volume growth despite an increase in average fare level.

However, no evidence has been found in this study's sales analysis for any impact on overall ticket sales volumes from Southern fares zonalisation, either in Southern's early internal monitoring or in a more comprehensive exercise carried out in this study. Nor was any significant impact on ticket retailing operations noted in enquiries at Southern's headquarters or at station level, or very conspicuous retail promotion of the zonal fares structure noted. The main mechanism by which passengers would be aware of the simplified structure was the 'Fare PAL' leaflet showing the fare zones

(which are identical to Travelcard zones) together with matrices of fares payable between zones, separately for journeys to or from London or journeys not involving central London. The Fare PAL leaflet shown in Fig ES1 indicates that, despite simplification, the presentation, in one item, of all the fares in effect within Southern's suburban area remains a challenging task. In addition to somewhat patchy distribution of this leaflet at stations, the content may be viewed on the Internet. Southern's current timetable leaflets include the map of fare zones superimposed on the route network, but these leaflets do not include the complementary details of the fares applicable.

Market research on the potential benefits of fares presentation using Fare PAL was undertaken with both rail users and non-rail-users. Granted that simplification has now been in effect for almost 18 months, it would have been reasonable to expect representatives of any new volume to be included in the rail user research. However as awareness of the simplified zonal fare structure was low (around 8%, or possibly lower) the non-user research was used to inform the analysis of a potential future scenario in which a higher level of fares communication was achieved.

Findings from the market research were analysed, with the aid of experts from ITS, to derive acceptable estimates of forecasting parameters usable within a fares model to confirm and forecast expected impacts of zonal fares over a suitable period into the future. This model allowed the elasticity impacts of changes in fares levels (arising as part of the adjustment to a zonal matrix of fares levels) to be identified separately from user response to the simplicity of zonal fares.

The forecasting values derived from the research going forward into the demand modelling were as shown in Table ES1 (which also forms Table 8 of this Final Report) which follows. Responses to fares levels were modelled using conventional elasticities by market segment recently researched by MVA specifically for London fares studies, adjusted to reflect the market mix on Southern, which are shown in Table 3 of this Final Report.

Table ES1: Increase in non-season journeys due to user response to simplicity of zonalisation and Fare PAL, by ticket format and scenario

Element	Scenario	
	Current position	Potential Future with greater awareness
Impact on point-to-point ticket volume (applied to non-season tickets only)		
Due to current users (source Table 1)	0.10%	0.15%
Due to current non-users (source sect 2.4.3)	0.00%	2.68%
Total impact	0.10%	2.83%
Impact on Travelcard ticket volume (applied to non-season tickets only)		
Due to current users	0.00%	0.00%
Due to current non-users (source sect 2.4.3)	0.00%	2.68%
Total impact	0.00%	2.68%

In deriving the above forecasting values account was taken of the anticipated frequency of new trip making, and excessively high values (which could not realistically be triggered solely by modest enhancements to fares communication) were screened out. Comparisons were also made between recent past and likely near-future behaviour, and between perceptions on Southern (where fares have been zonal since Jan 2005) and SouthEastern (where fares continue to vary on an individual flow basis). The near-future stated intentions were compared to the recent past findings and the ratio of approximately 2.5 used elsewhere in the study to scale down future 'stated intentions' forecasts as appropriate.

Findings

Qualitative research revealed that transparency of the fares structure is not seen as a very significant issue, in deciding to make a rail journey, by many of the current rail ridership. Few respondents have a well-founded concept of the existing fares structure (although many already assume that it is zonal similar to the Travelcard structure) and a large fraction of current rail users are only concerned to know local fares to a crude degree of precision. However, awareness of actual fares levels is poor with a significant element of overestimation influenced by the levels of Full Fare tickets. Accordingly the simplified fares structure may provide a viable means to facilitate fares promotional exercises which could generate significant additional earnings.

Quantified findings are presented separately for the current position and for the potential future position with increased fares communication, focusing on impacts on Southern as further impacts (mainly limited to Thameslink) add only approximately a further 14% to earnings or economic benefits as appropriate.

Table ES2 Current Position Test Results – Southern earnings impact

Test	Description	Typical per year (2006) £k	NPV (2004) of 2005-2019 impacts £k
Test 1	Fares actions actually undertaken	+8.0	+109.0
Test 2	Impact of fares level changes alone.	+0.1	+1.1
Test 3	With shifts to/from Travelcard *	-1.2	-16.9

* after adjustment for reduced allocation to Southern of volume transferred to Travelcard

Table ES2 shows that the modelled impact of fares restructuring is small, approximately +£8k per year, which is well below the threshold observable through analysis of TOC sales data. On Southern (where the average fare level was kept constant) the portion of this contributed by the individual fares level changes is minute – only approximately 1% - so that effectively the model finding is reflecting the level of generation from the simplification and better communication of zonal fares emerging from the analysis of market research.

Should the hypothesis that the fares promotion so far undertaken would encourage shifts to Travelcard be accepted, as suggested by the research, then the adjusted estimate of the overall impact on Southern of the new scheme would be mildly negative, equivalent over 14 years to -£16.9k in NPV terms. The difference is driven by the relatively small net effect of reduced allocation to Southern of Travelcard's increased sale price.

As the elasticity effect of fares level changes is so small in the case of this trial implementation on Southern, the influence of alternative fares elasticities is negligible, which has been shown in sensitivity tests. Thus the estimated impacts on Southern earnings are effectively proportional to any chosen up- (or down-) weighting of the market research's estimate of generation from fares promotion and simpler presentation. Accordingly the low impact on Southern earnings remains very small across a range of potential alternative estimates of user reaction to simplified fares.

The economic impacts of the zonal fares structure amount to only 75% of the earnings impact. Road user benefits of 27% of earnings are more than offset by negative crowding impacts approximating to 50% of earnings. User fare benefits are minimal mirroring the neutral level of overall fares change in the current trial on Southern.

Impact in potential future scenario with enhanced promotion

In the more heavily promoted scenario (with increased generation especially from non-users, across both point-to-point and Travelcard tickets) annual Southern earnings increases of over £0.6m could be possible, equivalent to 7% of the base earnings subjected to zonal fares. The likelihood of this level of generation would need to be validated either by further market research or by comparison with the impacts of previous similar campaigns. Such a level of promotion would have an ongoing cost to set against the revenue stream, unless a step-change in awareness was an inherent benefit of moving to zonal fares across the whole of London.

Conclusions

Principal conclusions to be drawn from the study are:

- The impact of the introduction of zonal fares in January 2005 (and extended by the moving of certain stations within the zonal area in January 2006) on Southern earnings and journeys has so far been minimal. Of the possible +£8k per year impact calculated, almost all is due to the overlay effect associated, following market research, with improved fares communication rather than with changes in fares levels. The minimal modelled earnings impact is consistent with analysis of sales data both by Southern and in this study.
- A 13% greater earnings impact has been calculated for all TOCs in aggregate, the majority of the extra demand accruing to Thameslink (which offers services in the area).
- The earnings impacts are heavily offset by potential crowding impacts (although at these levels both are negligible) such that the estimated economic impact is only 75% of the earnings impact.
- A secondary effect of the promotion of fares levels via Fare PAL could be that there would be transfers from/to Travelcards which would reduce the estimated Southern earnings impact to a very slight loss (of around £1k per year) under the Current Position scenario.
- There have not been any identifiable transaction cost savings to operators.
- While background research in the study area has indicated that transparency of the fares structure is not seen as being a very significant issue, in deciding to make a rail journey, by many of the current rail ridership, the literature study suggested that a relaunched product positioning on the basis of simplicity and ease of use had produced a generative effect for ridership levels elsewhere in the worldwide transport industry.
- Non-user research suggests that a future higher level of fares communication activity (such as might be achievable with the introduction of a London-wide zonal scheme) could produce significantly higher earnings impacts – up to £0.6m per year for Southern. This benefit occurs largely through correction of overly high impressions amongst non-users of rail fares for journeys to and from London. Fare PAL, as well as the need for ongoing promotional support, could be a viable tool in such a campaign, for which the magnitude of the payback remains relatively uncertain. The increases would largely be obtained by converting non-users to users, but at these levels of generation the impact on crowding would need to be considered.

- Should the zonal fares structure be rolled out across other London franchises with different base fares levels, the average level of fares on these franchises would be unlikely to be able to be kept constant in the way that it has been kept constant in the Southern trial implementation. In this event there would be likely to be a significant elasticity response to fares levels, for which the forecasting values and model used in this study would provide a valuable analysis tool. In particular this study has identified a suitable value for a higher elasticity to apply to individual fares increases of over a proposed threshold real increase of 20%.

Figure ES1a: Fare PAL map

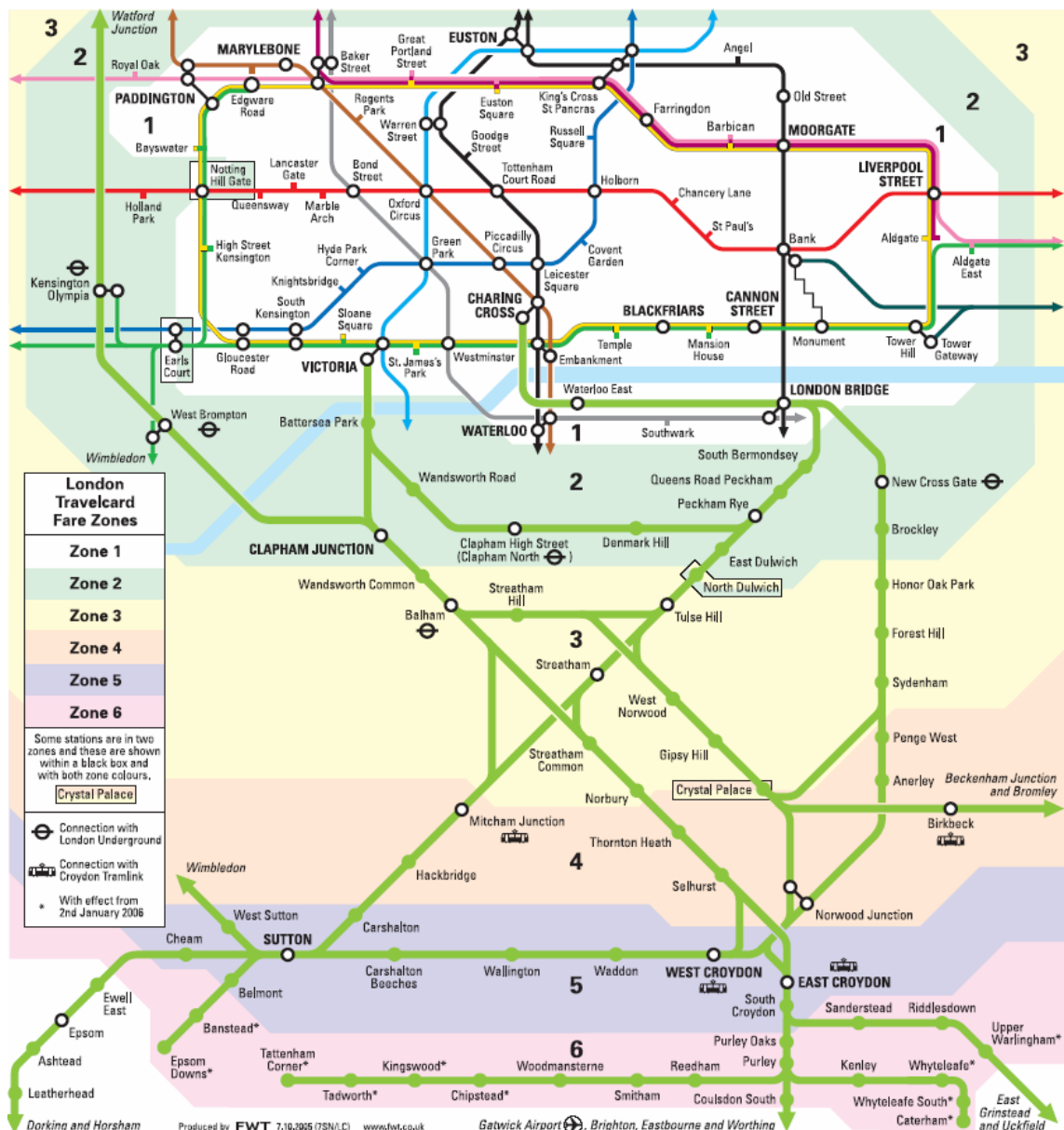


Figure ES1b: Fare PAL tables

Fare PAL
including zone 1 (side A)



Valid from 2 January 2006 to 1 January 2007

Travelcard Zones	Standard Day Single	Standard Day Return	Peak Day Travelcard	Cheap Day Return	Off-Peak Day Travelcard	Weekly Season Ticket	Weekly Travelcard	Monthly Season Ticket	Monthly Travelcard	Annual Season Ticket	Annual Travelcard
12	£2.00	£3.10	£6.20	£2.40	£4.90	£11.40	£22.20	£43.80	£85.30	£456	£888
123	£2.30	£3.80	£7.20	£3.30	N/A	£15.50	£26.00	£59.60	£99.90	£620	£1040
1234	£3.10	£5.30	£8.40	£3.60	£5.40	£21.50	£31.60	£82.60	£121.40	£860	£1264
12345	£4.10	£6.80	£10.40	£5.00	N/A	£27.90	£37.80	£107.20	£145.20	£1116	£1512
123456	£4.60	£8.40	£12.40	£5.10	£6.30	£28.90	£41.00	£111.00	£157.50	£1156	£1640

Fare PAL
excluding zone 1 (side B)



Valid from 2 January 2006 to 1 January 2007

Number of zones required	Standard Day Single	Standard Day Return	Peak Day Travelcard	Cheap Day Return	Off-Peak Day Travelcard	Weekly Season Ticket	Weekly Travelcard	Monthly Season Ticket	Monthly Travelcard	Annual Season Ticket	Annual Travelcard
1	£1.60	£2.70	N/A	£2.00	N/A	£7.20	£14.00	£27.70	£53.80	£288	£560
2	£1.80	£3.00	N/A	£2.30	N/A	£8.00	£14.00	£30.80	£53.80	£320	£560
3	£2.00	£3.20	N/A	£2.80	N/A	£11.60	£18.40	£44.60	£70.70	£464	£736
4	£2.30	£3.80	N/A	£3.60	N/A	£15.50	£22.20	£59.60	£85.30	£620	£888
5	£3.10	£5.30	£7.40	£4.00	£4.30	£21.50	£27.20	£82.60	£82.60	£860	£1080

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1 INTRODUCTION

1.1 Study Background and Objectives

1.1.1 The trial fare structure

Trial of a simplified, zonal fares structure for point-to-point tickets has been taking place since Jan 2005 on Southern TOC routes in the Greater London area, with the aim of achieving a readily understood, communicable, new fare product. The fares were promoted under a “Fare PAL” banner and communications format, which included the Travelcard fares as part of the integrated proposition.

The new formulation concerned only the cost of the fare – the purchase of a ticket with point-to-point validity remained unchanged.

The effect on passengers of introducing zonal fares was two-fold. As well as the overall simplification effect, passengers experienced fare changes as the previous fares on individual flows were brought into line within the zonal structure. Some individual fares were reduced (especially travelling from the far side of a zone), while others (from the near side of a zone) were increased. However in the Southern trial implementation the zonal fares levels were chosen so that the overall value of the regulatory fares basket was unaffected, an outcome which would not be possible in the event of the zonal fares structure being rolled out across other franchises with differing base fare levels.

1.1.2 Study objectives

The study was required to develop an understanding of the passenger valuation of a simplified zonal fares structure in terms of passengers’ willingness to pay, or frequency of travel. The findings in relation to Southern were intended to inform understanding of the impact of a potential extension of the zonal fares scheme to cover all of the London Travelcard area, on a similar basis to the pilot implantation on Southern alone.

The main deliverable was required to be an **evaluation of the trial Southern scheme**, taking into account the estimated passenger value of the simplified structure, as well as other related factors such as changes to actual fare levels, and possible effects in terms of TOC retail transaction and marketing costs and of passenger crowding costs.

1.2 This Report

This report provides the evaluation of zonal fares on Southern, which comprised a number of complementary workstreams supported by demand model assessments of the earnings and other impacts on Southern. The report therefore consists of four sections:

- Supporting Information;
- Demand model and input data;
- Findings; and
- Conclusions.

Elements of the supporting information include headline findings from the workstreams reported in Technical Note 1 (earlier entitled Initial Progress Note, and reviewed by the Client Group on 3 April), and Technical Note 2 (earlier entitled Interim Report, and reviewed by experts from Leeds ITS on 6 and 21 July), as follows:

Reported in Technical Note 1 (Initial Progress Note):

- Literature review;
- Southern internal preliminary sales analysis;
- Statistical analysis of passenger volume data; and
- Qualitative and quantitative market research (to pilot stage).

Reported in Technical Note 2 (the Interim Report):

- Quantitative rail user market research;
- Non-user market research; and
- Retailing implications review.

The modelled estimates of the earnings impact of zonal fares are presented separately for the current level of promotional activity (in section 3.6.1) and for a potential future heightened level of fares awareness (in section 3.6.2).

2 SUPPORTING INFORMATION

Summary reports of the literature review, Southern internal sales analysis, econometric analysis of passenger volume data; and qualitative and quantitative market research were provided in Technical Note 1 (the Initial Progress Report dated March 2006) and Technical Note 2 (the Interim Report of August 2006), together with the supporting papers, and only headline findings are included again here. For full details please refer to the reports as set out in section 1.2.

2.1 Literature Review of existing evidence on fares simplification effects

The review was carried out by Professor Peter Bonsall, with his colleague Jeremy Shires, from Leeds ITS which has, in recent years, been involved in a number of research projects looking at the complexity of pricing structures and people's ability to understand and relate to them.

The main finding was that simplification is inherently beneficial, aiding the supplier in promoting the product and the consumer in making it easier for them to comprehend it. Examples of demand growth in UK bus networks were observed, including London (2000) where a 1.5% increase in overall volume was ascribed to the simplification impacts of fares restructuring and Brighton and Hove (2001) where a flat fare and associated marketing had generated 8.5% year-on-year volume growth despite an increase in average fare level.

There is also a dimension of *fairness* which has a significant impact on the acceptability of fares levels and fares changes.

2.2 Southern Internal Preliminary Sales Analysis

As the new fares structure was introduced in January 2005 there was already a full year of experience of the change for daily ticket users, and for season ticket purchase (although not season ticket use). Preliminary analysis of the effects of the zonal fares scheme had already been carried out by TOC staff at Southern, by means of comparison of headline earnings growth during February–April in 2005 over 2004, compared with the growth rate in 2004 over 2003.

No evidence was found for any substantial impact, in either direction positive or negative, so no further review of longer-period findings was carried out by Southern.

2.3 Control Flow Ticket Sales Analysis

Passenger volume data was made available by Southern for a compatible series of flow and ticket product sales for calendar years 2003, 2004 and 2005 from the LENNON system. As well as data for non-Travelcard tickets being considered by this study, the data included sales of Travelcards (day and period) at in-scope stations operated by the TOCs or Network Rail, but excluded Travelcard sales made at London Underground stations or other non-National Rail locations.

While the findings can only be subject to broad confidence limits as the models did not succeed in capturing the full variation in the data very well, an upper-bound estimate in the region of +1% was made for the London market. No separate finding was available for the non-London market, due to its smaller size in combination with possible impacts from Oyster introduction.

2.4 Market Research Inputs

2.4.1 User research

The initially specified research was to be conducted among rail users who, if the restructuring had been successful in generating new journeys, would include a proportion of new users. The format chosen was at-station recruitment with computer-aided telephone follow-up shortly afterwards.

The qualitative research suggested that the impact of Fares PAL would mainly not be felt on existing rail customers' *regular journeys*, for which they will already be sufficiently aware of the fare and will continue travelling (subject to fares level elasticity effects). The quantitative research was therefore concentrated on the impact of fares communication on making 'new journeys'. The key questions concerned how many new journeys were likely to be made over the forthcoming 6 months (or had been made over the past 6 months), and then to probe the influence of the new fares structure on the number of trips made by rail. There was a follow-up question enquiring how the new structure made a difference, and why that was.

ACCENT's report on the user research, dated April 2006, was attached as Appendix A to the Interim Report (Technical Note 2). Principal findings were:

- Fares levels and the fares structure are taken for granted by customers, becoming of importance only if the concept of 'fairness' is breached.
- Raising the issue of fares structure and providing comprehensive details (as in Fare PAL) may for some people amount to a complication rather than a simplification.
- Many customers claim to only be interested in local fares levels to a coarse level of precision. Even when presented with changes in fares levels, the vast majority of rail users stated there would be no impact on journeys made.
- The existing fare system was typically not understood; however nor was it typically seen as difficult or a deterrent to travel. Although there was a poor factual basis for awareness of rail fares structures, there was a widespread assumption that fares were set on a zonal basis.
- Although those who categorised the fares structure as being based on point-to-point pricing rather than zones tended also to rate the structure as significantly more complex, the SouthEastern (non-zonal) fares structure was, if anything, judged to be overall less complex than the zonal fares structure on Southern.
- Only 2% of the Southern sample (4% on SouthEastern) stated that complexity discouraged travel. The one-third of rail passenger respondents who would now access fares information via a website would presumably not be discouraged by complexity, or by other features of hardcopy fares communications.

- While the concept of zonal fares gained a mixed response, 70% of respondents were in favour of fares being set zonally. Most Southern customers liked the simplicity and the ability to know fares in advance of travel. Similarly on SouthEastern there was mild support for the concept, counterbalanced by scepticism whether implementation would be truly neutral in terms of ticket costs.
- The most important disadvantage of specifying fares in a zonal way (all other disadvantages being associated with the details of the presentation rather than with the concept) was the unfairness for short trips across a zone boundary, mentioned unprompted by 13% of respondents (19% on SouthEastern). Two were aware of the cost penalty for short trips across a boundary under zonal fares, one of whom (who had been disadvantaged) would prefer to revert to the previous system.
- There was low current awareness of Fare PAL - only 8% had heard of it. However once revealed it was viewed very positively, the key advantages being clarity of information, ease of understanding, and being able to see the cost of travel in advance (mentioned by 20%) / reassurance of knowing fares in advance (mentioned by 9%).
- Despite the modest interest shown in being able to know fares in advance, in practice the qualitative research showed that many customers had only an approximate concern for fares levels, over half being interested only to the nearest 50p (the zoning adjustments on Southern being typically significantly less than that).
- Around a third of respondents stated that over the past (or forthcoming) 6 months they had made / were likely to make in-scope rail trips to places they had not visited for five years or so. These respondents were quizzed on the impact of zonal fares on the number of journeys actually made / thought likely to be made (the results of which are analysed in section 3). Approximately 3% suggested they would make more trips (partially offset by a minority who would make fewer).
- Within the 14% of the sample who were aware of the change on Southern to zonal fares, 14% thought the fares became more expensive (by 75p per week on average). A similar number thought the fares were less expensive, interestingly, by a much greater amount. Most, however, thought it made no difference and none thought that the changes had influenced the number of rail journeys they made.
- As the responses to fares structures and levels were muted, it is possible that the encouragement to purchase a Travelcard arising from Fare PAL information could be of significance.

2.4.2 Non rail user market research

The non-user surveys were commissioned primarily to investigate the influence of having a more confident mental estimate of the fare (such as Fare PAL could potentially provide) on the likelihood of making journeys by rail. The emphasis was on considering “what might be” rather than on assessing the effect that the introduction of zonal fares on Southern has had so far since, after more than a year of zonal fares, it seems likely that most people likely to be attracted to rail as a result of Southern’s new fares would already be users rather than non-users. The non-user survey thus allowed

us to consider the potential effect of greater public awareness of the simplified fare structure.

The quantitative main element of the non-user survey was preceded by a qualitative element. Because the qualitative phase indicated that rail's positioning was such that better information or minor changes in fares level would make little difference to its mode share for local journeys, the emphasis of the quantitative phase was more focused on travel to and from London. The research was carried out on street during daytimes, early evenings and weekends so as to capture a fair share of those in employment. Those in scope for the research consisted of non rail users who were not rejectors of rail, except that those whose reason for rejecting rail was simply cost were retained in the survey.

ACCENT's (draft) report of the non-user research, dated June 2006, was attached as Appendix B to the Interim Report (Technical Note 2), and noted the following main points forming the context for the quantification of response:

- Non-users (even those who were not outright rejectors of rail) were found, in any case, to include approximately 20% who preferred other modes on account of mode-specific factors. Such factors mentioned negatively in the qualitative survey included safety, cleanliness, reliability, and the possibility of meeting 'undesirables' on the train.
- Fares were generally believed to be higher than they actually were, with awareness and recall often expressed in 'round pounds';
- Estimates of the off-peak fare appear to have often been influenced by knowledge or experience of the peak fare.
- There appeared to be cultural or historical differences between the locations studied, in terms of familiarity with the rail product and pricing, and hence potential ease of use of fares information such as 'Fare PAL' (which, even after zonal simplification, remains a complex package of information).
- The reported awareness of Fare PAL (8%) was remarkably high, given that the value suggested by rail users was actually lower (6%). This suggested that both might to an extent be representing the proportion of people simply unwilling to admit to not having been aware of Fare PAL – in turn casting doubt on the user research figure derived from the similar question.
- Overall, just over half the respondents indicated that they would keep and/or use the Fare PAL leaflet.

The overall finding of the non-user survey was that communicating fares levels to non-users would have a beneficial effect on perceived value for money and (taking an overall average) on likelihood to make a journey by rail. Fare PAL is seen as a positive medium (though both positive and negative detailed comments were made) and would be retained by over half those who were interviewed. However impacts in terms of rail ridership would be limited and would mainly consist of journeys to/from London.

2.4.3 Derivation of values for estimating aggregate demand impact

The evidence from the market research and other workstreams has been assimilated (with the assistance of technical experts in Leeds University Institute of Transport Studies) into a form suitable to feed the model as described in Section 3. Details of the

procedure were described in the Interim Report (Technical Note 2), so that only the main findings and details of the parameter derivation are repeated here.

(a) Existing Rail User – based generation

The findings from the user research on Southern, where respondents had had the potential to be aware of Zonal Fares, are indicated in Table 1. The number of valid ‘new trips’ and existing trips has been derived from examination of section 3.7 of ACCENT’s user survey report. As outlined in Technical Note 2, it has been considered most realistic for forecasting to express the new trips relative to the volume of non-season trips currently being made, resulting in the generation estimate of 0.1% of current non-season volume as shown in the table.

Table 1 Estimated journeys impact of zonal fares structure due to perception of simplification

Estimate Basis	Respondents	Total journeys over the last six months		Impact
		New Trips	Existing	% of existing
Estimates of new trips in past 6 months by those aware of zonal fares, over whole survey base	212	+5	17097	+0.03%
Proportion of in-scope Southern journeys which are non-season journeys.				33%
Increase in trips taken as a proportion of existing non-season trips				+0.10%

Source: Analysis of rail user market research

(b) Generation from current non rail users

The possibility of any further impact current non-rail users is modelled as a sensitivity test as, if the impact had been major, then one would have expected the relevant proportion of new users to already be represented within the user survey.

Figure 26 and Table 12 in section 3.7 of ACCENT’s non-user survey report provide data indicating that a top-level forecast of ridership impact from non users (once aware of Fare PAL) could be around 5 rail trips per respondent over the forthcoming six months.

Taking account of the proportion of overall non-users who are “in scope” (might potentially consider a rail journey) and who might be aware of Fare PAL through marketing initiatives, and correcting for response bias, we estimate this value to be equivalent to 0.028 trips per head of population over 6 months, or 0.113 single-leg journeys per year per head of population. Applying this figure to total population estimates for the relevant station catchment areas, this implies 66.7 thousand new journeys per year.

Similarly to the analysis for rail users, the new trips have been expressed for forecasting relative to the volume of non-season trips currently being made, corresponding to 2.68% generation for these ticket types.

2.5 Communications Audit

Other strands fed in the extent to which user behaviour might have been affected by communication activity, as follows:

- Leaflets and posters were provided in advance of the launch of zonal fares at all stations, and were felt by the staff to be fit for purpose. The posters at stations were considered particularly helpful, since customers were prepared for fare increases (where these applied) in advance. Staff felt that this reduced the risk of any adverse reaction they might have received when the new fares were launched.
- Fare PAL leaflets were only found to be on display currently at East Croydon, and not at Norbury or Peckham Rye.
- For whatever reason, the complete Fare PAL including fares levels is not included in passenger timetable leaflets, which form the core material produced for customer retention. The Fare PAL (zonal map and fares tables) is however available on the Southern Internet site.
- The zonal fares structure and levels had not been the subject of any press release, media advertising or significant editorial mentions, of either a positive or negative tone.

2.6 Retailing Impacts

The customer reaction workstreams were complemented by investigation of other impacts of zonal ticket pricing, mainly relating to TOC costs, through visits to outlets and interviews with Southern TOC retail managers. Details relating to the TOC as a whole were also fed in, primarily via the revenue development manager Matt Bunn. Main findings were as follows:

- The zonal pricing trial scheme has not offered zonal travel availability to passengers. There has therefore not been significant benefit in terms of retailing transaction times, or in terms of simplified functionality of passenger-operated ticket machines: the operator is still required to define the precise origin and destination stations for the journey.
- Although it was possible that ticket offices might be experiencing fewer delays incurred by passengers needing to enquire about a range of different fares before choosing a particular ticket for their journey, no evidence to this effect was obtained. On the contrary, many customers were confused by the use of zones to express point to point fares in printed publicity.
- Customers continue to associate zones with Travelcards, and have difficulty associating them with point to point rather than unlimited travel. Whilst the intention was to simplify fares publicity by reducing the number of different price levels, the feeling is that the number of queries at booking office windows has increased, which is not the desired effect. For the future, it may be worth considering how printed information can be made easier to understand, perhaps by showing clearer separation between the Travelcard and point to point products.

- Although there had been very little direct customer feedback, a handful of off-peak passengers had commented about the change, but overall there had been very little reaction other than that at the small number of stations which had moved between zones or where there were clear issues of fares changes and relativities. Staff did not feel that there had been any migration between point to point and travelcard products as a result of the change.

An overall observation was that, in general, customers were becoming more confused by the range of fare types available. This was exacerbated by the availability of Oyster, which can host Travelcards (but not point to point tickets, nor prepay for National Rail) and which cannot be read or issued at most national rail stations.

3 DEMAND MODEL AND INPUT DATA

As set out in our proposal, we have built a spreadsheet model simulating volumes and earnings under a range of fares inputs, disaggregated finely and using cross-elasticities between fare types to explore the pricing interactions.

3.1 Base Dataset

3.1.1 Source data

The model operates on annual TOC data derived from the LENNON “Fares Index” dataset (obtained via ORR). Fares Index data was available for the financial years 2004/5 and 2005/6 and was subsequently combined to form one large dataset consisting of over 2 million entries.

The data structure is primarily driven by the Fares Index information, which includes records for each material priced fare flow on the UK railway system, excluding only some fare products outside the mainstream industry revenue (e.g. through fares with ferry operators, and fares including marketing add-ons such as meals). Each record in this database is structured as follows:

- Fare Flow details including origin, destination, route, status code.
- Earnings, journeys and passenger-miles by earning TOC in relevant year
- Fare-setting TOC
- Fare-setting body
- Code and Name of fare type
- Fare price in current and previous year
- Whether and how regulated
- Most of the flows are defined on a station-to-station basis, the obvious exception being Travelcards which are sold from an issuing station (assumed to be the origin) to a pseudo-destination representing the relevant destination zones.

3.1.2 Dataset Processing

The source data was screened to extract all fares within the study area set by Southern (regardless of which TOC the revenues accrued to), and included Travelcard sales from Southern-operated stations.

The various ticket types were classified into six main types, forming combinations of season, full, and reduced ticket types with the Travelcard and non-Travelcard ticket formats.

The dataset was subsequently aggregated on the basis of origin, destination, revenue earning TOC and main ticket type. The final dataset included 6885 entries.

3.2 Core Functionality

3.2.1 Philosophy

The model philosophy is similar to the Strategic Fares Model (SFM) devised for the fares regulation study undertaken for the SRA (although operating at a flow level of disaggregation) and simulates, using elasticities, the effect on each database entry (origin, destination, main ticket type, TOC) of the price and other exogenous changes in any defined target year.

Key aspects include:

- Conditional fare elasticities (i.e. if all product prices varied together) which in this case were derived by MVA in a study undertaken within the project area.
- Cross and own elasticities (based on MVA derived conditional elasticities, but using adjusted diversion factors to reflect differences in market share.
- Elasticities for exogenous growth, including population and either GDP or employment.

The model is run independently for each forecast year, and the files of flows with their forecast volumes by earning TOC constitute the raw output for each year. These flows are aggregated outside the main model by earning TOC and year and compared with the base year for both the 'base case' and for each particular test. The model also evaluates the impact of aggregate volume changes on levels of train crowding using data obtained from national PLANET runs, summarised at a TOC level.

The process is incorporated in a suite of EXCEL spreadsheets, within which much of the functionality is pre-programmed. On entering the appropriate sets of data to the SFM, the program automatically evaluates the impacts on demand. The files of output by TOC and ticket type are then copied to the summarising spreadsheet for analysis and record purposes.

3.2.2 Overlay features

The underlying SFM has been adapted to incorporate the impact of a number of overlay features appropriate to the Zonal Pricing study, at a flow level. These include toggles to include (or not):

- Additional growth (independently for point-to-point and Travelcards, by ticket type) used to simulate the fares communication benefits of zonalisation.
- The possibility of demand shifting between point-to-point and Travelcard tickets under improved communication of the product range.

The use of these features, which relates to the findings of market research undertaken in the study, is described in section 3.4. This section also notes the undertaking of sensitivity tests to alternative fares elasticity matrices

(a) Shifts to and from Travelcards

As outlined below, the model outputs are aggregated and compared using a separate output analysis spreadsheet. This sheet has also been used to identify the impact on TOC earnings of the potential transfers between Travelcard and point-to-point ticketing, in the sensitivity test where this possibility is examined.

While the effects on demand and aggregate fares paid are evaluated in the elasticity model, a further impact on TOC earnings arises through the operation of the Travelcard income allocation process. This has the particular feature that the proportion of income for each ticket sold retained by the TOC providing the service varies between point-to-point and Travelcard tickets, with a significant proportion of Travelcard income being allocated to LUL/LBL. Taking account of these allocation differences (as well as the different selling prices for these families of tickets) the TOC earnings will vary in the event that there is a transfer of demand between point-to-point and Travelcard tickets.

The impact has been evaluated using input information on earnings allocation supplied by Southern. This suggested that the proportions retained by Southern for sales at Southern-operated stations (which form all those in the study area excepting London Terminals Charing Cross, Cannon Street and London Bridge, for which in any case different allocation rules and a likely differing user transfer between point-to-points and Travelcards would apply) are as indicated in Table 2.

Table 2 Portion of Travelcard income allocated to Southern (for Travelcards issued at Southern stations other than London Terminals)

Travelcard Type	Southern element %
Full	54.89%
Reduced	60.30%
Season	58.04%

These allocation proportions may be compared with the revenue allocation, for the vast majority of flows in the model, to Southern of 100%. There is a small proportion of earnings on a small number of flows also served by other TOCs (primarily Thameslink, but also SouthEastern to a very minor extent) for which the proportions shown in the table above would compare with Southern allocations below 100%.

3.2.3 Spreadsheet structure

The Southern zonal evaluation model contains six worksheets:

- **Data1:** This provides the Fares Index data for the study area (inclusive of the stations transferred into the Travelcard area in January 2006). It contains 8000 entries.
- **Data2:** This is a refined version of Data1, in which the entries are aggregated by origin station, destination station, revenue receiving TOC and ticket type. It contains 6885 entries and is where most of the technical mechanisms of the model operate.
- **Output:** This worksheet provides the output values required by the output summary spreadsheet. It summarises the results for TOCs and combinations of ticket types as well as on a TOC aggregated basis. This worksheet also includes some economics applications, e.g. the application of crowding effects. Outputs include:
 - Net User Benefit (applies the rule of a half to fares changes between base year and test year)
 - Earnings, Journeys and Passenger Miles impacts
 - Net crowding benefits (applies the effect of crowding on the TOC between the base year and test year).

- LUp: This worksheet contains the various external inputs required for the model to operate. Little attention is required to most of the tables unless the user requires to change values such as inflation rate or value of time. This sheet does however include the controls to input the values outlined in the sections below on Fares levels, and the Test parameters set out in Table 8 and Table 9.

3.3 Input Data

3.3.1 Fares Elasticities

The base elasticities used in the model are tabulated in Table 3, and have been calculated from elasticities derived by MVA for the London Travelcard Area, and modified according to ticket type market shares for the Southern area (also shown in the final column of Table 3). The PDFH spreadsheet was employed to apply the mathematical relationship between own, cross and conditional elasticities and diversion factors. We have assumed that diversion factors can be modified directly by the market shares of different products.

Table 3 Base own and cross fares elasticities used in the Southern model

Ticket Type	Cond. Elasticity	Season (NTC)	Season (TC)	Full (NTC)	Full (TC)	Reduced (NTC)	Reduced (TC)	Mkt Share
Season (NTC)	-0.20	-0.60	0.31	0.10	0.00	0.00	0.00	7%
Season (TC)	-0.20	0.02	-0.24	0.00	0.03	0.00	0.00	57%
Full (NTC)	-0.33	0.02	0.00	-0.50	0.03	0.13	0.00	8%
Full (TC)	-0.33	0.00	0.31	0.10	-1.21	0.00	0.47	4%
Reduced (NTC)	-0.53	0.00	0.00	0.10	0.00	-1.10	0.47	4%
Reduced (TC)	-0.53	0.00	0.00	0.00	0.01	0.03	-0.56	20%

Source: Consultants' modifications to MVA London-wide elasticities

The source MVA values for the whole London area are provided in Table 4. These incorporate findings from a wide range of relevant studies, consideration of specific aspects of economic theory and spreadsheet analysis of testing out alternative formulations.

Table 4 Own and cross fares elasticities for use across the London area

Ticket Type	Conditional. Elasticity	Season (NTC)	Season (TC)	Full (NTC)	Full (TC)	Reduced (NTC)	Reduced (TC)
Season (NTC)	-0.20	-0.32	0.11	0.01	0.00	0.00	0.00
Season (TC)	-0.20	0.03	-0.24	0.00	0.01	0.00	0.00
Full (NTC)	-0.33	0.06	0.00	-0.92	0.30	0.23	0.00
Full (TC)	-0.33	0.00	0.04	0.07	-0.59	0.00	0.15
Reduced (NTC)	-0.53	0.00	0.00	0.04	0.00	-0.94	0.38
Reduced (TC)	-0.53	0.00	0.00	0.00	0.03	0.10	-0.65

Source: MVA

There are some inconsistencies between the elasticities in Table 3 and Table 4. For example MVA estimates' that the own price elasticity of Full (NTC) is -0.92, whereas our estimate is -0.50. However, such inconsistencies only occur when the market share values in the study area differ significantly from the conditions assumed for the MVA suggested elasticity values.

We have also conducted a sensitivity test using unmodified MVA fares elasticities.

(a) Heightened elasticities to potential large transitional fares increases

The change to a zonal fares structure is notable for involving higher transitional fares changes, on a minority of flows, than would be normal. We have taken a central approach in which the base fares elasticities are increased in cases where the fares change exceeds a limiting value. In practice we have used the base elasticities in Table 3 above for fares changes of up to 20% increase, and above this level of fare increase multiplying it by 1.15, the ratio between the responses noted for fares increases of 30% and 5% in the market research, as described in Technical Note 2.

We have as a sensitivity case also considered the impact of not including this upweighting.

3.3.2 Fares Levels

The model incorporates functionality to adopt alternative fares files defining the base and test cases. In each case explicit individual fare prices, in 2004 real terms, are input for pricing years 2005 and 2006 for each database entry. For future years, real pricing of +1% each year has been assumed.

(a) Base Case fares

The base case fares represent the price levels which we consider would have applied had zonal pricing not been implemented in January 2005. 2005 and 2006 fares at a flow level have been synthesised from applying to the 2004 fares increases corresponding to the actual weighted average fare increase across the model flows applied in those years (calculated from the Test Case fare values).

(b) Test Case fares

The main stream Test Case fares use the actual fares levels for 2005 and 2006 reflecting the application of zonal fares levels. These have been taken from the Fares Index file for each individual database entry, and adjusted to 2004 real prices. It is important to recognise that the Southern trial of zonal fares was able, as the first such scheme within the London area, to adopt zone-to-zone fares levels which in aggregate had a neutral effect on before-and-after average fares levels.

It was intended to undertake a sensitivity analysis of the impact of 'moving' a number of stations into the Travelcard area in January 2006, thus adopting zonal fares levels which in this case were significantly below those in the base case. For this a further alternative Test Case fares dataset was to be created in which the fares for the relevant stations remained at their Base Case levels in 2006. However, under Fares Regulation it would be expected that any such impact would be offset by increases to other fares within the basket. As we did not have any evidence to indicate how other fares in the basket would have been adjusted in the context of this change in isolation, we were not able to create a meaningful fare file representing this case.

3.3.3 Exogenous Factors

The PDFH elasticities for exogenous factors in the study area have been used, together with values for those factors as used in the Strategic Fares Modelling exercise. The values are as shown in Table 5 and Table 6 below.

Table 5 Demand elasticities to exogenous forecasting factors

Ticket Type	Pop-ulation	GDP	Employ-ment	Car Time	Non Car House-holds	Air Passen-gers	Fuel Cost
Season Non Travelcard	0	0	1.3	0.1	0	0	0.2
Season Travelcard	0	0	1.3	0.1	0	0	0.2
Full Non Travelcard	1	1	0	0.1	0	0	0.2
Full Travelcard	1	1	0	0.1	0	0	0.2
Reduced Non Travelcard	1	1	0	0.1	0.94	0	0.2
Reduced Travelcard	1	1	0	0.1	0.94	0	0.2

Table 6 Forecast year values of exogenous forecasting factors

Year	Population	GDP	Employ-ment	Car Time	Non Car Households	Air Passen-gers	Fuel Cost
2004	1.00	1.00	1.00	1.00	0.00	1.00	1.00
2005	1.00	1.03	1.01	1.01	0.00	1.04	1.00
2006	1.01	1.06	1.01	1.02	0.00	1.09	1.00
2007	1.01	1.09	1.02	1.03	0.00	1.13	1.00
2008	1.02	1.11	1.03	1.04	0.00	1.18	1.00
2009	1.02	1.14	1.03	1.05	0.00	1.23	1.00
2010	1.03	1.16	1.04	1.06	0.00	1.28	1.00
2011	1.03	1.19	1.05	1.07	0.00	1.33	1.00
2012	1.04	1.22	1.06	1.08	0.00	1.39	1.00
2013	1.05	1.24	1.06	1.09	0.00	1.45	1.00
2014	1.05	1.27	1.07	1.10	0.00	1.51	1.00
2015	1.06	1.30	1.08	1.11	0.00	1.57	1.00
2016	1.06	1.33	1.08	1.12	0.00	1.64	1.00
2017	1.07	1.36	1.09	1.14	0.00	1.71	1.00
2018	1.08	1.39	1.10	1.15	0.00	1.78	1.00
2019	1.08	1.42	1.10	1.16	0.00	1.85	1.00
2020	1.09	1.45	1.11	1.17	0.00	1.93	1.00
2021	1.09	1.48	1.12	1.18	0.00	2.01	1.00

3.4 Tests and Scenarios

Our baseline evaluation of the impact that the current zonal fare arrangement has had on Southern passenger demand is based on values for the ‘zonalisation and Fare PAL effect’ representing the current position. The baseline findings exclude any additional impacts associated with surveys of current non-users, since it is assumed that (now that it is over a year following introduction of the zonal fares) any further capture of non-users would be dependent on substantially increased promotion.

We have also excluded the potential transfer effects between Travelcards and point-to-point tickets from our baseline evaluation, owing to uncertainty over how best to interpret these. These transfer effects are included in a separate sensitivity test (Test 3).

We have therefore set out a series of situations to examine using the model, using the model fares elasticities outlined in section 3.3.1 above, as well as examining the core situation using the alternative elasticities also set out in section 3.3.1. The situations for examination concern isolating in turn the relevant elements of the evaluation estimate, as listed in Table 7 below.

Table 7 Tests modelled

Test	Description
Test 1	The impact of the fares actions actually undertaken on Southern.
Test 2	As Test 1, but excluding the estimated positive impact of simplified zonal fares – thus evaluating the impact of fares level changes alone.
Test 3	As Test 1, plus the further impact of potential shifts to/from Travelcard due to publicising the fares options.

3.4.1 Impact of simplified zonal fares

A sensitivity test of Test 1 was also undertaken under an alternative 'Potential Future scenario' in which a much higher fares level awareness was achieved (this might be either through advertising or as a benefit of applying zonalisation generically across London). This would therefore generate a higher element of demand through the appeal of simpler zonal fares, particularly among current non-users.

The zonalisation simplification and promotion impacts used in the Test 1 situation (and omitted in Test 2) are summarised in Table 8 below, for the relevant segments under the Current and Potential Future scenarios.

Table 8 Increase in non-season journeys due to simplicity of zonalisation and Fare PAL, by ticket format and scenario

Element	Scenario	
	Current position	Potential Future with greater awareness
Impact on point-to-point ticket volume (applied to non-season tickets only)		
Due to current users (source Table 1)	0.10%	0.15%
Due to current non-users (source sect 2.4.3)	0.00%	2.68%
Total impact	0.10%	2.83%
Impact on Travelcard ticket volume (applied to non-season tickets only)		
Due to current users	0.00%	0.00%
Due to current non-users (source sect 2.4.3)	0.00%	2.68%
Total impact	0.00%	2.68%

3.4.2 Test 3: Transfer to / from Travelcards due to exposure of relativities

The potential for the promotion of the full range of fares to encourage transfers in and out of Travelcards was explored in the market research. As set out in Technical Note 2 the forecast number of respondents transferring has been weighted according to the number of respondents who are believed to see Fare PAL under the relevant scenario. The 'transfer to/from Travelcard' impacts have not been applied to Season Tickets.

The transfers to/from Travelcards used in the Test 3 situation are summarised in Table 9 below, for the relevant segments under the current scenario only. There is no data on the possible transfers to/from Travelcards under significantly greater product range awareness.

Table 9 Transfer to/from Travelcards due to improved exposure of options

Element	Scenario	
	Current position	Potential Future with greater awareness
From point-to-point to Travelcard tickets	1.0% of non-season tickets	Not tested
From Travelcard to point-to-point tickets	0.2% of non-season tickets	Not tested

3.5 Output Elements

3.5.1 Summary Spreadsheet

The model suite includes a results summary spreadsheet able both to permit pairwise comparison of cases and to show the results of these comparisons.

From the earnings, journey and passenger mile impacts, this calculates fare and passenger crowding benefits for each TOC, and has also been used to evaluate in simple terms the economic benefits from the introduction of the zonal fares regime. The components of the assumed benefits are as follows:

- **TOC Earnings:** as calculated from fares changes and elasticities
- **Crowding:** calculated from the difference in passenger-miles on individual TOCs / flow types, using an average penalty cost per journey derived from the PLANET model.
- **Fare:** 100% of the fare change impact on those who continue to use a particular ticket type, with the 'rule of half' applied to those who transfer in or out from individual ticket types (but not explicitly considering the resulting individual price changes for those transferring ticket type).
- **Road:** Calculated using 15 pence per car km avoided, at an average load factor of 1.5 people (including driver).
- **Net Benefits:** Calculated as the sum of TOC earnings, crowding and fare benefits, plus road benefits.
- **Approx TOC effect:** Calculated as the sum of TOC earnings plus 0.3 x Crowding effect (on the assumption that the TOC is able to convert this fraction of the evaluated crowding impact into further ridership using second-order elasticity effects).

3.6 Model Results

Detailed model suite outputs are given in Appendix A.

3.6.1 Current Position scenario

Findings from the model runs are summarised in Table 10, focusing on impacts on Southern (the minor additional impacts across the whole industry are identified in sub-sections 3.6.1(c)).

Table 10 Current Position Test Results – Southern earnings impact

Test	Description	Typical per year (2006) £k	NPV (2004) of 2005-2019 impacts £k
Test 1	Fares actions actually undertaken	+8.0	+109.0
Test 2	Impact of fares level changes alone.	+0.1	+1.1
Test 3	With shifts to/from Travelcard *	-1.2	-16.9

* after adjustment for reduced allocation to Southern of volume transferred to Travelcard

The findings indicate that the modelled impact of fares restructuring is small, approximately +£10k per year, which is well below the threshold observable through analysis of TOC sales data. The portion of this contributed by the fares level changes is minute – only approximately 1% - so that effectively the model finding is reflecting the extent of generation from the better communication of zonal fares proposed as an output from the analysis of market research.

Should the hypothesis that the fares promotion so fare undertaken would encourage shifts to Travelcard be accepted, as suggested by the research, then a preliminary estimate of the overall impact on Southern of the new scheme would be mildly negative, equivalent over 14 years to -£16.9k in NPV terms. The difference is driven by the relatively small net effect of reduced allocation to Southern of Travelcard's increased sale price.

(a) Alternative elasticity scenarios for Current Position

Comparison of findings for the sensitivity tests undertaken to consider the effect of the alternative fare elasticity assumptions are summarised in Table 11.

Table 11 Current Position Alternative Elasticity Results – Southern earnings impact 2006

Case	Description	Difference £k on A	Difference % on A
Central	Model elasticities	-	-
B	No elasticity increase for larger changes	+0.010	+0.1%
C	No adjustments to MVA London-wide elasticities	+0.004	+0.04%

The findings confirm that, with the elasticity impacts to fares level changes driving only a small part of the estimated effect, there is no significant impact from alternative elasticity formulations.

(b) Sensitivity of estimates to research estimates of generation

Table 10 indicated that the policy impacts are almost entirely driven by the generative effects of Fare PAL fares presentation, as revealed by the rail user market research set out in Table 1. As indicated in Table 8, the value of this effect taken in our 'central case' estimate was 0.1% generation of current non-season journeys. The effects on the estimated Southern earnings for a variety of alternative input estimates are given in Table 12 below.

Table 12 Current Position: alternative generative effect results – Southern earnings impact

Generation applied to non-season journeys	Comment	Typical per year (2006) £k	NPV (2004) of 2005-2019 impacts £k
Results for Test 1: Fares actions actually undertaken			
0.05%	Sensitivity	+4.1	+55.0
0.10%	Central estimate	+8.0	+109.0
0.20%	Sensitivity	+16	+218.0
0.40%	Sensitivity	+32	+436.0

The estimated impacts on Southern earnings are effectively proportional to any selected up- (or down-) weighting of the estimated generation from fares promotion/presentation. Accordingly the impact on Southern earnings remains very small across the range of alternative inputs used.

(c) Impact at an all-industry level

Analysis of model results, for the fares actions actually taken, indicates that the results for 2006 on an all-industry basis exceed Southern’s earnings by 13%. The additional element is almost entirely associated with journeys and earnings allocated to Thameslink, which provides a significant number of services within the Southern pricing area.

Similar levels of uplift are suggested for other years, and would also be expected for other test cases including those with Travelcard transfer and ‘Future Position’ enhanced promotional activity.

(d) Observations of Total Economic Impact and constituents

Analysis of model results, for the fares actions actually taken, indicates that (at both a Southern and industry level) the Economic Impacts for 2006 amount to only 75% of earnings impact. User Fare benefits are minimal, while road user benefits of 27% of earnings are more than offset by negative crowding impacts approximating to 50% of earnings.

A similar pattern of constituents would be expected in other scenarios or years.

(e) Impact of excluding transfer of stations into Zone 6

As outlined in section 3.3.2 it has not been possible to set up a complete fares file to model the effect of this transfer in isolation, as in practice it would have been compensated by changes to other basket fares so as to ensure that the limiting fares basket value was achieved.

3.6.2 Potential Future Scenario analysis with enhanced promotion

Findings from the model runs for the ‘actual fares actions’ under the current and potential future scenarios are summarised in Table 13, focusing on impacts on Southern.

Table 13 Model Results for Future Scenario – Southern earnings impact £k

Test	Scenario	Typical per year (2006)	NPV (2004) of 2005-2019 impacts
1	Current	+8.0	+109.0
1	Potential Future.	+639.7	+8,650.8
1	Ratio	80	79

The findings indicate that in the more heavily promoted scenario, with increased generation especially from non-users, across both point-to-point and Travelcard tickets, annual revenue increases of over £0.6m could be possible, aggregating over the remaining 13 years to almost £9m in NPV terms. The likelihood of this level of generation would need to be validated either by further market research or by comparison with the impacts of previous similar campaigns. Such a level of promotion would have an ongoing cost to set against the revenue stream, unless it was an inherent benefit of moving to zonal fares across the whole of London.

The 2006 earnings impact of over £0.6m has almost entirely been derived from the application of the estimated journey generation from potential enhanced fares level promotion to the current levels of point-to-point and Travelcard non-season volume (the generation percentages being 2.83% for point-to-point and 2.68% for Travelcard as set out in Table 8). It is of interest to note that such an earnings impact represents 7% of current Southern point-to-point earnings within the study area (the base earnings from fares subjected to zonalisation) and 9% of non-season point-to-point earnings.

4 CONCLUSIONS

4.1 Qualitative Background Findings

The evidence from the workstreams is that the simplification in terms of price levels is potentially a useful step, which has made possible the presentation of the variety of journeys and fares in the single 'Fare PAL' document. This step alone however has not materially affected the retail process and in as much as the zonal fares levels do not mirror the zonal travel offered by Travelcard the change might not reduce any underlying impression of complexity of the overall fares offer.

Qualitative market research has revealed that transparency of the fares structure is not seen as being a very significant issue, in deciding to make a rail journey, by many of the current rail ridership. Few respondents have a well-founded concept of the existing fares structure (although many assume that it is zonal similar to the Travelcard structure) and a large fraction of current rail users are only concerned to know local fares to a crude degree of precision.

While the existing Fare PAL has been made available at stations within the geographical area, it has not been the subject of any significant promotional exercise. The retail audit indicated that there have not so far been identifiable transaction cost savings to operators; indeed to obtain customer benefits there is a requirement to produce and distribute Fare PAL – type materials on an ongoing basis.

Non-user research suggested there could be ridership benefits from better promotion of actual fares levels. While the Fare PAL was welcomed overall, there was evidence for some recipients that it might not reduce their impression of complexity of the rail fares structure. Respondents' estimates of potential journeys, which would be new to rail, appear to be high in relation to the effects on sales data actually observed and there are a number of aspects in which the response may relate more to the impact of fares promotion (in any form) than to the impact of zonal fares themselves.

4.2 Quantified Earnings and Demand Impacts

4.2.1 Current position findings

Southern's own monitoring came to the conclusion that no volume change was evident, despite significant fare change in cash terms at some stations. Our own analysis of Southern and SouthEastern sales data is consistent with this view.

The fares model analysis, using parameters from PDFH updated by MVA for the London area and from analysis of the study market research, confirmed that the net elasticity impact of the fares level changes under zonalisation (which had been designed to be fares-level neutral at the time of fares setting) was indeed effectively zero.

The model also allowed the impact of additional demand generated by enhanced fares communication to be built up from disaggregate flow and ticket type data, using values which were informed by the research undertaken in this study. This indicated (as reported in section 3.6) that the combined impact on Southern, as so far implemented, was an annual earnings increase of £8k, equivalent over 15 years to £109k in NPV terms.

The overall industry earnings impact is likely to be approximately 13% higher (the additional impact accruing almost entirely to Thameslink) while the economic benefits are only around 75% of the earnings benefit, due to modelled impacts of increased crowding. (However the modelled demand increase, at 6000 journeys per year, mirrors the earnings impact in being minimal compared with carryings so that the crowding effect would not have formed a material constraint to implementation.)

The fares communication impact of Fare PAL may have had the additional effect of encouraging transfers between point-to-point and Travelcard tickets. Should this have actually occurred the impact in terms of earnings retained by Southern (at current levels of awareness of Fare PAL) could be reduced to a very small negative value, effectively a neutral outcome.

4.2.2 Potential Future Scenario findings, under enhanced promotion

The model suggests that under a scenario of very much increased awareness of fares levels much higher earnings and volume increases could be obtained, almost entirely driven by estimates of conversion of non-users to users. The potential earnings impact to Southern could be of the order of £0.6m per year, across both point-to-point and Travelcard journeys. The increase represents around 7% of the non-travelcard base earnings on which zonalisation of fares has been implemented.

The estimated benefits are the sum of the positive response of non-users to promotion of rail's service and the impact of the fare level offer through Fare PAL, and are therefore largely an estimate of the impact of advertising promotion, facilitated by the simplified fares, rather than an estimate of the impact of the fares themselves.

The level of enhanced earnings under this scenario is subject to considerable uncertainty, arising not just from the levels of trial derived from research in this study, but also from how closely users' trial journeys and experiences match their expectations at the time of this research. Sustaining the earnings increase over time might well also require ongoing communications activity to maintain the level of fare and service awareness, unless simplification and enhanced market penetration facilitated a cultural step-change in rail awareness.

4.3 Conclusions

Principal conclusions to be drawn from the study are:

- The impact of the introduction of zonal fares in January 2005 (and extended by the moving of certain stations within the zonal area in January 2006) on Southern earnings and journeys has so far been minimal. Of the possible +£8k per year impact calculated, almost all is due to the overlay effect potentially associated, following market research, with improved fares communication rather than with changes in fares levels. The minimal modelled earnings impact is consistent with analysis of sales data both by Southern and in this study.
- A 13% greater earnings impact has been calculated for all TOCs in aggregate, the majority of the extra demand accruing to Thameslink (which offers services in the area).
- The earnings impacts are heavily offset by potential crowding impacts (although at these levels both are negligible) such that the estimated economic impact is only 75% of the earnings impact.

- A secondary effect of the promotion of fares levels via Fare PAL could be that there would be transfers from/to Travelcards which would reduce the estimated Southern earnings impact to a very slight loss (of around £1k per year) under the Current Position scenario.
- There have not been any identifiable transaction cost savings to operators.
- While background research in the study area has indicated that transparency of the fares structure is not seen as being a very significant issue, in deciding to make a rail journey, by many of the current rail ridership, the literature study suggested that a relaunched product positioning on the basis of simplicity and ease of use had produced a generative effect for ridership levels elsewhere in the worldwide transport industry.
- Non-user research suggests that a future higher level of fares communication activity (such as might be achievable with the introduction of a London-wide zonal scheme) could produce significantly higher earnings impacts – up to £0.6m per year for Southern. This benefit occurs largely through correction of overly high impressions amongst non-users of rail fares for journeys to and from London. Fare PAL, as well as the need for ongoing promotional support, could be a viable tool in such a campaign, for which the magnitude of the payback remains relatively uncertain. The increases would largely be obtained by converting non-users to users, but at these levels of generation the impact on crowding would need to be considered.
- Should the zonal fares structure be rolled out across other London franchises with different base fares levels, the average level of fares on these franchises would be unlikely to be able to be kept constant in the way that it has been kept constant in the Southern trial implementation. In this event there would be likely to be a significant elasticity response to fares levels, for which the forecasting values and model used in this study would provide a valuable analysis tool. In particular this study has identified a suitable value for a higher elasticity to apply to individual fares increases of over a proposed threshold real increase of 20%.

APPENDIX A - MODEL SUITE OUTPUTS FOR PRINCIPAL TESTS

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Run	Description
1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006
2	Test A1: Fares +1% per year, after actual zonal in 2005 and 2006
3	Test A2: As A1, but allowing Travelcard transfers arising from awareness
3a	Test A2 output (adjusted for Southern element of earnings on Travelcard transfers)
4	Test A3: As A1, but no generation from zonal simplicity/awareness
5	Test A4: As A1, but 50% greater user impacts, and nonuser impacts on Pt-Pt and Tcard

Note: Years tinted turquoise (2008-14 and 2016–19) are derived by interpolation / extrapolation from model outputs.

Test 1 : Fares changes as applied, including generational effect of zonal structure

Comparison of results between cases : by year		TOC	NSC	Discount Rate	3.5%
Base s	1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006		15	p / pcu km road benefit
Test sc	2	Test A1: Fares +1% per year, after actual zonal in 2005 and 2006		1.5	average car occupancy

		Earnings* £k	Journeys k	Pax Miles k	Crowding Benefits £k	Fare Benefits £k	Road Benefits £k	Approx TOC effect £k	Total Benefits £k
2 vs 1	2004	£0.0	0.0	0.0	£0.0	£0.0	£0.0	£0.0	£0.0
	2005	£7.7	4.4	26.0	-£3.8	-£0.1	£2.1	£6.6	£5.9
	2006	£8.0	4.6	26.9	-£4.1	-£0.2	£2.2	£6.8	£5.9
	2007	£8.3	4.7	27.6	-£4.5	-£0.2	£2.2	£7.0	£5.9
	2008	£8.7	4.8	28.4	-£5.0	-£0.3	£2.3	£7.2	£5.7
	2009	£9.0	5.0	29.1	-£5.5	-£0.3	£2.3	£7.4	£5.5
	2010	£9.3	5.1	29.9	-£6.0	-£0.4	£2.4	£7.5	£5.4
	2011	£9.7	5.2	30.6	-£6.5	-£0.5	£2.5	£7.7	£5.2
	2012	£10.0	5.3	31.4	-£7.0	-£0.5	£2.5	£7.9	£5.0
	2013	£10.3	5.5	32.1	-£7.5	-£0.6	£2.6	£8.1	£4.8
	2014	£10.7	5.6	32.9	-£8.0	-£0.6	£2.6	£8.3	£4.7
	2015	£11.0	5.7	33.6	-£8.5	-£0.7	£2.7	£8.4	£4.5
	2016	£11.3	5.8	34.4	-£9.0	-£0.7	£2.8	£8.6	£4.3
	2017	£11.7	6.0	35.1	-£9.5	-£0.8	£2.8	£8.8	£4.2
2018	£12.0	6.1	35.9	-£10.0	-£0.9	£2.9	£9.0	£4.0	
2019	£12.3	6.2	36.6	-£10.5	-£0.9	£2.9	£9.2	£3.8	
Total		£150.1	80.1	470.3	-£105.4	-£7.7	£37.8	£118.4	£74.8
NPV base 2004		£109.0	58.5	343.5	-£74.7	-£5.3	£27.6	£86.5	£56.6

Test 2 : Travelcard transfers also included, but not adjusted for reduced allocation to franchises (see next page for adjusted values)

Comparison of results between cases : by year		TOC	NSC	Discount Rate		3.5%		
Base sce	1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006			15 p / pcu km road benefit			
Test scer	3	Test A2: As A1, but allowing Travelcard transfers arising from awareness			1.5 average car occupancy			

		Earnings* £k	Journeys k	Pax Miles k	Crowding Benefits £k	Fare Benefits £k	Road Benefits £k	Approx TOC effect £k	Total Benefits £k
3 vs 1	2004	£0.0	0.0	0.0	£0.0	£0.0	£0.0	£0.0	£0.0
	2005	£14.3	5.4	-10.8	-£6.1	-£0.9	-£0.9	£12.5	£6.4
	2006	£15.1	5.6	-8.8	-£6.8	-£1.1	-£0.7	£13.1	£6.5
	2007	£15.7	5.8	-9.0	-£7.4	-£1.2	-£0.7	£13.5	£6.4
	2008	£16.4	6.0	-9.3	-£8.2	-£1.4	-£0.7	£13.9	£6.1
	2009	£17.0	6.1	-9.5	-£9.0	-£1.5	-£0.8	£14.3	£5.8
	2010	£17.7	6.3	-9.8	-£9.8	-£1.6	-£0.8	£14.7	£5.5
	2011	£18.3	6.4	-10.0	-£10.6	-£1.8	-£0.8	£15.1	£5.2
	2012	£18.9	6.6	-10.3	-£11.4	-£1.9	-£0.8	£15.5	£4.8
	2013	£19.6	6.8	-10.5	-£12.2	-£2.0	-£0.8	£15.9	£4.5
	2014	£20.2	6.9	-10.8	-£13.0	-£2.2	-£0.9	£16.3	£4.2
	2015	£20.9	7.1	-11.0	-£13.8	-£2.3	-£0.9	£16.7	£3.9
	2016	£21.5	7.3	-11.2	-£14.6	-£2.4	-£0.9	£17.1	£3.6
2017	£22.2	7.4	-11.5	-£15.4	-£2.6	-£0.9	£17.5	£3.3	
2018	£22.8	7.6	-11.7	-£16.2	-£2.7	-£0.9	£17.9	£3.0	
2019	£23.4	7.7	-12.0	-£17.0	-£2.8	-£1.0	£18.4	£2.7	
Total		£284.1	99.1	-156.2	-£171.3	-£28.6	-£12.6	£232.8	£71.7
NPV base 2004		£206.2	72.4	-114.6	-£121.5	-£20.2	-£9.2	£169.8	£55.3

Test 2a Travelcard transfers also permitted, adjusted for revised allocation to Southern.

Comparison of results between cases : by year		TOC	NSC	Discount Rate		3.5%
Base sce	1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006			15 p / pcu km road benefit	
Test scer	3	Test A2: As A1, but allowing Travelcard transfers arising from awareness			1.5 average car occupancy	

		Earnings* £k	Journeys k	Pax Miles k	Crowding Benefits £k	Fare Benefits £k	Road Benefits £k	Approx TOC effect £k	Total Benefits £k
3 vs 1	2004	£0.0	0.0	0.0	£0.0	£0.0	£0.0	£0.0	£0.0
	2005	-£1.2	-0.8	-35.7	£0.4	-£0.5	-£2.9	-£1.1	-£3.7
	2006	-£1.2	-0.9	-29.1	£0.5	-£0.6	-£2.3	-£1.1	-£3.7
	2007	-£1.3	-0.9	-29.9	£0.5	-£0.7	-£2.4	-£1.2	-£3.7
	2008	-£1.3	-0.9	-30.7	£0.5	-£0.7	-£2.5	-£1.2	-£3.5
	2009	-£1.4	-0.9	-31.5	£0.6	-£0.8	-£2.5	-£1.2	-£3.3
	2010	-£1.4	-1.0	-32.3	£0.6	-£0.9	-£2.6	-£1.3	-£3.1
	2011	-£1.5	-1.0	-33.1	£0.7	-£0.9	-£2.7	-£1.3	-£3.0
	2012	-£1.5	-1.0	-33.9	£0.8	-£1.0	-£2.7	-£1.3	-£2.8
	2013	-£1.6	-1.0	-34.7	£0.8	-£1.1	-£2.8	-£1.4	-£2.6
	2014	-£1.7	-1.1	-35.5	£0.9	-£1.1	-£2.9	-£1.4	-£2.4
	2015	-£1.7	-1.1	-36.3	£0.9	-£1.2	-£2.9	-£1.4	-£2.2
	2016	-£1.8	-1.1	-37.1	£1.0	-£1.3	-£3.0	-£1.5	-£2.1
	2017	-£1.8	-1.1	-37.9	£1.0	-£1.4	-£3.0	-£1.5	-£1.9
2018	-£1.9	-1.1	-38.7	£1.1	-£1.4	-£3.1	-£1.5	-£1.7	
2019	-£1.9	-1.2	-39.5	£1.1	-£1.5	-£3.2	-£1.6	-£1.5	
Total		-£23.2	-15.0	-515.6	£11.4	-£15.0	-£41.5	-£20.1	-£41.3
NPV base 2004		-£16.9	-11.0	-378.2	£8.1	-£10.6	-£30.4	-£14.6	-£31.8

Test 3: Fares changes as applied, generational effect of zonal structure excluded

Comparison of results between cases : by year		TOC	NSC	Discount Rate	3.5%
Base sc	1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006		15 p / pcu km road benefit	
Test sce	4	Test A3: As A1, but no generation from zonal simplicity/awareness		1.5 average car occupancy	

		Earnings* £k	Journeys k	Pax Miles k	Crowding Benefits £k	Fare Benefits £k	Road Benefits £k	Approx TOC effect £k	Total Benefits £k
4 vs 1	2004	£0.0	0.0	0.0	£0.0	£0.0	£0.0	£0.0	£0.0
	2005	£0.1	-0.1	0.1	£0.1	-£0.1	£0.0	£0.1	£0.0
	2006	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.0
	2007	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.0
	2008	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.0
	2009	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.0
	2010	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.0
	2011	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.1
	2012	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.1
	2013	£0.1	-0.1	0.1	£0.1	-£0.2	£0.0	£0.1	£0.1
	2014	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1
	2015	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1
	2016	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1
	2017	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1
2018	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1	
2019	£0.1	-0.1	0.1	£0.2	-£0.2	£0.0	£0.2	£0.1	
	Total	£1.5	-1.2	1.8	£2.1	-£2.7	£0.1	£2.1	£1.0
	NPV base 2004	£1.1	-0.8	1.3	£1.5	-£2.0	£0.1	£1.5	£0.7

Test 4: Future higher-exposure scenario with increased user impact, and non-user impacts

Comparison of results between cases : by year		TOC	NSC	Discount Rate	3.5%
Base sce	1	Base Case A: Fares +1% per year, after average of actual in 2005 and actual 2006		15 p / pcu km road benefit	
Test sce	5	Test A4: As A1, but 50% greater user impacts, and nonuser impacts on Pt-Pt and Tcard		1.5 average car occupancy	

		Earnings* £k	Journeys k	Pax Miles k	Crowding Benefits £k	Fare Benefits £k	Road Benefits £k	Approx TOC effect £k	Total Benefits £k
5 vs 1	2004	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
	2005	£610.2	£376.6	£3,265.7	£-296.5	£-12.1	£262.7	£521.3	£564.3
	2006	£639.7	£385.8	£3,339.3	£-318.8	£-19.1	£268.6	£544.1	£570.4
	2007	£663.7	£396.2	£3,429.3	£-344.3	£-22.9	£275.9	£560.4	£572.3
	2008	£689.7	406.7	3,519.7	£-382.7	£-27.7	£283.2	£574.9	£562.5
	2009	£715.8	417.2	3,610.1	£-421.2	£-32.5	£290.4	£589.5	£552.6
	2010	£741.9	427.7	3,700.5	£-459.6	£-37.2	£297.7	£604.0	£542.8
	2011	£767.9	438.2	3,790.9	£-498.0	£-42.0	£305.0	£618.5	£532.9
	2012	£794.0	448.7	3,881.3	£-536.4	£-46.8	£312.3	£633.1	£523.1
	2013	£820.1	459.2	3,971.7	£-574.8	£-51.5	£319.5	£647.6	£513.2
	2014	£846.1	469.7	4,062.1	£-613.2	£-56.3	£326.8	£662.2	£503.4
	2015	£872.2	£480.2	£4,152.6	£-651.6	£-61.1	£334.1	£676.7	£493.5
	2016	£898.3	490.7	4,243.0	£-690.1	£-65.9	£341.3	£691.2	£483.7
	2017	£924.3	501.2	4,333.4	£-728.5	£-70.6	£348.6	£705.8	£473.8
2018	£950.4	511.7	4,423.8	£-766.9	£-75.4	£355.9	£720.3	£464.0	
2019	£976.5	522.2	4,514.2	£-805.3	£-80.2	£363.2	£734.9	£454.1	
Total		£11,910.8	6,732.2	58,237.7	£-8,087.8	£-701.2	£4,685.2	£9,484.4	£7,806.9
NPV base 2004		£8,650.8	4,920.0	42,564.6	£-5,734.4	£-486.2	£3,424.3	£6,930.5	£5,854.5