

# CASE STUDY

## GSMR Project Civils Enabling Works

**LOCATION:** Nationwide  
**CLIENT:** Irish Rail  
**DATE:** November 2016 - ongoing



### Introduction

The objective of the GSM-R project is to install telecoms towers and monopoles with associated civils and services works to facilitate the transition of train communications to a modern digital radio network. The overall project is divided into packages of individual sites ranging from 4 sites to 18 sites on the Irish Rail Network

nationwide. Sites include greenfield sites, Irish Rail properties, sites adjacent to the rail line, railway bridges and level crossings. To date Global Rail Services have completed over 100 sites.

### Project Deliverables

Global Rail Services takes on the role of main contractor and PSCS for the project. The works are carried out adjacent to the live railway and public areas such as public roads, train stations and carparks. A number of sites are greenfield sites requiring liaison with landowners and residents. Global Rail Services also liaise closely with Irish Rail for works taking place beside the live railway which require day and night time possessions and isolations.

All temporary works are designed and implemented by Global Rail Services. These include construction of temporary access roads and piling platforms, craneage/lift plans, protection of existing services within the vicinity of the worksites and stabilisation of embankments

and deep excavations. Global Rail Services are responsible for reinstatement of all access areas on completion.

Work sites are set up to establish green zone working areas in order to minimise the requirement for Irish Rail lookout protection, possessions and isolations of the rail line. Sites are cleared of vegetation. Temporary and permanent access roads are constructed where needed. Temporary piling platforms are constructed where king post walls are required. SFA and ODEX piling is carried out from depths of 4m to 22m with mini piling rigs and pincher.

Excavation works are carried out using specialised rail plant as well as diggers and vacuum excavators. Concrete mast bases, including steel reinforcement, are installed. Where required, ducting, under track crossings (UTXs), mini pillars, manholes, earth

ring, tape and pits are installed. Once infrastructure is in place, the mast or monopole is erected. The compound is secured with fencing and gates.

## Challenges and Solutions

Most sites involve working adjacent to the live railway line. We carry out initial joint site surveys with the client and review each worksite individually and jointly confirm the best site set up to complete the works. We endeavour to set up where possible a full green zone of working on day one to reduce the requirement for Irish Rail lookout protection and for railway possessions and isolations. This is not always possible. In these instances, we endeavour to complete as much preparation works off site. Off site preparation works includes:

- ① Prefabrication of the RC cages for the tower and telecoms cabinet bases and delivery to site fully assembled, ready to lift into the excavation. In some instances where the cages are too big to transport to site prefabricated, we fabricate on adjacent lands and lift in fully assembled under possession.
- ① Pre-assembly of the formwork in line with the approved temporary works design and delivery to site, ready to lift into the excavation
- ① Pre-assembly of the holding down frames or stub assemblies for the towers and monopoles and delivery to site, ready for installation

At some sites there is a requirement to supply and install JB4A manholes over the existing fibre cable adjacent to the mast site to link into the networks within the track support zone. In the past this would have required the design of extensive temporary works including the installation and maintenance of the temporary works under railway possession for the duration of the manhole construction. The works would involve:

- ① putting in place temporary speed restrictions for trains for the duration of the works
- ① installation of a concrete foundation under possession, requiring concrete at night
- ① building the manhole in blockwork
- ① installation of the manhole frame and cover
- ① allowing a min of 7 days to cure before the temporary works could be removed under possession
- ① backfilling of the manhole under possession
- ① tamping of the track ballast prior to handover

To eliminate the extensive temporary works, Global Rail Services jointly designed precast concrete chambers with our precast concrete supplier. By using the precast manholes with no base, we are able to attend site under 1 night possession, excavate and locate the fibre cable, install the PCC manholes with cut out and

no floor over the fibre cable, install the frame and cover, backfill the excavation, tamp the ballast as required and hand back to our Client in one shift with absolutely no interference with the operational railway and no requirement for temporary works. This vastly reduces the railway interference and time required on site to complete the works.

One of the key engineering challenges on this project is piling. Global Rail Services use an approved piling contractor that has successfully completed all piling works on this project to date. Due to the nature of the works, we were able to agree for the use of a small rig with a low mast that could install the piles within specification without fouling the track. Therefore enabling us to install the piles without the requirement for possession in most locations.

On sites requiring king post walls, Global Rail Services carried out a redesign of the king post walls with gabion basket retaining wall structures in order to reduce the need for Irish Rail Lookout protection. This resulted in a reduction of the overall cost and a reduction in the 7 day waiting period for the concrete to cure sufficiently to proceed.

Another key engineering challenge for these works is the method of erection of the mast/monopole. Generally, the site access is not always ideal and usually very restricted with space and working possession times. It is not always possible to use a 50t crane to erect the mast. We have the capability to use our own in-house certified HIAB lorries with 30, 40 and 50t crane attachments and road rail teleporter to erect on track where no road access is available. We also have access to small all-terrain cranes with large lifting capabilities which are used where there is no road access. Global Rail Services have fully trained, railway experienced Appointed Persons to produce and fully design lift plans from start to finish in house. The Appointed Person attends site to review restricted site access, confirms the best method to use for the erection of the structure under TIII possession, maps out the footprint of the lifting appliance and completes CBR tests on the crane platform to confirm suitability. A full lift plan detailing all aspects of the lift from start to finish is produced and submitted to the client for approval well in advance of the works.

## Benefits

Global Rail Services have all the in-house skills and capabilities available to complete the civils and construction works for this project. For the erection and rigging of the new 30m masts and 15/10m monopoles, we have our own in-house telecoms department, GRA networks, who are currently the maintainer for the operational GSMR site throughout the Irish Rail network. We have many fully experienced, trained, and qualified railway riggers. We differ from other contractors as we can supply a full turnkey solution in house and have the flexibility to respond quickly in house to everchanging schedules and possessions at short notice to meet our Client's requirements without being dependant on an outside sub-contractor.

As the current approved supplier of all telecom towers and monopoles to the Irish Rail network, we have jointly developed a tower and monopole design to meet the Client's requirement. We have in-house knowledge on the most efficient way to handle the

load and deliver these large structures to confined worksites ready for erection under possession. 30m towers and 15m monopoles are delivered and erected within one track possession.

All crews involved in the works have 20+ years railway experience in all aspects of the railway. Generally, they have local knowledge but more importantly they have firsthand experience working on GSMR sites in tight restricted rail environments.

Global Rail Services is able to work proactively with Irish Rail to maximise the green zones of working and minimise TIII Possessions to allow for unrestricted working were possible. Therefore reducing the overall cost of the project.

## Testimonial

### *Package 2F*

"All works completed at the Bray head sites, a special word of thank you to Damien Carroll, Nicolía Gherghelas and the lads on the ground who managed to deliver a good clean job despite the very wet and stormy winter on a very limited and awkward few sites."

**Paul Flynn**  
**Technical Executive**  
**Iarnród Éireann Infrastructure**