

ENNISKILLEN SOUTHERN BYPASS: A COST BENEFIT ANALYSIS

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Congestion is endemic in modern Ireland and the town of Enniskillen is no exception. In this essay Laura Gibson challenges the decision to exclude the proposed Enniskillen Southern Bypass from the Transport Plan 2015. The viability of the project is investigated using a comprehensive cost-benefit analysis. To add further depth to her analysis, two separate alternatives to the project are considered; imposition of a road toll and increased expenditure on public transport.

Introduction

Continued growth and development in the Enniskillen area has led to an increase in delays and congestion at some of the critical points in the transport network during periods of peak demand. Average daily traffic has increased from 10,870 vehicles in 2003 (FDC, 2004)¹ to 12,180 vehicles in 2004 (RSNI, 2004)² on the main A46 route to Belleek and Donegal. In a rural county, such as Fermanagh, the lack of adequate public transport, the dispersed population and distances to hospitals, places of work and schools all point to the need for an adequate road structure. The Enniskillen Southern Bypass was one of a number of schemes appraised for inclusion in the Forward Planning Schedule of the Regional Strategic Transport Network – Transport Plan 2015, a strategic plan dealing with the transport needs of the whole of Northern Ireland, proposing a total investment in transport of £2319.8 million from 2002-2015 (Department for Regional Development, 2005). However, the proposal for a Southern Bypass of Enniskillen was not included as the Roads Service claimed that it did not rank sufficiently high enough when assessed against other competing schemes, as “most of the traffic going into the town of Enniskillen stays in the town” (Divisional Planning Manager, 2005). However, with a geographical position that places the town in the centre of major transport corridors in the region, it is thought

¹ Fermanagh District Council

² Roads Service of Northern Ireland

that the exclusion of the proposal from the Plan is significantly unjustified. Mr. Sam Foster, Fermanagh and South Tyrone representative of the Ulster Unionist Party, summed up the problem well when addressing the Northern Ireland Forum:

Much to my disappointment, the proposal for a Southern Bypass for Enniskillen has been overlooked. I respect the interests, the dedication and the integrity of all the Committee members... but, as none of them comes from anywhere near the West or South-West of the province, all the thrust is towards the East... (Foster, 2003)

Economic Impact of Congestion

Additional costs to Fermanagh businesses due to weaknesses in the local road infrastructure have been estimated at £1.7 million per year based on the following; the effects of lost orders due to inability to provide fast and reliable deliveries, costs of accidents, damaged goods in transit and additional fleet maintenance and repairs due to poor road services (Fermanagh District Council, 2002). This is equivalent to approximately £30 per resident of the county. Applying this figure to the population of the surrounding cross-county road catchment area (ibid) provides an estimate of the annual economic cost of poor road infrastructure to be approximately £6.3 million. This is almost certainly an under-estimate. It does not account for business lost due perceived length and unpredictability of journey times in the region.

While the economic impact of congestion in Enniskillen and the surrounding area is of great concern, it also has great impact on local people, in terms of time constraints and other negative externalities. Examples including noise, dirt, vibrations, toxic fumes, safety fears, loss of privacy, disruption and the need for relocation of both people and industry (Button, 1982). All of these problems would be significantly relieved by the construction of a 2km length of single carriageway road from a point just to the north of the Killyhevlin Hotel, following the route of the old Sligo, Leitrim and Northern Counties Railway line to join the A509 Cavan/Dublin near its junction with the Sillees River.

Cost-Benefit Analysis

Cost-Benefit Analysis (CBA), as defined by E.J. Mishan (1998), sets out to answer whether a number of investment projects should be undertaken and if funds are limited, which one or more of these projects should be selected, all of which would otherwise qualify. CBA is suitable for the analysis of capital-intensive projects as a means of assigning expenditure to specific outcomes of the project, depending on the level of their relative performance. With projects such as the Bypass, unless a toll is charged it will not gain monetary benefits to pay-off against the initial costs of construction or the continuing maintenance costs; other benefits and positive externalities must be assigned a monetary value in order to justify the costs, both in terms of monetary expenditure and negative externalities resulting from the project. It is in the allocation of such costs and benefits that I believe the Roads Service has not been accurate or efficient, leading to a false impression in their assessment of the need for a Southern Bypass for Enniskillen.

Proposed Costs of Investment

Georgi (1973:18-19) has defined project costs as, “the value of goods and services that are required to establish, maintain and operate a project.” Scott Wilson and Ferguson McIlveen, in their original economic assessment of the Southern Enniskillen Bypass, have estimated that the total cost of the scheme, including an allowance for risk and optimism bias, amounts to £10.7m,³ (Fermanagh District Council, 2005a) composed of construction costs of £10.1m, land acquisition costs of £0.1m and preparation and supervision costs of £0.5m. This suggests the initial cost per kilometre to be £5.35m.

This figure, when compared to the relative total cost of the Cavan Bypass at £5.59m per kilometre⁴ (Finfacts, 2007) and that of the Drogheda Bypass at £6.89m per kilometre,⁵ (ibid) seems reasonable. However, these totals are based on the cost of building roads in Ireland, which doubled within a few years. This fuelled large cost over-runs - 92.4% cent on the Cavan Bypass and 117% on the Drogheda Bypass (ibid). In addition, the National Development Plan 2007-2013, launched on 23rd January 2007, states that land acquisition accounts for 23% of the cost of road projects in

³ Mid-2002 prices

⁴ Total Cost = €33m, distance 3.9Km, (1 EUR = 0.66098 GBP)

⁵ Total Cost = €244m, distance 21.5km, (1 EUR = 0.660198 GBP)

Ireland. While land prices in Northern Ireland cannot be directly compared with those in the Republic, an estimation of land acquisition costs to be only £0.1m in this case seems to be an underestimate. Finally, these estimations do not encompass continuing maintenance costs of the proposed Bypass.

Proposed Benefits of Investment

The benefits of a project, as defined by Georgi (1973:19) “comprise of all the positive effects, less the negative effects, resulting from the realisation of the project regardless of whom they fall to.” Barrett and Mooney (1984) have characterised three main benefits which have been quantified in studies of highway investment, namely time savings, accident reduction and vehicle cost savings. Through the following analysis, the true Shadow Prices and the overall Net Present Value for the scheme, which have been computed in the original CBA prepared for Fermanagh District Council, shall be discussed in order to gain a true understanding of whether or not the appraised project should have gained acceptance into the Transport Plan 2015.

Journey Time Analysis

“Time savings allow further activities to be engaged in.” (Barrett & Mooney, 1984:22) To understand the impact that the Bypass would have on people in and travelling through Enniskillen, an analysis of journey times between the two ends of the proposed Bypass was carried out at the request of Fermanagh District Council, using the existing road structure. An approved driving instructor was commissioned to undertake 20 journeys (10 each way) from the car park at the Killyhevlin Hotel to the 40 MPH speed limit on the A509, between the 19th of January and the 22nd of February 2005. The mean journey time was 19.9 minutes. However, this was affected by a number of fairly long journey times. The modal and median journey times were both 16 minutes. The most notable feature of the distribution presented, is that 6 of the journey times (30% of the total trips) were over 20 minutes in duration and 4 (20% of the total) were over 30 minutes. The longest recorded journey, during a peak time, was 38 minutes.

These figures can be used to illustrate the journey time savings which the Bypass would bring about. Compared to the average journey time of 19.9 minutes found in the survey, driving along the Bypass would take approximately 2 minutes (2km @ 40MPH or 60KPH). The journey time saving is therefore 17.9 minutes. 2,100 journeys per day would be predicted on the Bypass if it opens, growing to 2,700 per day in the longer term (Divisional Planning Manager, 2005). The calculation of annual journey time saving, on this basis, is shown in the following table:

Table 1. Annual Journey Time Saving along Enniskillen Southern Bypass

	2100 Journeys per day	2700 Journeys per day
Average Journey Time Saved	17.9	17.9
Total Daily Journey Time Saved in Hours	626.5	805.5
Total Annual Journey Time Saved in Hours	228,672.5	294,007.5
Total Annual Journey Time Saved in Days	9,528	12,225
Total Annual Journey Time Saved in Years	26.1	33.6

Source: Scott Wilson, Ferguson McIlveen (2005) *Enniskillen Bypass: Updated Economic Assessment*

Current guidance from the Transport Plan on the value of time saved in road journeys suggests an average value of £8.65/hour/vehicle.⁶ Applying this value to the journey time savings suggests an annual economic benefit of £1,975,730 on the basis of 2,100 journeys per day and £2,540,225 on the basis of 2,700 journeys per annum.

Accident Cost Savings

Accident data prepared by Scott Wilson and Ferguson McIlveen (2005) via the COBA 11 Release 6 computer model presents accident cost savings of £2.893m. This implies that while Enniskillen has a relatively low accident record, 56 collisions in 2005/2006 (Fermanagh District Policing Partnership, 2006), compared to similar-sized towns in Northern Ireland (Omagh, for example, is reported as having 73 collisions in 2005) the number of accidents will be further reduced on the Bypass. This reduction in the accident rate will be largely due to, “the reduction in the number of junctions drivers will face on the Bypass, along with the presence of a central barrier along a portion of the 2km proposed carriageway.” (Department of Regional Development, 2007)

Vehicle Cost Savings

The COBA model has presented a figure for vehicle cost savings of £0.214m per annum, encompassing fuel savings. This figure is smaller than expected and could be overly conservative, due to the fact that it does not capture the extra fuel consumed by increased moments of acceleration and deceleration

⁶ Regional Strategic Transport Network – Transport Plan 2015; this figure is recommended when more accurate vehicle type information is not available

during the current congested conditions in the town (Barrett & Mooney, 1984).

From these figures, combined with an updated figure for the cost of the scheme, including maintenance costs, the overall impact of the Bypass has been calculated.

Table 2. Overall Impact of the Enniskillen Southern Bypass⁷

Benefits	£ millions
Time Saving Benefits	2.54
Accident Cost Savings	2.893
Vehicle Cost Savings	0.214
Business Benefits	18.682
Consumer User Benefits	17.34
Present Value of Benefits	41.67
Costs (Government Funding)	
Present Value of Costs	13.051
Overall Impact	
Net Present Value	28.619
Benefit to Cost Ratio	3.193

Source: Scott Wilson, Ferguson McIlveen (2005) Enniskillen Bypass: Updated Economic Assessment

Cost-Benefit Analysis Overall Results

It can be seen that the proposed Southern Bypass would generate an overall Net Present Value of £28.619m, with a corresponding Benefit-to-Cost Ratio of 3.193. In monetary terms this means that for an investment of £13.051m, the benefits are equal to a monetary value of £41.67m. By this analysis, the benefits far outweigh the costs. In addition, it must be noted that this analysis fails to include the majority of non-monetary externalities, both positive and negative. However, due to the fact that the proposed Bypass is

⁷ COBA 11 Release 6 analysis is based on default central traffic growth and default economic growth with costs in 2002 prices. The evaluation period is 60 years, with the first scheme year being 2008. The Discount Rate is 3.5% for 30 years, thereafter 3.0% for 46 years, thereafter 2.5%.

aligned to run along the old Sligo, Leitrim and Northern Counties Railway line, it is assumed that the additional non-monetary benefits would far outweigh the further possible costs. Examples of these costs include the environmental impact, as no buildings would have to be demolished and few buildings along the old railway line will be exposed to visual intrusion (Barrett & Mooney, 1984).

Although NPV data for the further proposed schemes that have been included in the Transport Plan 2015 are not presented, it can be seen that with an NPV of £28.619m and a Benefit-to-Cost ratio of 3.19, both almost certainly understated, it is hard to imagine why the Enniskillen Southern Bypass was not included. Further analysis shows that while the other schemes could perhaps have lower NPVs, they involve a much lower initial outlay of cash. For example, Stage 3 of the Omagh Bypass requires an outlay of only £5m and Stage 2 of Strabane Bypass requires only £4m (DRD, 2005)⁸. It is the high level of initial outlay which seems to be the deterrent of the Roads Service against the inclusion of a Bypass for Enniskillen.

Alternatives to the Bypass

When the original assessment of the proposal for a Southern Bypass for Enniskillen was undertaken, 2 alternatives were studied:

- Increased expenditure in the rural public transport network.
- A toll to reduce unnecessary traffic through the county town.

Increased expenditure in the existing bus network throughout the county was turned down on three counts. Firstly, due to the high dispersion of the rural population a great hike in the service, supported by huge infrastructural investment, would have to be considered to make any sort of obvious influence on the traffic coming into the town. Secondly, despite the fact that the bus is an efficient use of road space, as Barrett and Walsh (1983) point out, with such a dispersed population as that in Fermanagh, “in the absence of a market, [the bus service] is unable to derive a commercial advantage from this efficiency” (ibid:364). Finally, an increased bus service would not address the congestion caused by the heavy transportation vehicles travelling through the town along the regional transportation corridors.

⁸ Department for Regional Development

The adoption of a toll, in line with Newberry's (1990) rationale that as road space is a scarce and invaluable resource, it should be rationed by price, was suggested as a 'quick-fix' alternative to reduce unnecessary journeys through Enniskillen. It has been calculated that a toll of £9.24 would be required to reduce traffic numbers significantly and cause average or individual cost to rise to the marginal cost of a journey. This would equate the supply and demand of available trips with no capacity in excess. It is a huge price to pay for a trip into a county town. Indeed, the daily cost into London, originally put in place by Ken Livingston in February 2003, is currently £8 (Transport for London). Therefore, it could not be expected for people entering a county town to pay even more than this.

Proposed Solution and Conclusion

Following the analysis of the original CBA, additional traffic surveys and proposed alternatives, it can be seen that a Southern Bypass is the only truly viable solution to the congestion problem in Enniskillen. The major flaw in the Roads Service's analysis of the need for the Bypass is their failure to consider it as a circular route for journeys that currently have no option but to travel through the town. In that sense their analysis does not "measure the benefits and costs to *society as a whole*," Barrett (1985:48). The fact that the Bypass will act as a circular route to traffic, needs to be further stressed to the Roads Service and backed up by empirical evidence if the scheme is to be included in the Transport Plan 2015, or in any additional plan for that matter.

Therefore, it can be seen that the most valuable lessons for those involved in the case for the Bypass is to consider the vast improvements that can be made in the Cost Benefit Analysis. The scheme represents a sound transport initiative. However, more realistic evaluation of the cost elements and ways to reduce initial cash outlay should be given priority, in order to gain consideration by the powers that be and to remind them that in such initiatives we are, "aiming for [a] Pareto optimal improvement for society as a whole..." and in the case of the Enniskillen Southern Bypass the "gainers can (indeed) compensate the losers." (Barrett, 1982:51)

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