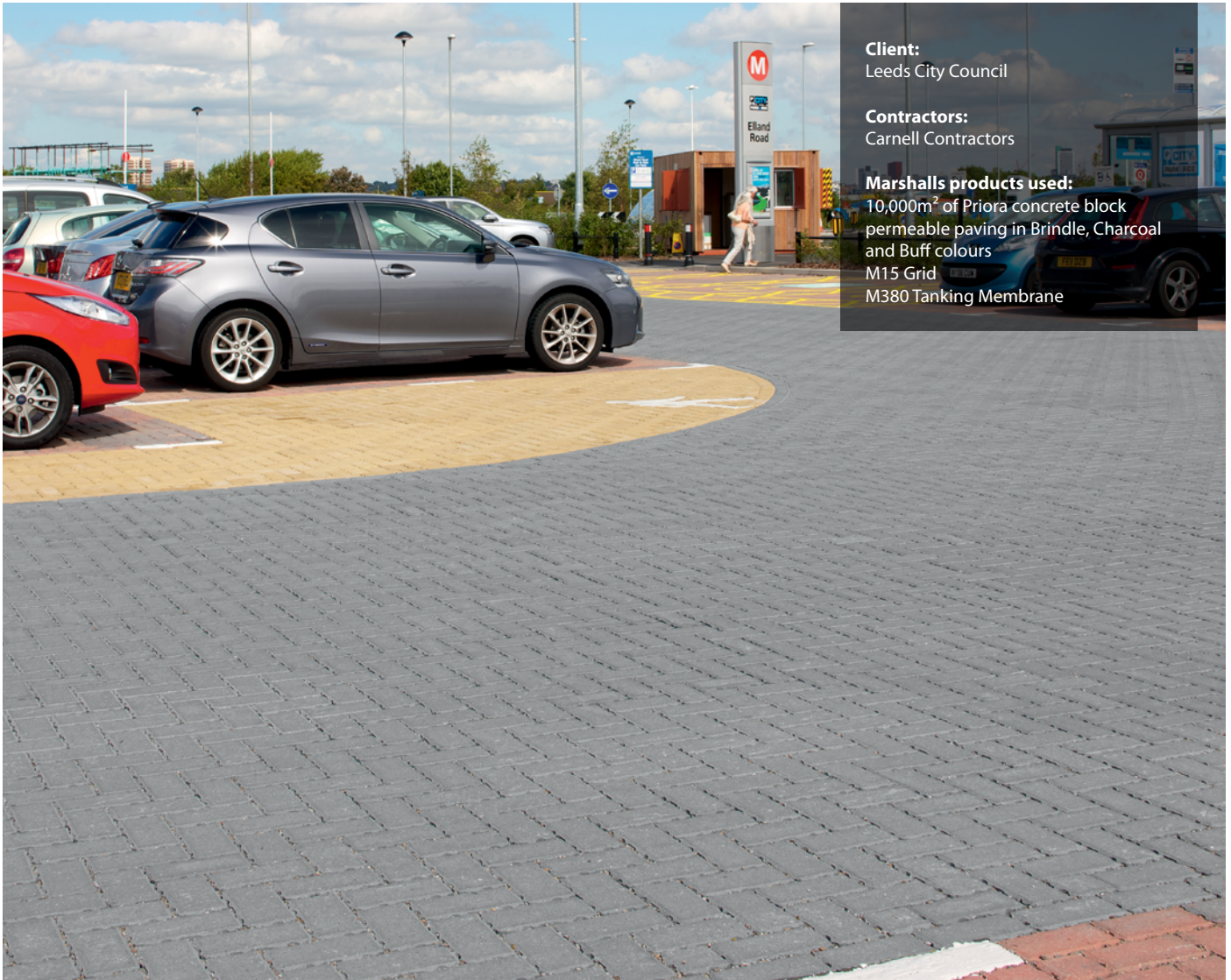


Leeds Park & Ride



Client:
Leeds City Council

Contractors:
Carnell Contractors

Marshalls products used:
10,000m² of Piora concrete block permeable paving in Brindle, Charcoal and Buff colours
M15 Grid
M380 Tanking Membrane

Marshalls has provided Leeds City Council with a complete permeable paving system which mitigates flood risk, removes surface water and improves water quality



When Leeds City Council required a more effective design for the city's first large Park and Ride scheme, it turned to Marshalls for the solution.

Challenge

Leeds' first major park-and-ride scheme at Elland Road includes 800 spaces, aimed at removing hundreds of cars from the city's roads. Located near Leeds United Football ground, it offers a shuttle bus every 10 minutes into the city centre, helping to reduce congestion. Its construction was fast-tracked to ensure it was ready in time for the city's hosting of the first stage of the Tour de France cycle race when thousands of visitors would be descending on Leeds.

The initial design of the car park included an attenuation system using gravel in the parking bays. With concerns regarding the

potential long-term durability of the car park, Leeds City Council approached Marshalls to discuss alternative solutions. The Council was keen to improve the design with a permeable paving system, particularly as the ground was susceptible to collecting water both from rainfall and run off from the road. At the same time however, it wanted to ensure that costs were controlled and kept within budget.



The nibs around the edge of each Piora block create voids so water can fall through into the sub-base



Colour can be used to differentiate parking bays

Solution

Marshalls carried out an assessment of the car park and established that the excavation depth could be made shallower than was originally planned. In doing so, this helped to reduce costs and enable permeable paving blocks to be installed on top of the subgrade.

A new plan was agreed and 10,000 sq m of Marshalls Piora permeable paving was supplied. Piora is an example of a Sustainable Drainage System (SuDS).

When rainwater falls onto the surface, it is allowed to pass through specially designed voids between the blocks and into a sub-base where it is stored until it either permeates into the ground, or is channelled away at a controlled rate.

Each block features a series of six patented Piora nibs around its edge, which interlock on eight separate faces in three different directions. These nibs create voids between the blocks through which water run-off percolates into the sub-base. The sub-base is composed of two types of tightly specified (but easily available) aggregate which offer excellent structural stability and also a high void ratio, which makes it ideal for storing volumes of water.

Because the infiltration rate of the bare earth was poor, Marshalls M380 Tanking Membrane was used to line the sub-base. Using the membrane effectively created a tank beneath the surface, from which the stored water could be slowly channelled away at a controlled rate.

As the ground was also classed as weak, Marshalls M15 Grid was also provided to improve the bearing capacity (or CBR) of the ground and stabilise the sub-base of the Piora system.

Benefits

Piora has provided Leeds City Council with a complete permeable paving system that mitigates flood risk, removes surface water and improves water quality - with the added benefit of a 10-year warranty. The designs of both the sub-base and the block will ensure that this large park and ride scheme will stand the test of time, offering maximum durability but with reduced maintenance.

Compared to the original design, the Piora has also resulted in a more pleasing aesthetic appearance, replacing the gravel that was proposed with high-quality, textured blocks.

Joe Malik, site engineer for Leeds City Council said: "This is the first time I've used the Piora drainage system and I'm very impressed, particularly with the final finish. Those who attended the formal opening of the park and ride, including many local dignitaries, have also praised its design and appearance."