

## WESTLINK M1 MOTORWAY BELFAST, UK

### RETAINING STRUCTURES

#### Product: MacWall

##### Problem

Arup were faced with the problem of widening Northern Ireland's busiest motorway from a 2 lane dual carriageway, to a 3 lane plus hard shoulder, whilst maintaining the same overall highway footprint – no additional land take was possible as it is sited within a heavily built up area of the city.

The Stockman's Lane project is one of three junctions on the Belfast Westlink, all of which required major reconstruction to improve traffic flow and increase capacity to cope with over 65,000 vehicle movements per day.

Two new bridges were required to span the Stockman's Lane circulatory system beneath the motorway and slip roads had to remain in use throughout the work.

##### Solution

MacWall Landmark retaining walls have been installed at the Stockman's Lane Junction of the Belfast Westlink, one of the City's principal arterial roads and part of a £115m, M1 motorway improvement scheme being undertaken by Contractors HMC [Highway Management Construction] for the Northern Ireland Department for Regional development Road Services.

Arup's design solution was to install near vertical, masonry-faced reinforced earth retaining walls between the new carriageway and the slip roads. Four walls were to be constructed, each approximately 150m long and up to 4m high. Detailed design was undertaken by Geotechnical Specialists Maccaferri, who specified MacWall Landmark Segmental Retaining Wall blocks for the wall facing.

The MacWall Landmark system employs an innovative positive connectivity device that locks polymeric



During construction



During construction



Post construction

Client:

NORTHERN IRELAND DEPT. FOR REGIONAL ROADS

Main contractor:

HIGHWAY MANAGEMENT CONSTRUCTION

Designer:

ARUP LTD

Product used:

MACWALL "LANDMARK", ENKAGRID PRO

Construction date:

SPRING / SUMMER 2007

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geogrids to the masonry facing blocks giving the system its immense strength. These geogrids are installed in conjunction with layers of compacted backfill behind the wall to form a highly efficient earth retaining structure. Landmark carries the British Board of Agreement [BBA], Roads and Bridges Accreditation and is also approved by Northern Ireland's Road Services for use in structures requiring TAS approval.

Speed of installation was also a major factor in the choice of retaining wall materials. Because of the need to maintain traffic flows, Contractors HMC were restricted to night time and off peak periods in which to work.

The MacWall Landmark system comprises split faced masonry blocks that are laid by hand onto basic granular footings. They are straightforward to install and, as HMC had not used MacWall Landmark before. Unlike traditional retaining wall structures, MacWall Landmark is a dry-built system requiring no concrete foundations or shuttering work. It uses geogrids that work with compacted backfill to create a mass structure of immense strength and stability.

Geogrids were placed at every alternate course of blocks and were sandwiched between 250mm thick compacted layers of type 1A1 backfill.

The M1 Westlink project is the first major highway infrastructure use of the MacWall Landmark system in the UK and Ireland.

The Westlink reconstruction is a PFI, DBFO package [Design Build Finance & Operate], and is also the first of its kind in Northern Ireland. Construction work began in early 2006 and will continue until early 2009



During construction



The completed structures

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