

Upgrading the road to motorway standard Carlisle to Guards Mill

M6
Extension

The story of construction

About the scheme

The scheme provides a 3 lane motorway connecting the north end of the M6 at Carlisle and the south end the A74(M) at Guards Mill. Located between long lengths of motorway to the north and south, it was known locally as the 'Cumberland Gap'. It was a bottleneck and has been the scene of major accidents, occasionally leading to diversions and considerable delay on this very busy route.

Over one third of the 45,000 vehicles using this road daily are lorries and there is no suitable alternative route when problems occur. The upgrade of this section to motorway standard will bring considerable road safety and travel time benefits. It was seen as the last "missing link" in the motorway network between London and Glasgow. It is a vital strategic road which forms part of the Trans-European Transport Network TEN-T and is part-financed by the European Union.

The motorway was created by widening the existing A74. Alongside the new motorway is a new all-purpose road for non-motorway traffic which makes local journeys and local community access considerably easier and safer. Farm vehicles, local buses, walkers and cyclists will no longer have to mix with high speed longer distance traffic.

The scheme includes a second bridge over the River Esk, alongside the existing one, to give the extra road width and a new bridge over the West Coast Main Line railway. The existing Mossband Viaduct that carried the A74 over the railway is life expired and is being demolished.

Construction work on site started in July 2006 and the new motorway was opened in December 2008.

The benefits of the scheme to road users are:

- A reduction in the number of accidents on the route
- The provision of more predictable journey times
- A reduction in driver frustration
- An improvement in accessibility for users
- The provision of more carriageway space for emergency services attending accidents
- The provision of more carriageway space for attending and dealing with accidents
- Segregation of local and long distance traffic

Key features

Mossband Railway Bridge

The new bridge is a reinforced concrete box structure 160 metres long and 6 metres high over the railway. The main walls are just 6 metres away from live railway lines. The railway had to remain open while the bridge was being built.

A major concern was the risk, however small, of the large cranes falling across the railway lines. The contractor devised an innovative moving gantry system, mounted on rails, allowing the concrete walls to be formed in 12 metre sections. Once a section had hardened the system was

pulled away from the wall, cleaned and moved along to form the next section. Meanwhile trains continued to use the railway safely.

The 136 precast concrete beams for the bridge deck were lifted into place on Saturday nights when Network Rail had the railway closed for their maintenance work, so avoiding further disruption to rail users. Concrete was poured over the beams to complete the bridge structure ready for the road surface.

At the same time ground improvement work was carried out to strengthen the weak peaty soil under the earth embankments leading up to the bridge. Some settlement was expected as the weight of earth fill was built up and when this finished the new carriageways could be constructed.

The new bridge was completed and opened to traffic in July 2008.

River Esk Bridge

The old bridge over the River Esk is not wide enough to carry all the lanes of the new motorway and the local road so another bridge was built alongside it.

Two of the new bridge piers stand in the river. It was important not to reduce the width of the river too much during construction. The south pier was built on a temporary island with a bridge from the south bank. The island was then removed and the stone re-used to build a temporary platform out from the north bank for the second pier construction. Afterwards that too was removed, allowing the river to resume its normal course.

The deck of the bridge was 'launched' across the river from the north bank in two stages. First a 100-metre section of steelwork was assembled on the ground behind the north abutment then winched across the water by steel cables and hydraulic rams as far as the centre pier. Then the remaining 75 metres was assembled and connected to the first section and then the whole deck, now weighing 1200 tonnes, was winched again to complete the crossing. This technique avoided the need to work over the river, substantially reducing the danger to the

workforce and the threat of pollution to the watercourse.

The new bridge carries the southbound carriageway of the motorway. Both northbound and southbound traffic was switched on to the new bridge for a period while the existing bridge that now carries the northbound carriageway and the local road over the River Esk was refurbished.

All-Purpose Local Road

The new local road runs along the west side of the new motorway, between Rockcliffe Road on the north side of Carlisle, to Guards Mill south of Gretna. It connects the local road network severed by the new motorway and provides a route for local traffic, buses, farm vehicles, cyclists and walkers. These road users are now much safer because they no longer have to share road space with high-speed long distance traffic.

VOSA site

A new larger and better equipped site for the Vehicle and Operator Services Agency (VOSA) was built one mile (1.5km) north of its previous location. VOSA provides a range of licencing, testing and enforcement services to improve the roadworthiness of vehicles and compliance of operators and drivers with road traffic legislation. At the site the existing land had to be levelled. This involved the removal of around 250,000 tonnes of soil that was transported to other parts of the scheme and used to build embankments.

The team

The six major organisations who worked together in partnership on the scheme are:

The Client - The **Highways Agency** promoted the project, including the feasibility, public consultation processes and selection of the preferred scheme. The Highways Agency were responsible for taking the scheme through Public Inquiry, obtaining the powers to build it, procuring, funding, controlling the contract and putting customers first.

The Client's Representative – Scott Wilson provided engineering support to the Highways Agency through all stages of the project giving evidence at the Public Inquiry, preparing the contract documents and representing the Highways Agency on site during construction.

The Contractor – Carillion provided road construction experience and expertise from an early stage. They helped to formulate options for the preferred scheme and to produce evidence for the Public Inquiry. They managed the designers through outline design, detailed design and the construction stage. They identified Value Engineering savings and managed their incorporation into the project.

Carillion constructed the scheme to the planned December 2008 opening date. They managed the construction and traffic to minimise disruption and disturbance to the public and completed the works with an excellent safety record.

The Contractor's Designer – Capita Symonds produced the design for the new carriageway, drainage, communications network, earthworks, lighting and landscaping. During the construction stage Capita Symonds supervised and checked construction on site and provided design support to get best value. Capita Symonds employed Grontmij to design the structures on the scheme including the new bridge over the River Esk and the new Mossband railway bridge.

The Environmental Specialists –

Cresswell Associates were involved with the initial environmental and ecological surveys and in producing the Environmental Statement. They supported the Highways Agency at the Public Inquiry giving evidence. Cresswell designed environmental improvements such as the wetland habitats and the badger tunnels under the motorway. During construction they oversaw all the environmental works.

The scheme to upgrade the A74 to a 3 lane motorway was one of the first projects procured as an Early Contractor Involvement Contract (ECI). Implicit in this type of contract is the need for a partnering approach to be adopted by all the parties and stakeholders engaged on the work. ECI allowed the Highways Agency to benefit from the contractor's experience and skills from an early stage. As a result of ECI much of the planning was done by both the designers and contractors. This provided a more co-ordinated design benefitting from the contractor's previous experience of road building. This ultimately provided a quality scheme that was easier to build and gives the best value for money.

By adopting a partnering approach risks were identified early and challenges during the work were overcome more quickly. It also promoted a more open style of management both in financial matters and on site. Partnering generated a spirit of shared responsibility and collaborative working that helped to solve problems and maintain progress on the works when setbacks occurred.

The environment

The area lies close to a number of designated sites and environmentally sensitive areas including the Upper Solway Flats and marshes and three moss-land county wildlife sites.

Care needed to be taken to minimise the effect of the scheme on the environment. The Highways Agency and their contractors take environmental responsibilities very seriously.

The scheme has seen the creation of three environmental ponds for the benefit of wildlife. Suitable habitats for reptiles have been created, including 'hibernacula' – made from logs and stones buried underground – where snakes can shelter from the cold and hibernate during the winter. There has also been successful translocation of important hedgerows, the construction of nine mammal crossings and creation of safe foraging corridors for barn owls.

Before work began, reptiles were removed from the verges of the A74 and other areas under the footprint of the scheme. In total, 220 adders – Britain's only poisonous snake – and 280 common lizards were moved to adjacent areas or suitable sites further away. Some of the adders were taken to Matterdale Forest, an area of clear felled woodland owned by the Forestry Commission.

Timber screen fences have been erected next to properties close to the new road.

The fences reduce the noise levels and improve the environment for residents alongside the new motorway. Additionally, extensive landscaping and planting, including the creation of wet woodland, has been carried out. This work has helped to blend the edges of the construction corridor into the existing landscape of farmland and mosses. Over 120,000 native species trees and shrubs have been planted which, once mature, will also help blend the scheme into the landscape, improving the views for nearby residents and road users.

Working with the local community

Throughout construction, we at the Highways Agency and our contractors have actively engaged with the community.

Regular liaison meetings were held to keep local residents and stakeholders updated on progress. Additionally, regular letters were sent to the local community to keep them informed.

Our contractors had a dedicated Public Liaison Officer on site to deal with any complaints or enquiries from the public.

Local Schools

Our contractors have liaised closely with local schools, giving presentations and inviting them to visit the project. As part of their work within the schools community they have created a running track for Gretna Primary School, a footpath and quiet seating area for Longtown School, and provided topsoil for Eastriggs Primary School vegetable garden.

Local Charities

During the course of the project, our contractors have donated £60,000 to local charities and community groups. Half was raised by the staff and workforce, some of it from a monthly cake sale at the site office. The rest was donated by Carillion and their suppliers.

Beneficiaries of these donations have included:

- Sponsorship of Longtown Christmas lights.
- Donations of over £1200 to Gretna scout group.
- Resurfacing the car park at the Glenmore Trust Social Enterprise Project
- £1300 for Cumbria Air Ambulance

Our successes

Traffic Management

One of the big successes has been the way traffic has been kept flowing safely through the works. Over 45,000 vehicles, around three quarters of all cross border traffic, travel through the scheme daily. The same number of lanes were kept open at peak times during construction as there were before work started. This was an extremely difficult and complex task; any lane closures that were needed were done during the night or in less busy periods. As some lanes were made narrower speed limits had to be reduced to make it safer for both the workforce and for motorists.

The Highways Agency are very pleased that over the two-and-a-half years of construction there have been very few complaints from the travelling public. Indeed we have received several positive comments on how the traffic management has been carried out.

Minimal disruption to the railway

Building the new Mossband Railway Bridge required innovative ways of working. Major concern surrounded working so close to the West Coast Main Line railway. A moving gantry system was used that enabled safe working at the required distance from the railway with trains running normally. Lifting the 136 deck beams over the railway could only be done when no trains were running. Beams were placed on Saturday nights when the railway was closed, causing no disruption to the travelling public.

The team worked very closely with Network Rail on the demolition of the old Mossband Viaduct over the railway. As much as is safely possible has been dismantled without affecting the railway. The parts that cannot be demolished while trains are running will be taken down at Christmas while Network Rail have this section of the West Coast Main Line closed for their own engineering works.

Innovation

Highways Agency and railway engineers worked together with our contractors to develop innovative techniques to construct the bridge while keeping trains running safely.

These included:

- Constructing special cages to protect the workforce from the railway's 25000v overhead electric cables and allow them to carry out their work in safety.
- Building concrete anchor blocks the length of the bridge wall to secure the 80ft high rigs installing the bridge's foundation piling.
- Installing moving gantry systems to allow construction of the two 160m long bridge abutment walls without the use of cranes while trains were running.

The new River Esk bridge was assembled on the river bank and launched over the water to avoid the dangers of working over water and next to live carriageways.

The new highway drainage is channelled into new purpose built reed-bed ponds so that run-off is purified and released gradually into the local watercourses and has minimum impact on the local environment.

Safety

The safety record on site has been outstanding. A continuous period of nearly 1.5 million hours was worked without a reportable accident.

Collaborative working

The Highways Agency and Network Rail signed a Memorandum of Understanding to support their close working relationship. This partnership resulted in the successful construction of the new bridge over the busy west coast railway line. The Memorandum of Understanding focused on improving communications and promoting co-operation between the two organisations.

Key dates along the way

2000

- **March 2000** – Lord MacDonald announces the inclusion of the scheme in the Targeted Programme of Improvements
- **October 2000** – Scott Wilson Scotland Limited and CAPITA dba were commissioned by the Highways Agency to look again at the project to upgrade the A74 and determine a preferred route

2002

- **July 2002** – Preferred Route Announced

2003

- **February 2003** – Carillion Construction Limited appointed under the Highways Agency's Early Contractor Involvement (ECI) initiative, to allow development and detailed planning of the works to be carried out while the scheme was taken through the statutory procedures.

2005

- **February 2005** – Public Consultation process including Non Technical Summary publication
- **7 & 8 February 2005** – Draft Orders exhibition
- **27 Sept – 11 Oct 2005** – Public Inquiry

2006

- **22 March 2006** – Secretary Of State's decision announced
- **12 June 2006** – Compulsory Purchase Order notices served
- **25 July 2006** – Start of Works cutting ceremony

2007

- **16 May 2007** – New River Esk Bridge deck 1st launch
- **11 June 2007** – New River Esk Bridge deck 2nd launch
- **20 May 2007** – Mossband Rail Bridge first beam
- **26 Aug 2007** – Mossband Rail Bridge last beam

2008

- **26 March 2008** – First traffic over new Esk Bridge
- **10 June 2008** – First traffic over new Mossband Bridge
- **11 June 2008** – Vehicle Operators Services Agency site handed over
- **20 June 2008** – First section of all-purpose road handed over to Cumbria County Highways
- **27 July 2008** – Old Mossband Viaduct free of traffic
- **5 November 2008** – Demolition of old Mossband Viaduct – removal of first span
- **November 2008** – Whole of all-purpose road handed over to Cumbria County Highways
- **5 December 2008** – M6 opening ceremony
- **Christmas 2008** – Completion of demolition of Old Mossband Viaduct

Major quantities used in the construction of the scheme

- Excavation – 270,000 cubic metres
- Piling 1500–450mm dia 17-25m long – 5,700
- Band drains – 21,000
- Imported aggregates – 1,400,000 tonnes
- Concrete – 21,000 cubic metres
- Reinforcement – 4,000 tonnes
- Structural Steel – 930 tonnes
- Drainage pipes/channel – 35km
- Surfacing – 150,000 tonnes

For real time traffic information:

08700 660 115

www.highways.gov.uk/trafficinfo

24 hours a day, 365 days a year

(Calls from BT landlines to 0870 numbers will cost no more than 8p per minute; mobile calls usually cost more)

For general Highways Agency information:

08457 50 40 30

email: ha_info@highways.gsi.gov.uk

24 hours a day, 365 days a year

(Calls from BT landlines to 0845 numbers will cost no more than 4p per minute; mobile calls usually cost more)

Safe driving at roadworks

Remember that tiredness can kill. Take regular breaks from driving.



During 2006 two workers were killed and 19 seriously injured in the course of their work on Highways Agency roads.

For the safety of all road users and roadworkers, when you are approaching roadworks:

- Keep within the speed limit – it is there for your safety.
- Get into the correct lane in good time – don't keep switching.
- Concentrate on the road ahead, not the roadworks.
- Be alert for works' traffic leaving or entering roadworks.
- Keep a safe distance – there could be queues in front.
- Observe all signs – they are there to help you.