

In terms of the Irish road network, the M50 is one of the most critical elements of the country's infrastructure and ensuring minimal disruption to its efficient operation while carrying out extensive upgrading presents significant challenges. Richard Neuling, Chartered Engineer, project manager, Atkins, spoke to the Journal about how the design engineers and the Spanish contractors joined forces to overcome the challenges of upgrading Ireland's busiest motorway

M50 upgrade - Atkins team with Spanish contractors on busiest route

A number of factors distinguish the M50 upgrade in Richard's view: "The critical nature of the motorway infrastructure, the scale and complexity of the design challenges, and the influence of the Spanish contractors combined to make this an exceptional project. The upgrade has also proved significant in delivering design innovation as exemplified by the M50/N3 Interchange. Adding value as demonstrated by the design for the M50/N2 Interchange has also been a feature."

Ambitious scale

The M50 Upgrade PPP contract was signed in September 2007. With an approximate value of £250m, the contract encompasses the widening of 23km of motorway and the operation and maintenance of 42km of motorway for 35 years.

The scheme design included seven interchange upgrades, with major upgrades to full free flow at the M1, N2 and N3 interchanges. The PPP also entails delivery of a total of 21 bridges of various construction types including steel beams, steel box and concrete beams. Principal structures include:

- a five-span, 155m-long concrete viaduct at the N3 interchange over railway and canal;
- two three-span, curved steel beam composite bridges, each over a 100m long and with spans of up to 50m, at the M1 interchange; and,
- a two-span, twin steel box girder with spans of 58m and 47m, and 60 degree skew at the N3 interchange over the M50.

A further indication of the scale of the upgrade was the requirement

for 100 sign/signal gantries and numerous other retaining walls and culverts. Richard explains: "The objective of the upgrade is to deliver a motorway that can efficiently serve daily traffic flows of up to approximately 100,000 vehicles."

The PPP contract is being carried out by M50 Concession Ltd, a joint venture between Global Via Infraestructuras S.A. and Sacyr Concessions, both Spanish contractors, and P.J. Hegarty & Sons.

The detailed design and supervision contract for the overall programme, worth approximately €11m, went to Atkins. Over 14 Atkins offices were involved in various aspects of the programme including Dublin, Cork, Belfast, Swansea, Cardiff, Glasgow, Edinburgh, Birmingham, Leeds, Warrington, Manchester, Chelmsford, Sharjah and Bangalore with the number of staff from Atkins and sub-consultants involved in design work reaching a peak of 150.

Building trust

Working effectively with the Spanish client on an Irish project required the building of trust and confidence on both sides, according to Richard: "There were challenges in overcoming differences in practice and approach and in contracting culture. However, the Spanish contractors had strong design competencies and this, coupled with their own specific expertise and background, brought new perspectives to existing design practices and project conventions here. Working out effective and innovative solutions that would meet the requirements of the contractors and the highest standards of excellence in design benefited the project considerably and led to a broadening of knowledge and expertise both for the contractors

Construction programme

The construction of the M50 Upgrade was planned to be implemented via three contracts. The two design and build contracts, which included the N4 and N7 Interchange upgrades and the removal of the toll plaza, were completed in 2008 in conjunction with the installation of the M50 electronic tolling. The PPP contract covering the widening of the 23km stretch of the M50 is planned to take 33 months and is due to be completed this year. The construction of the PPP Contract has been delivered by M50 (D&C) Ltd, a joint venture between Spanish contractors FCC Construccion and Sacyr, and, again, PJ Hegarty & Sons.



M1/M50 interchange bridge lift.



N2 Interchange.



M1 Interchange.



Richard Neuling.



Tom O'Malley.

and us."

An example of the value of this interplay of approaches was evident in the ultimate design solution for the M50/N3 Interchange. The contractors improved the original design for this part of the project, which involved construction of a link road underneath the Royal Canal and mainline railway. "We suggested seeking an alternative design crossing over the canal and railway with a much easier road layout, the crucial factor being the contractors' willingness to take the calculated risk of putting a new design through the planning process with the potential for delay and disruption which that presented. The support and backing of the NRA, Irish Rail and Waterways Ireland was vital and helped greatly in taking this gamble."

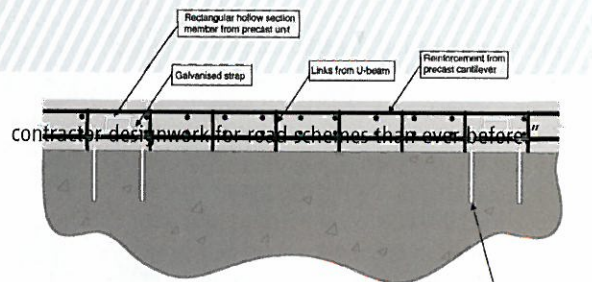
Fortunately, the revised design got through the planning process successfully and resulted in a number of advantages over the original design concept: "A safer road layout was devised that simplified traffic movements, with enhanced junction capacity at the N3/Auburn Avenue. The alternative design also ensured a reduction in the levels of disruption of N3 traffic during the actual construction. Equally there was less disruption to the railway as the alternative design required no temporary speed restrictions or any work under the railway which meant there was less construction work that had to be done at night. Of course, in addition to the project management efficiencies, this enhanced overall construction health and safety on the project."

Adding value

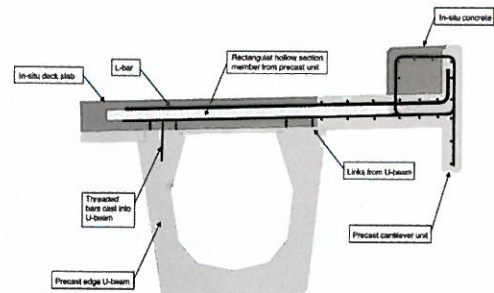
The original NRA design for the M50/N2 Interchange was enhanced to convert from partial free-flow to full free-flow resulting in the delivery of a substantial amount of engineering value. Some of the benefits include:

- the removal of traffic signal junctions;
- better facilities for pedestrians and cyclists; and,
- the provision of an additional grade separation.

The exchange of new ideas with international project partners that took place on this project is now an increasingly prevalent aspect of day to day work for Atkins engineers in Ireland, Jack Sheehan, Atkins Ireland's director of roads and bridges states: "It relates back to our global presence. Internationally, Atkins is carrying out more



PRECAST PARAPET CANTILEVER
LONGITUDINAL SECTION



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Atkins

Atkins is now positioned as one of the world's leading engineering and design consultancies, with the depth and breadth of technical expertise to respond to the complex challenges of the world's major infrastructure projects and carbon critical design, according to Tom O'Malley, Chartered Engineer, FIEI, and managing director of Atkins Ireland. Internationally, Atkins lays claim to a turnover of £1.3bn and more than 17,000 employees with 170 people employed in Ireland. Current international infrastructure projects include the 2012 Olympics, London Crossrail, the Dubai Metro and the Copenhagen Metro.