

NATIONAL AUDIT OFFICE MEMORANDUM

THE A5 DUNSTABLE QUEUE RELOCATION SCHEME

Background

Dunstable town centre has suffered from severe traffic congestion problems for many years, due to limited road capacity, a high volume of heavy goods vehicles using the A5 to access the M1 South, and continuous heavy traffic. The busy A5 trunk road, used as an M1 overspill, runs through Dunstable town centre where it intersects with the A505 and other local routes. As a result, Dunstable town centre is prone to grid-locking, bringing local and through traffic to a standstill and resulting in poor air quality in the town.

With further increases in traffic levels expected in and around Dunstable, central and local government recognised the need for measures to ease traffic congestion and alleviate local disappointment, following the postponement of the Dunstable Eastern Bypass (since overtaken by plans for a proposed Northern Bypass). The Dunstable A5 queue relocation scheme was conceived as a short term solution to provide a co-ordinated traffic management control system of all existing and newly installed traffic signals along the A5 in the Dunstable area. In April 1999, the Agency proposed a scheme based on Dunstable Town Centre Management Committee's 1996 report *The Future of Our Town Centre*, to be progressed under a Partnering arrangement between the Agency and Bedfordshire County Council, South Bedfordshire District Council and Dunstable Town Council. This included a proposal to replace the Dunstable town centre mini roundabouts with traffic signals.

Construction was completed on the first phase of the scheme in Summer 1999, and work started on the second phase in July 2002. The scheme initially opened in January 2003, with further revisions to the signals throughout the year and was completed in March 2004. The principal aims of the scheme were to improve the flow of traffic through Dunstable by linking all the traffic signals to a common traffic management system, so to minimise the number of times vehicles were stationary in the town centre; reduce traffic queues; improve safety and accessibility for pedestrians across the busy A5 by installing more signal controlled pedestrian crossings; improve the accident safety record at Caddington Turn junction by installing a new set of traffic signals; and lessen the associated problems of noise and pollution in the town centre. In the absence of a tried and tested solution to town centre congestion, the Agency deployed combined the use of external gateways with a computerised traffic signalling system known as SCOOT (Split Cycle Offset Optimisation Technique), which it had used previously in conjunction with Bedfordshire County Council in Bedford and Luton on the trunk road network.

But not everyone is satisfied with the outcome of the scheme and the Transport Minister and the Agency's Chief Executive recently met local representatives to discuss ongoing problems. Local dissatisfaction has highlighted the potential for conflict between national and local interests when proposing solutions to problems affecting the trunk road network. Whilst the circumstances of the Dunstable scheme are specific to that location, our enquiries have identified lessons which could apply more widely across the Agency. Our findings and suggestions for improvement are set out below.

The original scheme created unrealistic local stakeholder expectations

In April 1999, the Agency presented the *Dunstable TRANSYST Assessment: Queue Re-location Strategy Report* prepared by URS Thorburn Colquhoun to the local councils. The report stated

the potential benefits of the scheme positively and with such authority that it generated unrealistically high expectations amongst the councils of the benefits to be delivered by the scheme. For example, the final conclusion of the report states "*the co-ordination of traffic signals will reduce the randomness in the current traffic system and result in a reduction in vehicular delay and all of the associated environmental dis-benefits*".

The Agency agrees with our view that the way the scheme's objectives were described to the residents of Dunstable in the Agency's public information leaflet and at its public exhibition created high expectations that queuing times would be reduced. It promoted the scheme as creating a "green wave" effect in Dunstable, with pulses of traffic passing through the town centre. In practice, not all pedestrian crossings along the route were connected to the newly-installed traffic signals, which interfered with the free flow of traffic. The scheme's limited ability to reduce queuing first became evident at the detailed design stage, but the Agency did not effectively communicate these constraints to local councils and residents.

Local stakeholder concerns were not treated as risk factors in the Agency's scheme prioritisation and appraisal processes

Taking the time to identify and acknowledge or address stakeholders concerns is an important facet of working in partnership with the community, especially where the Agency recognises in advance that its scheme will not fully address local issues. The Agency accepts that it placed too much dependence on theoretical models that had not been rigorously validated or tested. It also accepts that it did not have a true "partnership" with all the affected bodies. The Agency funded all of the scheme and associated development costs and tended to focus on its own issues without consideration of the wider impact. For example, the prime concerns of local residents and their representatives about the Dunstable queue relocation scheme were its likely impacts on congestion, road safety, 'rat-running' (where drivers transfer to less busy local routes to complete their journeys), and further deterioration to the air quality in Dunstable town centre. Whilst the Agency knew of local stakeholders' concerns, it did not build an area wide traffic model and so was not able to fully represent the effect of 'rat-running'. It did not take air quality or rat running into account as risk factors when appraising and prioritising the scheme, or take steps with local councils to mitigate the risks. The Agency told us that, in retrospect, it considers that the implications and associated costs for all parties would have been better identified if each had contributed their share of the costs. This, it believes, would also have led to greater acceptance of the proposals. The agency told us it has now established closer working relationships with South Bedfordshire Council and Dunstable Town Council and that it is working to improve its relationship with the local highway authority, Bedfordshire County Council.

On air quality, the Agency had forecast improvements to air quality in Dunstable from the scheme. It modelled the likely effects of the scheme on air quality using the DRACULA micro simulation model and took air quality readings from monitoring stations along the A5 for the pre-construction period right through to the post opening period, enabling a comparison of before and after scenarios. The monitoring results showed large seasonal variations but the Agency told us that all readings indicated that no levels exceeded those deemed hazardous to health. Since the modelling was undertaken, there has been an increase in traffic through Dunstable which will have affected air quality in addition to any impact of the scheme. Local stakeholders told us that since the scheme opened, the air quality at the Church St-West St crossroads had deteriorated due to the sheer number of vehicles using the junction, such that it was designated an Area Quality Management Area in January 2005. When implementing its Route Management Strategy for the A5 and developing the Route Management Plan and Route Outcomes for the section through Dunstable, the Agency will need to work closely with local authorities to help alleviate congestion and improve air quality.

On 'rat-running', the Agency knew from its modelling that some drivers would transfer to local routes to complete their journeys. It did not, however, commission quantitative survey data on residential road usage in Dunstable prior to work commencing on the scheme, against which to monitor subsequent changes.

The modified scheme did not meet the original scheme's objectives

Following the initial public consultation, the Agency modified the specification for the A5 queue relocation scheme when it realised that out of town queues would be unmanageable. As originally planned, the scheme would have held traffic back on the outskirts of the town centre on red signals, with traffic being released through Dunstable in short pulses. But traffic modelling at the detailed design phase revealed an unacceptable increase in 'rat running' on unsuitable roads through surrounding villages. The modified scheme held traffic on the A5 at the northern and southern entry points to Dunstable until the queues reached a predetermined length, then released vehicles through to the town centre. This approach reduced, but did not eliminate, 'rat running' and allowed some congestion to build up in Dunstable High Street. The Agency did not, however, impart these changes effectively to local residents and the local councils, who still expected the completed scheme to reduce congestion, improve journey times and lessen air quality problems in the town centre.

Local stakeholders told us that they felt the Agency should have undertaken more detailed design work to assess the feasibility of the original scheme before seeking their support. They also felt that the Agency should have met with them again when it realised that the original scheme needed to be modified, particularly given the potential impact on the town. The Agency accepts that it did not recognise or manage this 'expectation gap', which is at the heart of residents' and local councils' dissatisfaction with the completed scheme. Local stakeholders view the scheme as not having met the original scheme objectives, which the Agency accepts were overly-optimistic. The Agency's Project Sponsor, on the other hand, believes that the Agency has achieved the best practical solution, in light of the problems it faced and the inherent limitations of the scheme.

The objectives identified in the Agency's value management process were not the same as the scheme objectives it publicised to stakeholders

The National Audit Office has reviewed the application of the value management process to the A5 Dunstable scheme, taking into account that the process in place at the time the A5 scheme was approved did not use comprehensive national guidance to score schemes or chose between them. The cost benefit analysis in the A5 scheme's original Project Appraisal Report, completed in June 2001 by the Area 8 Managing Agent Contractor, showed that the scheme was proposed and selected for the network management programme on the basis of benefits from safety improvements and on journey time improvements.

Whilst the value management process prioritised the A5 Dunstable scheme solely on the basis of these improvements, the scheme objectives in the Agency's Public Information leaflet are far broader and included improved air quality, reduced noise pollution, economic growth and a pleasant pedestrian environment. Publicising additional benefits before the detailed design work had established that they were deliverable was, at best, overly optimistic.

The Agency underestimated the scheme's preparation and supervision costs

Prior to its use on the scheme in Dunstable, the queue relocation concept had not been used by the Agency on a town centre route. In the absence of a precedent, the Agency's budgets for preparation and supervision costs were based on default percentage of works costs of nine per cent (£96,000) and five per cent (£54,000) respectively. In practice, these cost estimates were

unrealistically low, given the complexity of the Dunstable scheme and the considerable design input required after the works to adjust the signal timings to optimise traffic flows. Outturn costs were £236,000 for preparation and design and £694,000 for site supervision (146 per cent and 1,185 per cent above budget respectively).

To prioritise schemes for the regional network management programme and compare predicted rate of return, the Agency needs reasonably accurate cost estimates. One source of this data may be local transport authorities, who have implemented similar schemes.

The scheme was not re-evaluated when its Rate of Return was reduced

The original Project Appraisal Report, completed in June 2001 by the Agency's agents, showed a predicted First Year Rate of Return (FYRR) of 16.25 per cent, and indicated that works costs would be recovered from cost benefits in just over six years. This led to the scheme being rated high priority and entered into the network management programme. When the Project Appraisal Report for the A5 Queue Relocation Scheme was revised in February 2002 after public consultation, the FYRR was recalculated as 7.9 per cent, indicating that it would take at least twice as long to recover the scheme costs. At this point, the Agency's agents identified unquantifiable ancillary benefits, including improved pedestrianised areas with raised planting beds and seating, disabled parking facilities, improved bus laybys and crossing facilities. These were cited in the Project Sponsor's proposal to retain the scheme in the network management programme and were discussed with, and supported by the local councils.

Under the value management process then in place, the Project Sponsor's proposal justifying continuing with the scheme did not rank or re-evaluate the scheme relative to other schemes competing to be in the network management programme. The Project Sponsor has since provided the National Audit Office with details of the FYRR for other schemes carried out by the Agency around the same time, which indicate that the revised FYRR for the A5 Queue Relocation Scheme was still comparable.

The Agency's Post Opening Project Evaluation (POPE), issued in September 2005, indicates that the scheme has not delivered some of the benefits forecast in the Project Appraisal Report

The Agency does not commission post-completion assessments on all completed network management schemes but a post-completion assessment of the benefits delivered by the A5 Dunstable Queue Relocation Scheme was carried out in response to pressure from local councils. It took the form of a POPE Monitoring Report prepared by Carillion-URS for the Agency and published in January 2005. POPE is managed by the Agency's Safety Standards and Research Directorate, whose Traffic Appraisal, Modelling and Economics Group handles the work. POPE is an independent review, as the Agency area in which the scheme is based are not consulted.. The Carillion URS report did not cover the value management process decision to select the A5 Dunstable Queue Relocation Scheme. Nor did it include an assessment of whether the predicted benefits in the Project Appraisal Report, such as the predicted FYRR, were achieved. In September 2005, the Agency issued the evaluation report for the A5 phase 2 and queue relocation strategy, prepared by Atkins, as part of the Post Opening Project Evaluation (POPE) Commission. This assessed whether the predicted benefits had been delivered for safety, traffic volumes, journey times, environment, accessibility, and scheme costs.

The POPE evaluation concluded that:

- There has been a reduction of 8.4 accidents along the route. Atkins' analysis of the limited data to date suggested that this was not due either to a reduction in accidents at junctions, or to a reduction in pedestrian accidents. Atkins concluded that the reduction

was attributable to vehicles between junctions, perhaps because vehicle speeds were lower on this route;

- The number of accidents may have fallen overall but the proportion of fatal and serious accidents as a percentage of serious accidents (known as the severity index) has not. In the period prior to Phase 1 of the scheme, fatal and serious accidents accounted for 14 per cent of all accidents, compared to 15 per cent in the post-Phase 1 period and 20 per cent in the post-Phase 2 period;
- Accidents at Caddington Turn fell but accidents at other junctions, notably Church Street and Houghton Road have increased. Atkins concluded "*...that the scheme has resulted in an opening year accident saving of 8.40, it must be concluded that this saving has not been the consequence of an improvement in safety at junctions*";
- The modest journey time reductions forecast in the Project Appraisal Report have not materialised, and the POPE assessment identified longer journey times. Atkins based its calculations on peak hour traffic flows and journey times on the A5 in 2004. Assuming that the flow of traffic remained constant before and after implementation of the scheme, and that journey times measured in time surveys applied to all vehicles using the road, Atkins calculated average increases in travelling times of 79 seconds in AM peak hours, 66 seconds in the PM peak hours, and 62 seconds in the adjacent to peak, or interpeak, hours. These increases amounted to estimated total additional journey time of 126,617 hours in the first year of operation of the scheme but Atkins could not determine from the data available whether all, or only part, of this additional time was directly attributable to the scheme;
- Atkins noted that it could not establish from the available data whether stop-start movements had decreased, and hence whether the scheme had impacted on noise and air quality impacts. As a result, the POPE report is silent on changes in air quality. This is a surprising and disappointing omission, as air quality had been a serious concern for the local community, and the Agency had assured us that it had modelled the likely air quality changes in DRACULA and carried out pre-and post-scheme air quality monitoring along the route. Nor did the Atkins report mention that the Church St-West St crossroads was designated an Area Quality Management Area in January 2005;
- Notably, the Atkins POPE evaluation makes no mention of the impact of the scheme on congestion on the A5, in the Town Centre or on surrounding routes. This is disappointing, given the innovative use made of SCOOT.

Local stakeholders were not consulted during the post-completion evaluation of the scheme

The Agency has no formal policy on consulting stakeholders as part of its post-completion evaluation of small network management schemes. The decision to consult affected stakeholders in such cases is a matter of judgement for Area teams.

The Agency considers the Carillion-URS Monitoring Report, published in December 2004, and the POPE review issued in September 2005 to be objective assessments of its performance in delivering the A5 Dunstable queue relocation scheme against the scheme objectives and has shared the report with local councils. But Carillion URS and Atkins did not consult local councils and stakeholders directly affected by the A5 Dunstable Queue Relocation Scheme. Nor did the Carillion-URS and Atkins reports comment on the sixth objective listed in the Agency's public information leaflet (September 2001) which was to "*Improve air quality and reduce noise pollution in the town centre.*" In light of local concerns over a reduction in air quality, this omission diminishes the lessons which the Agency might otherwise learn from the scheme.

The absence of routine feedback from local stakeholders on completion of small network management schemes means that the Agency may not be made aware of additional costs and other unintended outcomes arising from its schemes. For example, local authorities may have to deal with complaints from residents, or employ additional resources to understand and assess the impacts of the Agency's work.

There has been an increase in the number of accidents occurring in Dunstable town centre since the queue relocation scheme came into operation, which local stakeholders attribute to increased waiting times and pedestrian unfamiliarity with the new road layout. The modifications the Agency made to the scheme resulted in busier roads, longer waits at pedestrian crossings and a road crossing on the High Street South section of the A5 was sited in the wrong place. When it modified the scheme, the Agency should have consulted on whether the new layout met the needs of pedestrians, as well as other road users. The Agency told us it had agreed the location of the crossing with Dunstable Town Council within the constraints of its standards. The relocation of the crossing is now, we understand, the subject of debate with Dunstable Town Council. On future schemes, taking the time to consult local stakeholders on pedestrian access may help the Agency improve road safety and avoid costly road crossing relocation work, which, in Dunstable, will cost the Agency around £180,000. The Agency should also consider consulting local authorities on accident trends as part of its POPE evaluations.

Lessons learned on the A5 Dunstable scheme were not shared with other teams working on traffic management and queuing schemes

The Project Sponsor for the A5 Dunstable queue relocation project told us that the Dunstable Queue Relocation Scheme was a unique solution that the Agency was unlikely to replicate elsewhere, and that there were no plans to share the experience gained from the Dunstable scheme with other Area Teams. From our discussions with the Traffic Operations Business Support Team, the National Audit Office has since learnt that the Agency has used schemes elsewhere to manage traffic movement and queuing using linked traffic signals. An Agency scheme, completed on 31 March 2005 on the A663 in Oldham, for example, used SCOOT to link pedestrian crossings in order to reduce queuing.

That the team working on the A663 scheme may not have been aware of the work already carried on the Dunstable queue relocation scheme highlights the scope for improvement in the way Areas disseminate information about the novel solutions they have devised.

Whilst the A5 Queue Relocation Scheme, as modified, has delivered some benefits, it has not reduced congestion in the town centre or improved air quality

Having reviewed the A5 Dunstable Queue Relocation Scheme, it is apparent from our discussions with third parties that the scheme has not delivered a demonstrable reduction in congestion or an improvement in air quality in Dunstable, due in part to an increase in road traffic. Congestion and air quality are of prime importance to local stakeholders and the way in which the Agency initially promoted the scheme as improving these aspects raised unrealistic expectations which it could not subsequently deliver. Whilst the Project Sponsor believes that the Agency achieved the best practical solution in the light of the problems it faced, this view is not shared by local stakeholders, who are dissatisfied with the scheme.

Summary of recommendations and suggestions for improvement

- Discussion with local stakeholder is essential to the effective management of stakeholder expectations and increases the likelihood of customer satisfaction with the completed scheme. Providing training for Project Sponsors on managing stakeholder expectations may help to promote realistic outcomes for schemes. For future schemes, the Agency

should consider making local stakeholders aware as soon as possible of constraints impacting on delivering service improvements, so as to help manage expectations.

- Whilst there will always be an element of disparity between the expected benefits to trunk road network users, and the benefits and costs likely to be experienced by the local community, the Agency should take care to identify the adverse impacts of a scheme on the local community and, if appropriate, take steps to mitigate them.
- Where modifications are made to the specifications of road schemes or to scheme objectives after consultations with local stakeholders have taken place, the Agency should inform all parties of the changes and the likely impact on the scheme objectives.
- When announcing the expected benefits to be derived from schemes, the Agency should consider only publicising the benefits it has identified under the Value Management Process until it has completed its detailed design work.
- In the absence of reliable preparation and supervision cost data on schemes using novel traffic management measures, the Agency should consider seeking benchmark cost data from other organisations, such as local transport authorities, who have implemented similar schemes. The Agency accepts that it could benchmark but would need co-operation from local highway authorities. The Traffic Management Act 2004 would require any future schemes of this nature to be developed in partnership with the local highways authority.
- In view of the potential for sub-optimal prioritisation of road schemes, the Agency's should carry out a re-evaluation of the merits of a scheme when its costs or specification is revised, or the expected benefits of the scheme have been re-assessed. The Agency confirmed that it had introduced a cost control procedure in March 2003 for all schemes over £0.5 million. Schemes with a low FYRR like Dunstable require approval at senior management level above the team promoting the scheme. Similarly, scheme cost increases greater than 10 per cent require a review of the FYRR and Divisional Director approval.
- If it has not already done so, the Agency should consider commissioning and publishing on its web-site a review of the operation of the SCOOT system in Dunstable. The Agency agrees that it should review SCOOT and publish its findings.
- Sending a written survey to local councils and local highways authorities, some months after completion of the work, would provide useful feedback and help the Agency identify areas for improvement. The Agency plans to extend the scope of POPE to include environmental issues later this year.
- On future schemes, taking the time to consult local stakeholders on pedestrian access may help the Agency improve road safety and avoid costly road crossing relocation work, which, in Dunstable, will cost the Agency around £180,000. The Agency should also consider consulting local authorities on accident trends as part of its POPE evaluations.
- To improve information sharing about novel solutions devised to address difficulties when implementing schemes:
 - the Agency could establish a central database of schemes, allowing Project Sponsors to identify other schemes, for example, which reduce congestion and are using SCOOT and other traffic queuing measures.
 - Traffic Operations Directorate's Regional Operations Managers could discuss novel or problematic schemes at their monthly meetings.

- The Agency could also consider publicising on its web site and in trade magazines the lessons learned from its use of novel schemes and new technologies that will be of interest to local highways authorities.
- When implementing its Route Management Strategy for the A5 and developing the Route Management Plan and Route Outcomes for the section through Dunstable, the Agency should use the opportunity to make local stakeholders aware of the constraints under which it is operating, and work with local authorities and other third parties to help alleviate congestion and improve air quality.

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