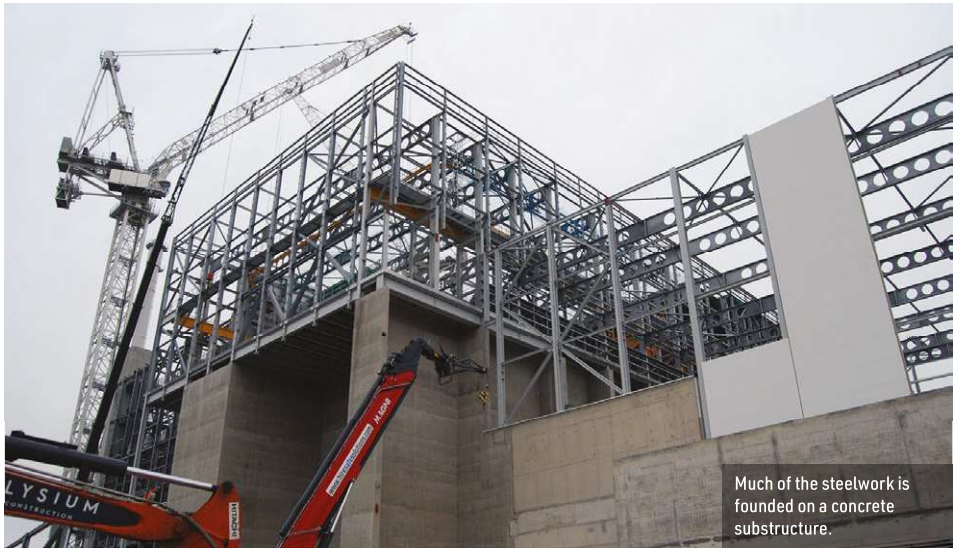
Waste solution

Rising up on the south bank of the River Thames, structural steelwork is playing a pivotal role in the construction of one of the UK's largest energy from waste plants.

The Riverside Energy Park in Belvedere is expanding with the construction of a second energy from waste (EfW) facility.

Riverside 1, which was initially built by the Cory Group 15 years ago, (see NSC October 2009 *https://www.newsteelconstruction.com/wp/energy-solution-from-waste/*) and has been operating since 2011 will be joined by an adjacent facility, which will be operational in 2026.

Riverside 2 will play an important role in helping to achieve the goals set out in the London Plan, which aims for 100% of the capital's waste to be processed within its boundaries by 2026.



Much of the steelwork is founded on a concrete substructure.

It will be one of the UK's most efficient EfW facilities and will divert around 650,000 tonnes of non-recyclable waste a year from landfill, converting it into enough low-carbon electricity to power the equivalent of 176,000 homes per year.

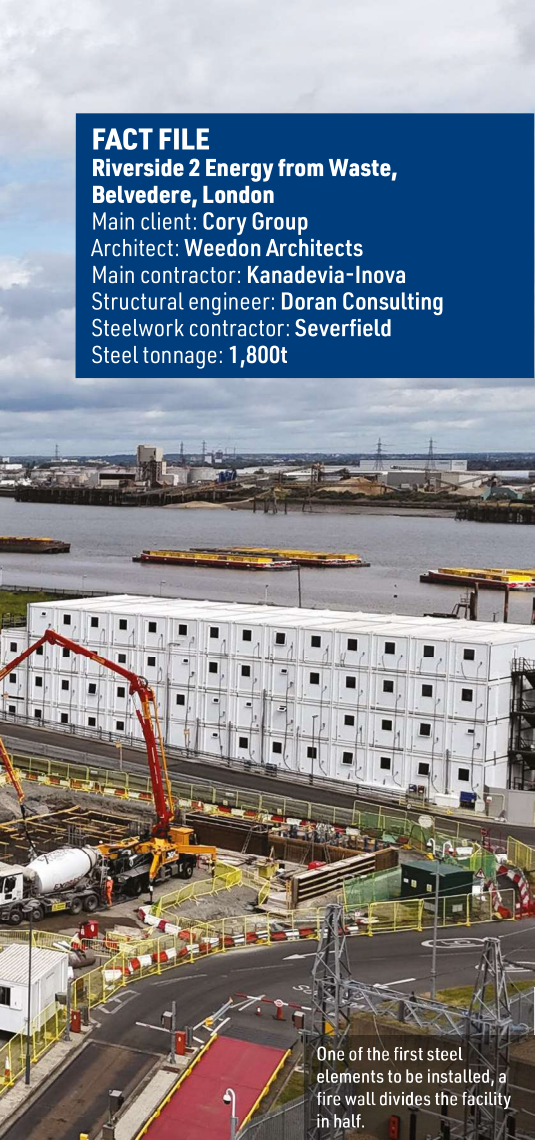
Cory Group CEO Dougie Sutherland, says: "The construction of Riverside 2 is a huge milestone not only for Cory, but also for London and for the development of the UK's low-carbon infrastructure. This facility is being built to deliver a world-class service for the communities, businesses, and local authorities that really care about the environment.

"We are always looking for ways to mitigate our environmental impact. Riverside 2 will have the UK's lowest nitrogen oxide (NOx) levels, will take refuse vehicles off our roads by transporting waste via the River Thames, and will be connected to one of the UK's largest heat networks."

Cory has a commitment to sustainability and reducing environmental impacts on the local area. As part of this, the company is progressing an industry-leading carbon capture project, which will also be located at the Belvedere site and has the potential to capture around 1.4 million tonnes of CO_2 per annum by 2030.

Like the majority of EfW projects, the Riverside 2 facility is housed within a large steel-framed structure. The material was chosen for a number of reasons, including the fact that it can efficiently form the required long column-free spans, necessary to house the various process and equipment areas.

FACT FILE
Riverside 2 Energy from Waste, Belvedere, London
Main client: **Cory Group**
Architect: **Weedon Architects**
Main contractor: **Kanadevia-Inova**
Structural engineer: **Doran Consulting**
Steelwork contractor: **Severfield**
Steel tonnage: **1,800t**



One of the first steel elements to be installed, a fire wall divides the facility in half.

Steelwork offers the project speed of construction and the long-span qualities needed for such facilities.

For this project, the steelwork package has been divided between two companies, with Severfield fabricating, supplying and erecting around half of the overall main building. Its work consists of the tipping hall, waste bunker and hopper area, an admin block, as well as a stand-alone ash bunker building.

Working around and alongside the groundworks team – who installed the piled foundations and formed the large concrete substructure, on to which much of the steel frame is sat, Severfield's initial task was to erect a fire wall.

The wall divides the facility into two parts, between the area Severfield is installing and the zone containing the boiler house and process equipment (being erected by another contractor). Once it was installed, the steelwork for the adjacent waste bunker was erected.

This part of the steel programme included the largest and heaviest individual steel element of the project; a 27m-long × 1m-deep truss, weighing 50t.

The high-level truss spans over two hoppers and supports a crane beam, in an area where columns could not be accommodated.

Fabricated and transported to site as one piece, a 500t-capacity mobile crane was used to install the truss.

"This is a busy site with many trades working at the same time," says Kanadevia-Inova Civils Construction Manager Gary Moore. "To help run the scheme efficiently we have a streamlined project and steelwork helps with this as it can be fabricated offsite, arriving in fully-formed sections, ready to be erected straight from the delivery truck, which ultimately creates a quicker delivery programme."

As well as the crane beam that is supported by the truss, on the opposite side of the bunker, there is another, completing the runway for the waste area's 100t-capacity overhead crane. With no obstructions, this beam is supported by a series of lattice columns, standing 10m-tall and sat on top of the bunker's concrete wall.

The bunker is deep, and the distance from the ground floor slab to the roof is more than 50m. To complete the uppermost steelwork, Severfield has used a combination of cranes and MEWPs, including an access unit with a working height of 185 feet, which is one of the highest available.

"To avoid as much working at height as possible, the roof for the bunker has been installed in a series of modules, brought to site in sections, which were then assembled on the ground before being installed," explains Severfield Project Manager Gavin Rogers.

The roof modules each weighed 40t and measured 37m-long × 6m-wide. They consisted of two outer spliced rafters, connected by a series of cross members. As well as cutting down on the amount of steel erection at height, the design also helped the numerous follow-on trades, as the modules also included electric cabling and water suppression units.

Once the waste bunker steel was installed, the next phase consisted of the admin block. This is a six-storey building that is positioned next to the bunker and gains its stability from the concrete substructure and a lift shaft.

Formed with a series of 12m-long beams, creating a column-free office environment, the steelwork supports metal decking and a concrete topping for a composite flooring solution.

The other large steel frame to be erected was the tipping hall, which adjoins the waste bunker. This is the area where trucks will deliver the refuse and it is accessed via a road bridge which links to a first-floor zone above a concrete podium.

Creating a necessary space for the trucks to be able to enter and turnaround, the tipping hall is formed with 15m-tall columns supporting a series of 27m-long roof rafters.

As well as the steel frame, Severfield's scope includes various cold-formed design products, such as steel stairs, nine cat ladders, 362m² of open grid flooring, 823m of permanent handrailing and 2,700m² of metal decking ■

"To avoid as much working at height as possible, the roof for the bunker has been installed in a series of modules, brought to site in sections, which were then assembled on the ground before being installed,"

A large truss supports one of the bunker's crane beams and also spans over two hoppers.

Another crane beam is supported by a series of lattice columns.

Long-span cellular beams span over the tipping hall.