2025

Leca®
SAINT-GOBAIN

BUILD

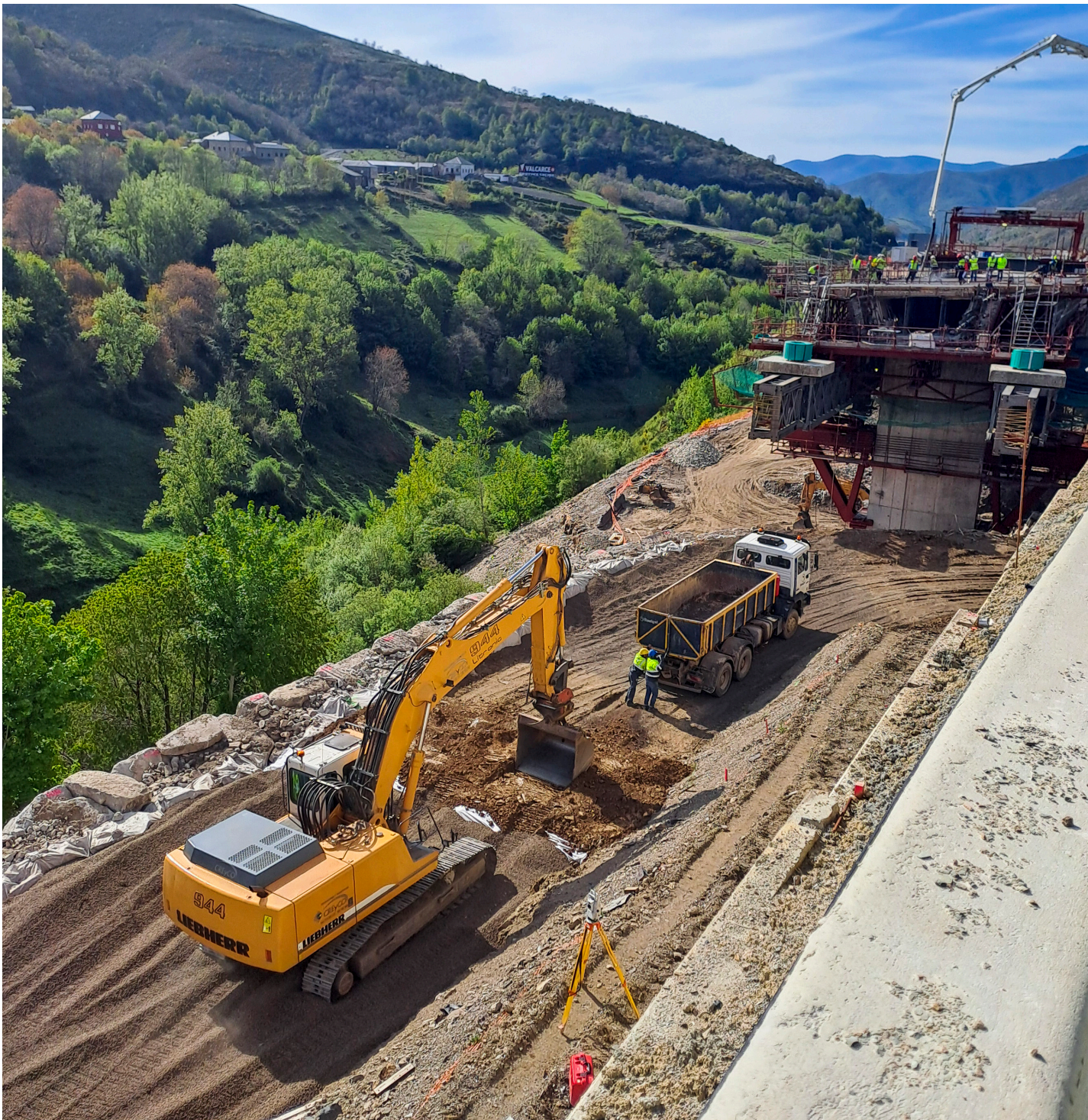
A MAGAZINE FROM LECA

Water Management

Housing

Infrastructure

1-2025



BUILD is a magazine published by Leca International
Cover: Reconstruction Of The El Castro Viaduct, Spain

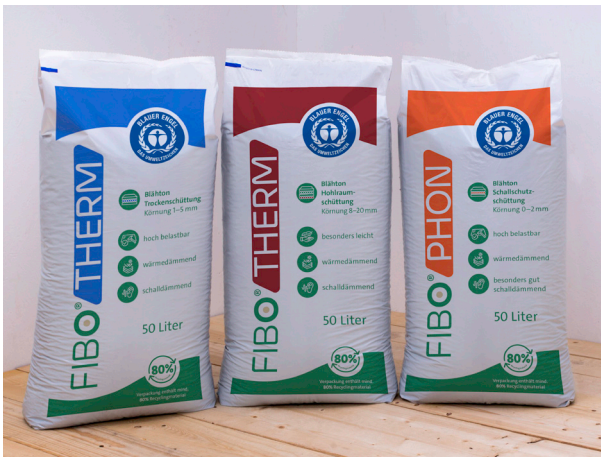
Flash Facts

New EPD Published for Leca® Reuse

Reusing building materials is one of the most effective ways to reduce emissions in the construction industry. Leca Finland has taken a big step forward with its recycled lightweight aggregate, Leca Reuse, and now, the product has a verified Environmental Product Declaration (EPD).

Made from reclaimed material, Leca Reuse is tested, CE-marked, and offers the same reliable properties as traditional Leca LWA – lightweight, load-bearing, and durable. The key difference? It has a significantly lower carbon footprint.

According to the new verified EPD, published for Leca Finland, the GWP (Global Warming Potential) for stages A1–A4 is just 8 kg CO_2-eq/m^3. That makes Leca Reuse a smart and sustainable choice for low-emission fills and infrastructure projects.



Recycled Content in Packaging: Balancing Ambition and Practicality

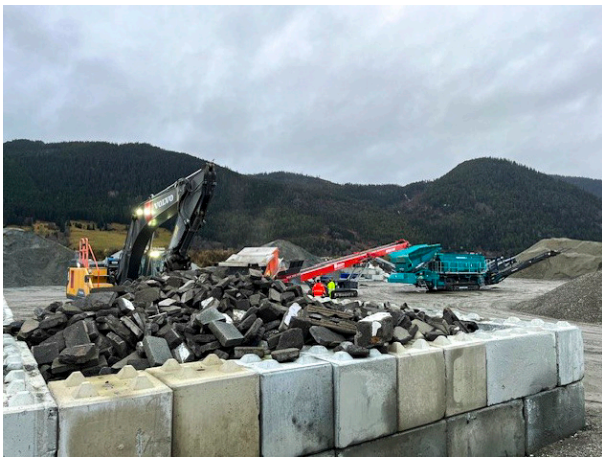
Packaging is more than just a wrapper. Even though it isn't part of the finished structure, it still affects a product's environmental footprint – both ecologically and practically. That's why Fibo Germany is gradually switching their lightweight aggregate packaging to films with a higher percentage of recycled content.

Up to 80% Recycled Content – Depending on Application

Currently, Fibo Germany uses films containing 30%, 50%, or 80% recycled material, depending on the application and the availability of suitable recyclates. Their goal is to further increase the recycled content – without compromising on stability, protection, or functionality. On-site packaging must be robust, weather-resistant, and easy to handle.

What's in the Film?

Fibo Germany uses recyclates made from polyethylene (PE), polypropylene (PP), or polyethylene terephthalate (PET), which are obtained through recycling processes from post-industrial or post-consumer waste. Using these materials helps reduce the need for raw plastic and supports resource conservation.

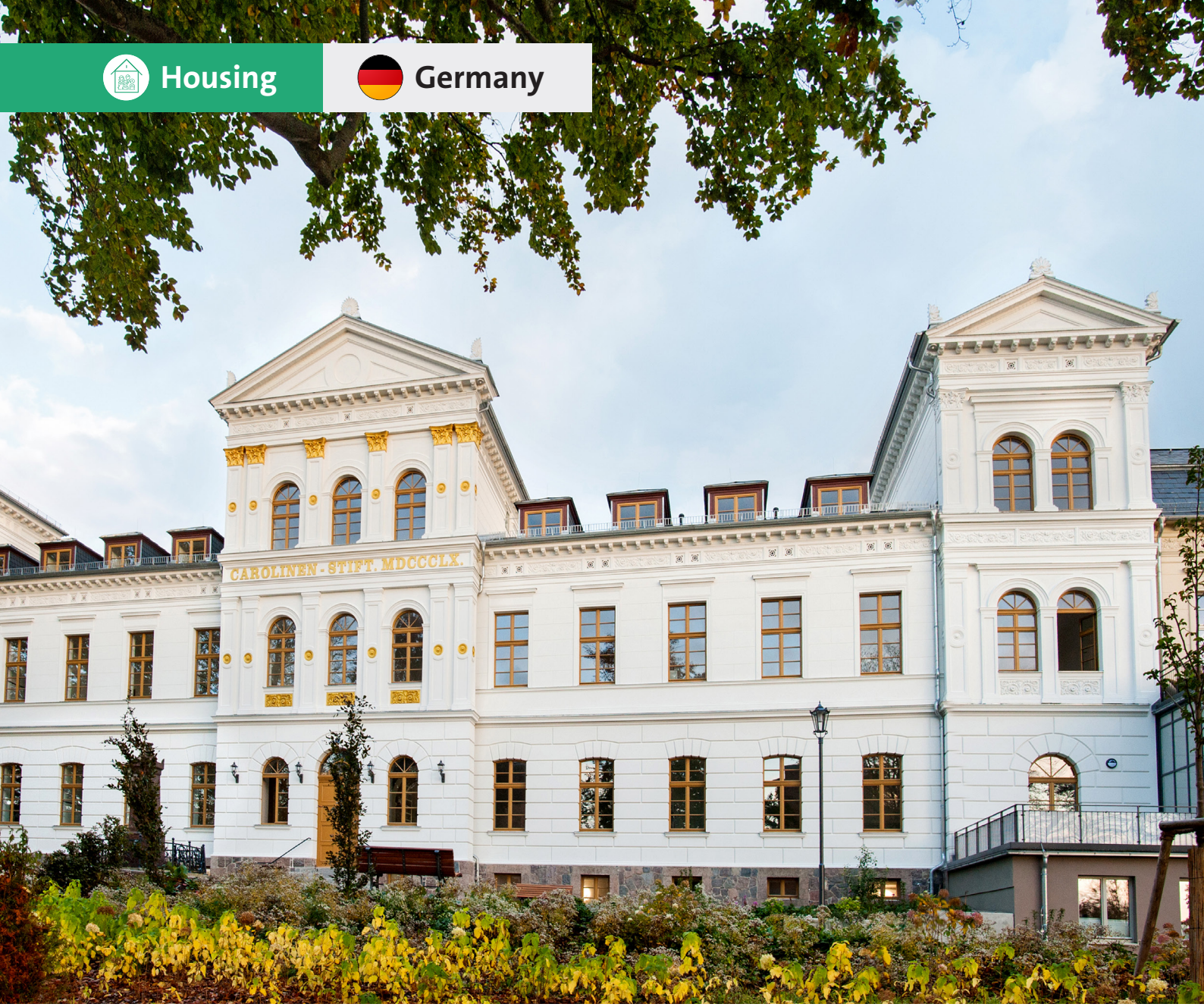


First reuse project for Leca Isoblock is ready and underway!

- In week 44 Leca Norway will start grinding the Leca bricks they have removed from the Leca Isoblocks from the demolition waste following the demolition of Tilaksveien 22 in Orkanger.
- The construction company Orkla Mardahl will use the crushed Leca bricks as an insulation layer under the elevated swimming pool to be built.
- 40 tonnes of originally hazardous waste have been turned into 35 tonnes of quality product.
- The waste is reused in a construction project approximately one km from where the Leca Isoblock waste originally comes from.

next STEP

Housing | Germany



The Carolinenstift directly at the harbor of Neustrelitz ©Neustrelitzer Wohnungsgesellschaft mbH

NEUSTRELITZ | EFFECTIVE FIRE AND SOUND INSULATION WITH FIBOBAU NE

The Carolinenstift, an old building with a castle-like façade, was built in 1860 in a prime location directly at the harbor of Neustrelitz. In 2010, neuwo (Neustrelitzer Wohnungsgesellschaft mbH) purchased the magnificent property and constructed a total of 45 apartments with modern amenities in the buildings. At the same time, this measure preserved the architecturally valuable appearance of the building for the city of Neustrelitz.

A Building With Major Structural Challenges

In earlier times, the building was used as a hospital. There were many doors and shafts. Some mortar joints had softened over the years, and the door lintels had only about one centimeter of bearing surface. The conversion and renovation work lasted many months and involved many trades from the region. Plastic and Styrofoam were not used in this project; instead, ecological building materials such as expanded clay were employed.

High Requirements For Fire And Sound Protection

The building was classified as building class five according to the state building code, which implies particularly high requirements for fire protection. The apartments therefore had to be adapted to current fire and sound insulation standards. For this purpose, the existing timber beam ceilings were statically reinforced and, to achieve better sound insulation, a total of 250 m^3 of bound fill was installed flush with the surface. The material was conveyed by screed pump up to the 3rd floor and horizontally over distances of up to 30 meters.

Building view.

PROJECT INFORMATION

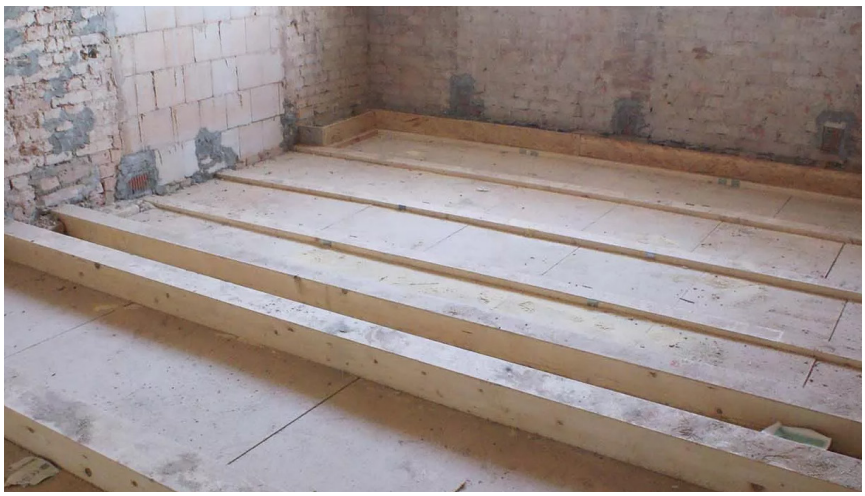
Client: Neuwo – Neustrelitzer Wohnungsgesellschaft mbH

Planner: Christian Peters, Freie Architekten & Ingenieure

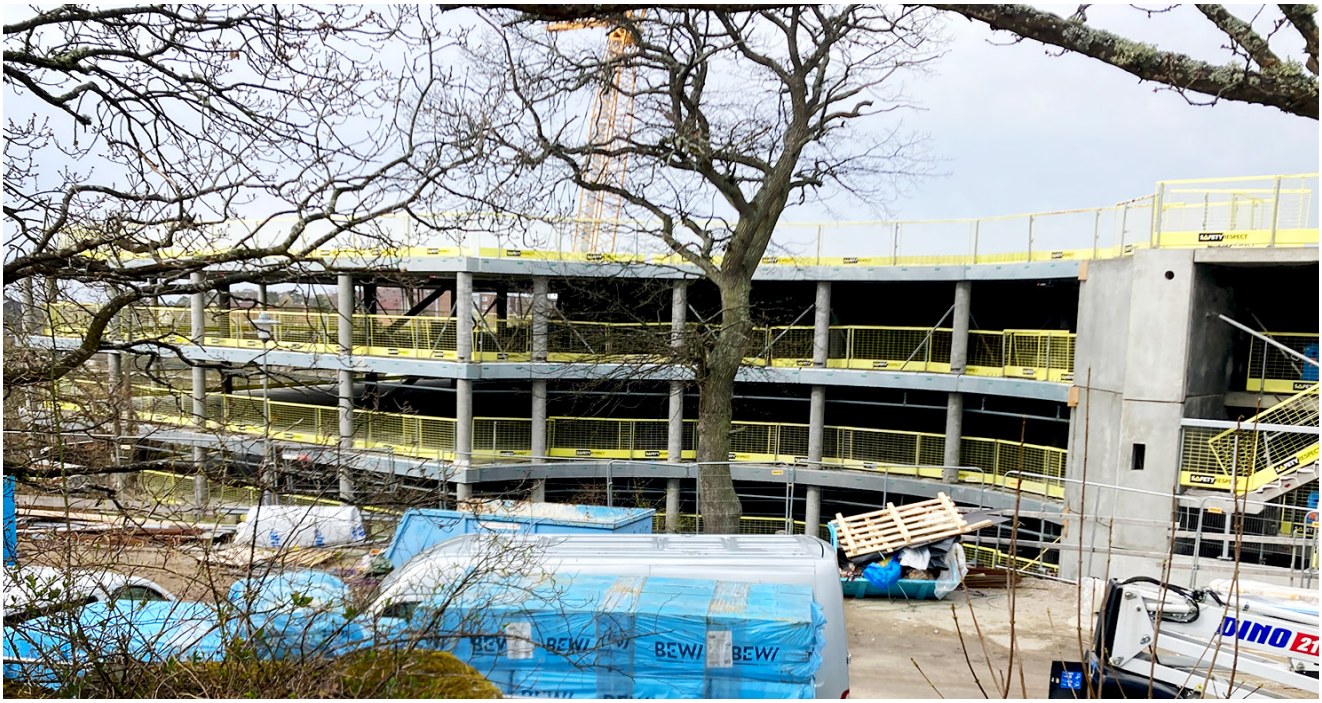
Contractor: FLEX Bau GmbH, Broderstorf

Area: Approx. 2,500 m^2

Leca product: 250 m^3 FIBOBAU NE in bound form



Timber construction



The parking structure was adapted to preserve the oak tree and protect local biodiversity.

LECA® LWA SOLVED GROUND CHALLENGES AT KARLSKRONA HOSPITAL'S NEW PARKING FACILITY

The construction of a new parking facility at Karlskrona Hospital turned out to be a complex project, involving both geotechnical and ecological challenges. But thanks to creative engineering and the use of Leca lightweight aggregate (LWA), the contractors managed to handle unpredictable ground conditions and establish a stable foundation.

Unexpected Ground Conditions Required New Solutions

Part of the parking structure is built below ground, with several semi-underground floors. Initial geotechnical investigations suggested the bedrock was close to the surface. However, excavation revealed the rock was significantly deeper in some areas—up to 9.5 meters—necessitating a new reinforcement strategy. Additionally, the rock was so fractured and weathered that it had to be secured to ensure safe working conditions.

LWA Backfilling Stabilized Weathered Rock

The original plan was to leave a gap between the building's foundation and the rock face. But the poor rock quality presented new risks.

"*The rock turned out to be very porous. After blasting and cleaning the rock, we could come back a week later and clear out just as much again*," says Anders Carlsson, CEO at Svensk Entreprenad.

To ensure stability, the team decided to backfill the space to support the weakened rock. Leca LWA was chosen for the job.

PROJECT INFORMATION

Project: Parking facility at Karlskrona Hospital

Client: Region Blekinge

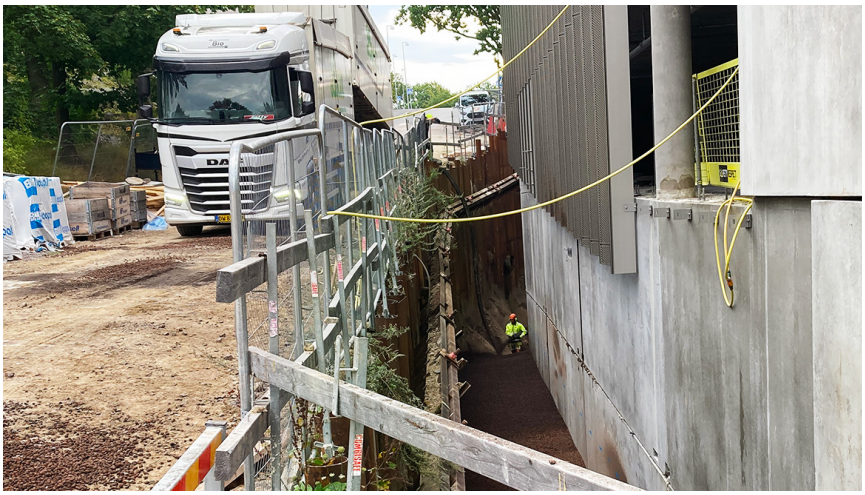
Investor: Svensk Entreprenad i Torsås AB (SEAB)

Main contractor: JSB Construction AB Krook & Tjäder

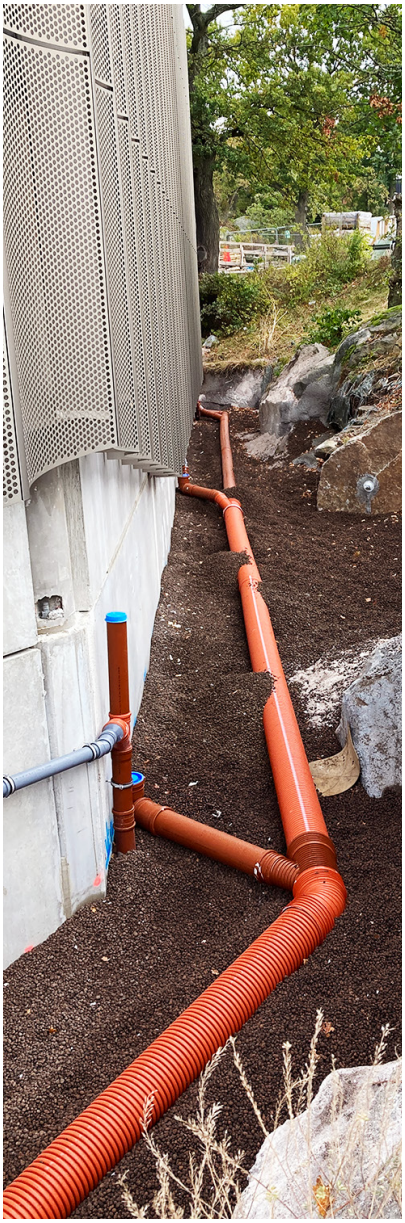
Architect: Krook & Tjäder

Location: Karlskrona, Blekinge

Leca product: Leca® LWA 10-20 mm



LWA is delivered by blowing to reach hard-to-access trenches at the parking structure.



Leca LWA is used as backfill to stabilize the porous rock next to the building.

"*We initially had to reinforce the rock temporarily to carry out the work. But once the Leca LWA was in place, it acted as permanent protection*," Carlsson explains.

To avoid excessive earth pressure on the wall, a lightweight fill was essential—making Leca LWA, with its low density, an ideal choice.

The conditions at the construction site meant that not only the material's properties were important—its delivery method was also a key factor in the choice of fill material.

Pneumatic Blowing Enabled Access

Just next to the hospital is a Natura 2000 protected area, home to several ancient oaks. These trees provide habitat for rare insects and fungi, including the highly protected hermit beetle, which likely resides in one of the oaks growing directly adjacent to the construction site.

To preserve the tree and its biodiversity, the design of the parking facility was adjusted to accommodate it—an important decision, but one that placed tight constraints on where construction and deliveries could take place.

Despite these limitations, the contractors developed safe and efficient workarounds. Pipes were used to direct material precisely into the excavation zones. And when it was time to deliver the Leca LWA, a ready-made solution for difficult-to-access areas was used: pneumatic blowing. Thanks to this method, the material was delivered directly into the fill zone, enabling efficient work with minimal waste.

"Leca® LWA Saves Time"

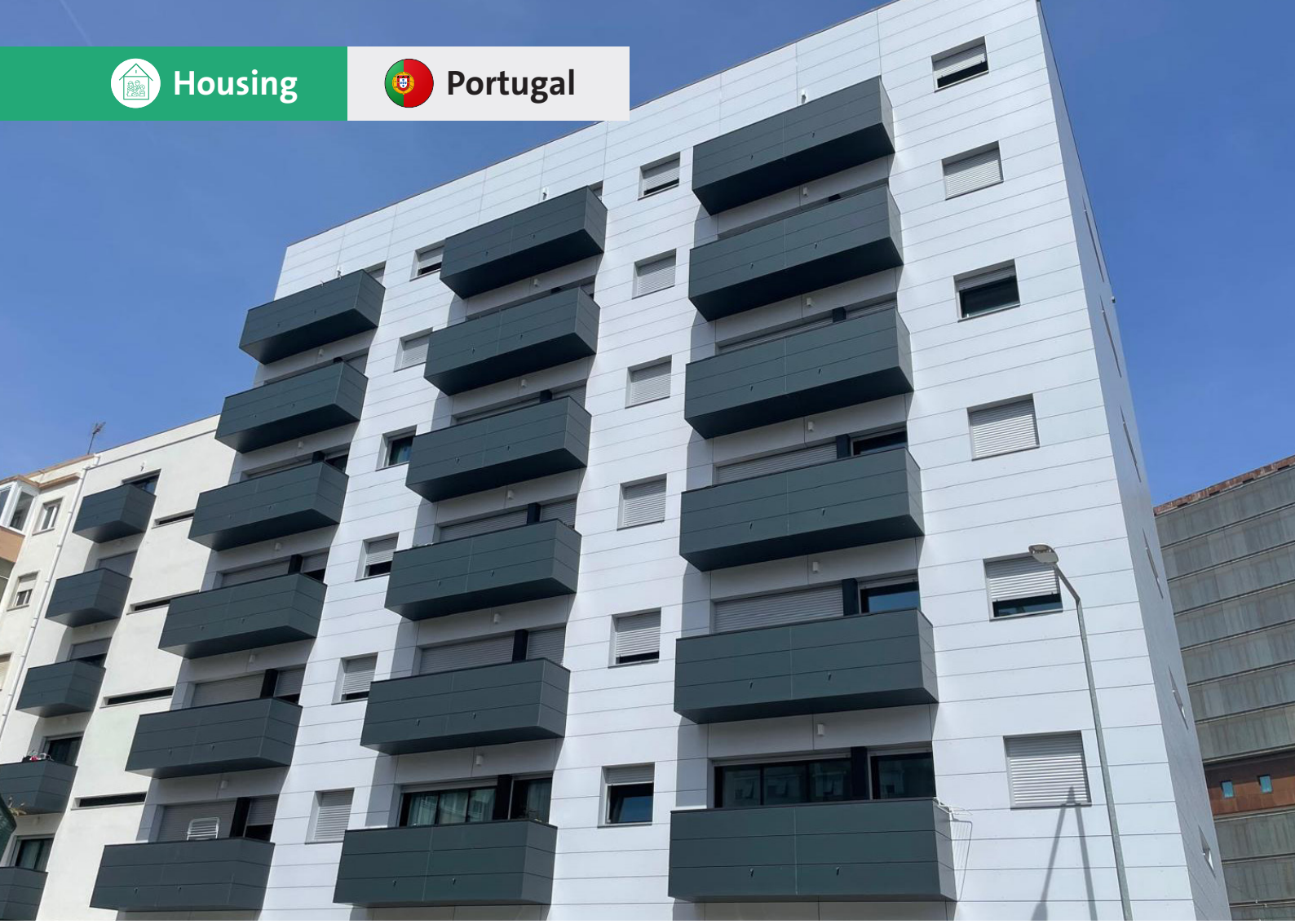
With careful planning and well-executed logistics, deliveries ran smoothly without delays.

"*We planned how many deliveries we could handle each day and stuck to that plan*," says Anders Jonsson, Sales Representative at Leca Sweden.

This was the first time the contractor worked with such a large volume of LWA—and the experience was a positive one.

"*In terms of production and timing, using Leca LWA saves time. It makes a significant difference. And from a work environment perspective, the blowing method is also very beneficial*," says Tomas Rundgren, Site Manager at Svensk Entreprenad.

Housing Portugal



LECA® UNO SUPPORTING MORE AFFORDABLE AND SUSTAINABLE HOUSING

In the city of Lisbon, a new affordable housing project has embraced Leca® Uno — a product that combines innovation, efficiency, and environmental responsibility. Located in Moscavide, this urban development reflects the municipality's investment in practical and sustainable housing solutions.

Leca Uno is a pre-mixed lightweight concrete that enables floor filling and levelling in a single application phase. This integrated method delivers significant savings in time, resources, and water, while ensuring high quality control—thanks to its factory-prepared, ready-to-use format, requiring only water to be added on-site.

PROJECT INFORMATION

Client: Lisbon City Council

Main contractor: NORCEP Construções S.A.

Installer: Pavifilips Pavimentos, Lda.

Leca product: 300 m³ of Leca® Uno applied for floor filling in the building

Technical Solutions Serving Housing Needs

The lightweight and versatile nature of Leca Uno made it an ideal choice for this residential building, which was designed with a focus on resource optimisation and meeting tight project deadlines.

On-site application provided:

- A reduction in execution stages, resulting in greater speed and safety
- Improved thermal and acoustic performance for living spaces
- A reduced structural load, without compromising comfort or durability

Beyond its technical strengths, Leca Uno also offers clear environmental benefits. It is produced using recycled industrial waste, reduces consumption of raw materials, and is packaged in recycled materials. Its streamlined logistics, which eliminate the need for storage, make it particularly effective for urban projects with limited space.

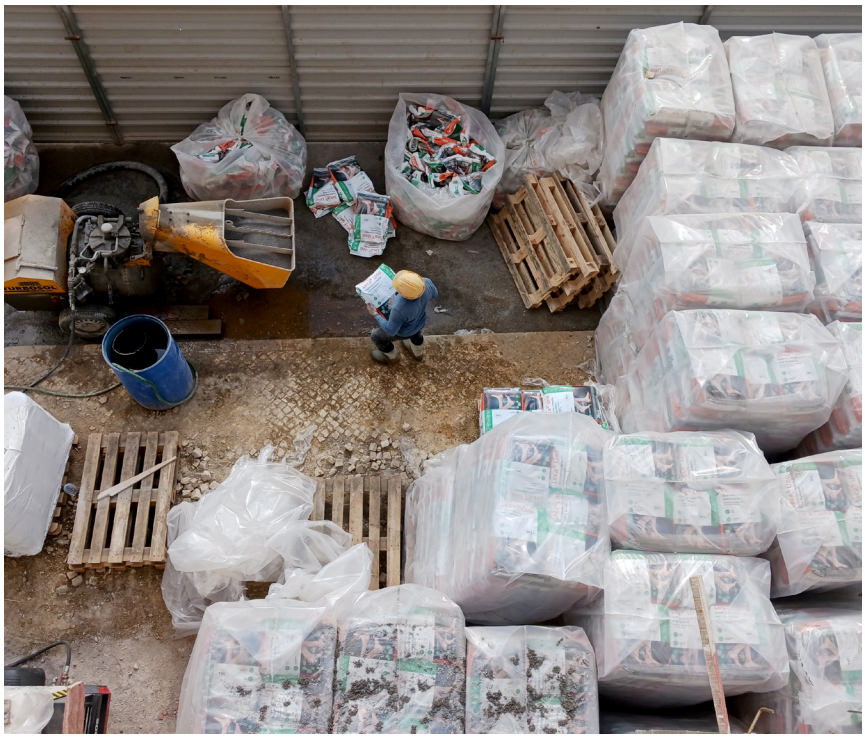
Affordable Housing with Social Impact

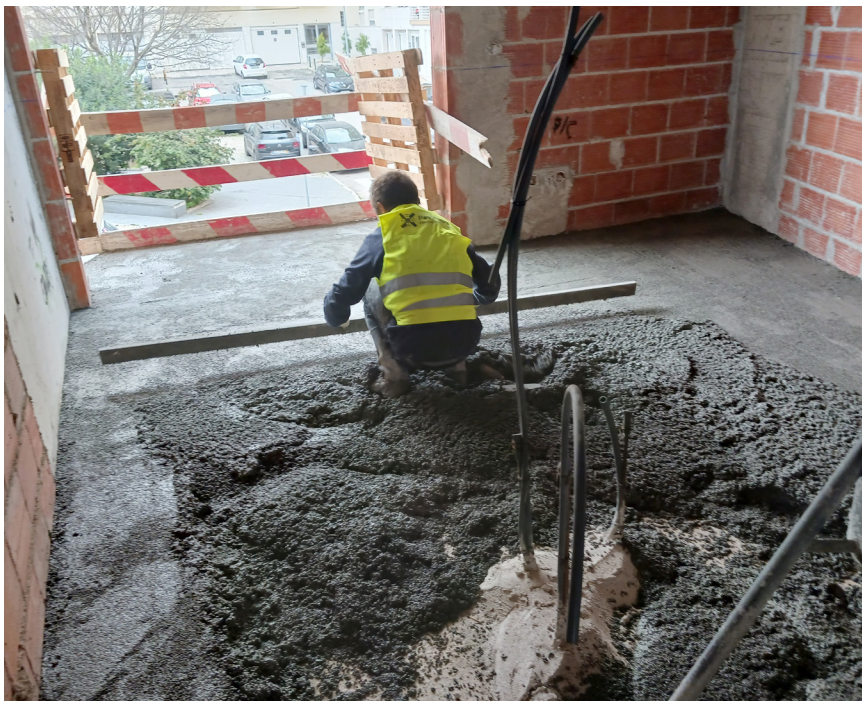
Promoted by Lisbon City Council, this project is part of Portugal's Recovery and Resilience Plan (PRR). It aims to provide housing for middle-income families who fall between social housing eligibility and the affordability of private market options.

The initiative is part of the Housing Access Support Programme, developed in collaboration with the Institute for Housing and Urban Rehabilitation (IHRU), local authorities, and other public bodies, with the shared goal of ensuring decent, accessible housing nationwide.

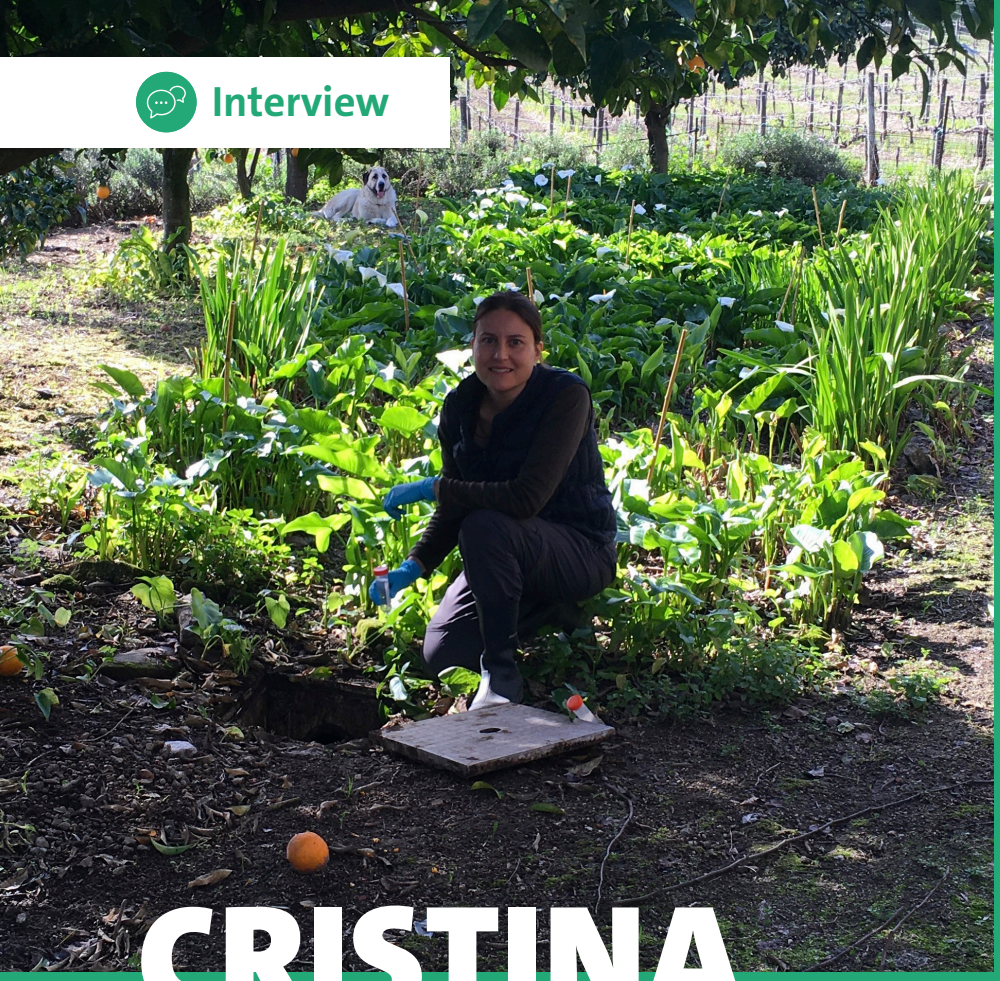
Leca® Uno: A Solution with Social Purpose

The use of Leca Uno in this project showcases the value of Leca renovation solutions in supporting modern, socially responsible construction. Combining efficiency, sustainability, and technical performance, Leca Uno plays an active role in delivering housing that has positive social and environmental impact.





Interview



CRISTINA CALHEIROS

"The future lies in smart, sustainable, and territory-integrated systems that not only better control rainfall but also promote greener and more resilient cities."

Cristina Calheiros is an Environmental Engineer with a PhD in Biotechnology. She is a researcher at the Interdisciplinary Centre for Marine and Environmental Research, coordinator of the Environmental Monitoring and Interpretation Centre (CMIA) of Vila do Conde, Portugal, Professor at the University of Saint Joseph – Macau/China and at the University of Porto, and Ambassador of the European Climate Pact. Her work focuses on the development of nature-based solutions to support territorial sustainability, as tools for climate change adaptation and mitigation, and for the delivery of ecosystem services. She is also dedicated to water and solid waste management and valorisation through phytotechnologies, grounded in circular economy principles, phytoremediation, environmental education, integrative productive practices, tourism, and rural development.

Can you share your experience with stormwater management projects, including nature-based solutions and constructed wetlands (fito-ETARs)?

I have been working in the field of water management with nature-based solutions for over 20 years. I began with the application of constructed wetlands (fito-ETARs) and have experience with different substrates, with expanded clay standing out due to its effectiveness and performance.

I have also used other nature-based solutions such as floating islands, applied in marinas, rivers, and lakes, not only for water treatment but also to support stormwater management and biodiversity promotion. I have focused on developing more sustainable green roofs and vertical gardens, considering materials, maintenance, drainage, water quality, and reuse, based on life cycle analysis.

These systems are essential in urban contexts to address climate change, manage risks, and support the energy transition. The projects I participate in, both nationally and internationally, integrate plants, microorganisms, and water as core elements, in collaboration with public, private, and academic entities.

I value working with the community, especially in schools, and consider international networking essential to keeping up with developments in the field.

What are the main current challenges in sustainable stormwater management, and which good practices are already required or should be further promoted?

Sustainable stormwater management faces growing challenges, mainly due to climate change, urbanisation, and soil sealing. To move forward, it is essential to have effective public policies, proper urban planning, and active involvement from society.

Extreme events such as heavy rainfall and prolonged droughts demand more resilient solutions

than traditional infrastructure. It is crucial to invest in proper drainage systems that allow for groundwater recharge and water reuse, rather than discharging directly into rivers or the sea. Diffuse pollution worsens with these events, carrying pollutants into water bodies.

Urbanisation exacerbates this issue by increasing soil sealing, flood risk, and biodiversity loss. Raising awareness among communities and ensuring effective regulation are key steps to addressing these challenges.

Good practices in stormwater management include the integration of nature-based solutions that help control water flow and reduce flooding, such as green roofs and walls, rain gardens, permeable pavements, and infiltration swales that help retain, filter, and infiltrate water into the soil; the implementation of rainwater harvesting and reuse systems for non-potable purposes, reducing the consumption of treated water; the creation of infiltration zones and aquifer recharge areas through green spaces and restoration of degraded areas; the adoption of regulations and incentives, such as mandatory permeability coefficients and requirements for retention and infiltration systems in new buildings; and the promotion of education and awareness to inform the public and businesses about the benefits of sustainable water management.

The application of the "sponge city" concept in urban contexts is key for sustainable stormwater management. The general objectives are to restore the city's capacity to absorb, infiltrate, store, purify, drain, and manage rainwater, and to regulate the water cycle as closely as possible to mimic the natural hydrological cycle.

Is the construction and engineering sector aware of these solutions or is there still resistance to their adoption?

The construction and engineering sector has been evolving in the adoption of more sustainable solutions for stormwater management, but challenges and some resistance remain. Some companies and developers see sustainable solutions as an added cost, without considering the long-term economic and environmental benefits, such as flood reduction and improved water quality.

Although some municipalities have regulations in place, the lack of clear requirements or financial incentives can discourage the adoption of innovative practices. Awareness is increasing, but implementation remains uneven. In large urban centres, innovative projects are already being implemented with a growing effort to integrate green infrastructure and sustainable drainage systems.

However, in many regions, conventional approaches still dominate. Regarding technical knowledge, although the number of professionals specialised in sustainability is growing and other fields are increasingly involved, more training is still needed for the effective and integrated application of these solutions. It is also essential that clients are informed and demand these approaches as added value in buildings.

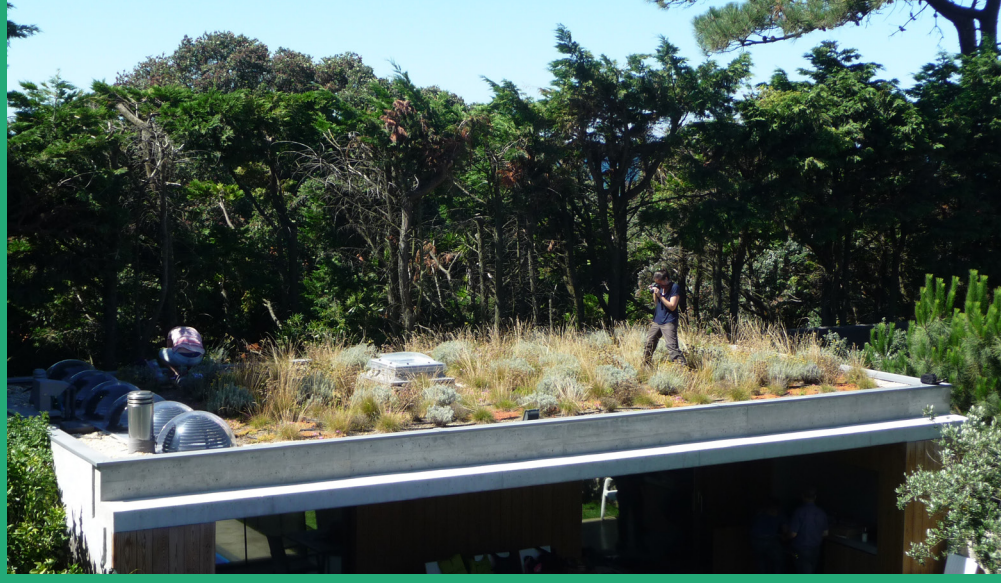
The trend is positive, with more stringent environmental and urban regulations pushing the sector to adapt, and with increased availability of efficient materials and techniques such as permeable pavements and modular stormwater retention systems. As the impacts of climate change intensify, the importance of resilient infrastructure is increasingly recognised.

The solution lies in complementing grey infrastructure with green infrastructure. Although the sector is moving in the right direction, there is still a long way to go before nature-based solutions are widely adopted.

In your opinion, what are the most effective solutions for stormwater management, from green roofs to sustainable drainage systems?

Effective stormwater management requires an integrated and holistic approach that combines multiple solutions adapted to the specific context of each area. In Portugal, we have diverse geography, regional climates, and a strong coastal influence, so each situation must be carefully analysed.

It is also essential to consider whether the solution is to be applied to existing buildings or planned



from scratch. The most effective solutions are those that manage water efficiently in terms of quality and quantity, are resilient to extreme events, and require low maintenance.

Nature-based solutions are particularly valuable because they are economically viable, offer environmental, social, and economic benefits, and help build territorial resilience. They are inspired and supported by nature and promote a wide range of ecosystem services through multifunctional approaches. Examples include green roofs, vertical gardens, constructed wetlands (fito-ETARs), infiltration swales, and rain gardens.

The aim is to implement strategic planning and combine decentralised but interconnected nature-based solutions to amplify, improve, and strengthen water management systems. We can have cities where water management begins at the rooftop, utilises façades and interior infrastructure, and connects to the ground level and aquifers.

How do you compare constructed wetlands (fito-ETARs) with other alternatives?

Constructed wetlands are nature-based solutions that mimic the biogeochemical processes of natural wetlands to purify water efficiently. They mainly use plants and microorganisms for water treatment while offering various ecosystem services. Their application must consider the type, quantity, and composition of the water to be treated, the target pollutants to remove, the end-use of treated water, or the receiving environment.

Compared to conventional solutions, constructed wetlands stand out for their low implementation costs, low energy consumption and operational costs, lack of need for specialised personnel, harmonious landscape integration, and additional services such as biomass valorisation and biodiversity promotion.

Their main challenges and limitations include greater space requirements—although next-generation systems are already more optimised in this regard—longer treatment times, and sometimes lower efficiency in removing specific industrial pollutants. Constructed wetlands are an excellent option for small communities, individual units, rural areas, or places prioritising sustainability.

However, they can also be considered in dense urban areas through hybrid solutions that combine conventional technologies with natural systems to enhance water treatment and even reuse rainwater.

What role does expanded clay play in rainwater treatment and retention? What advantages does it offer for these solutions?

Due to its lightness, porosity, and high absorption and drainage capacity, expanded clay is essential in rainwater treatment and retention, making it a valuable material in water management solutions.

It promotes infiltration, making it ideal for permeable pavements, green roofs, and rain gardens. It acts as a natural filter, removing impurities and pollutants, and retains water to release it gradually, reducing irrigation needs.

Its porosity supports biofilm development, improving water quality. Being natural, inert, and durable, it is an ecological and effective solution for rainwater management in both urban and rural contexts.

What kind of research and development is still needed to improve and expand the application of these solutions?

There is great potential to expand the use of expanded clay in sustainable rainwater management solutions. However, both applied and fundamental research, the development of targeted water management regulations, and cost-benefit strategies are needed to accelerate its adoption and ensure greater efficiency and durability of the systems.

Although expanded clay already offers many advantages, there are technological challenges and development areas that could be explored to enhance its efficiency and viability. These include optimising the structure and composition of expanded clay, for example through coatings that enhance pollutant adsorption and exploring different granulometries to balance water retention and drainage; integrating with other filtration and purification

technologies, such as hybrid systems using additional materials or even nanotechnology for selective pollutant removal; long-term studies on durability and efficiency; application in smart and digitally monitored infrastructure, such as embedding sensors in expanded clay-based retention and drainage systems to monitor parameters and pollutants in real-time, and developing predictive models for use in smart cities and flood control; improving manufacturing processes to make expanded clay more accessible and sustainable; and using alternative raw materials and industrial by-products in production to support circular economy integration.

Are there any emerging innovations that you find particularly promising for the future of stormwater management?

I find the following innovations particularly promising: smart permeable pavements using porous materials such as expanded clay, combined with sensors for real-time monitoring; modular reservoirs with reuse systems for efficient rainwater storage and reuse; the application of biotechnology, including the use of microalgae and biofilters with microorganisms to remove pollutants from collected rainwater; green roofs with optimised substrates for water management, both retention and release, and biodiversity promotion; the integration of artificial intelligence in water management using predictive models to forecast rainfall and suggest retention and drainage strategies; the use of hydrogels for water retention—when combined with drainage layers, including expanded clay, they can enhance gradual water release; and nature-based drainage solutions promoting urban integration for water absorption, purification, and increased city resilience.

The combination of innovative materials, digital technology, and nature-based solutions is transforming rainwater management. The future lies in smart, sustainable, and territory-integrated systems that not only better control rainfall but also promote greener and more resilient cities.

What are your key recommendations for those looking to implement an efficient stormwater management system?

My main recommendations are to conduct a thorough site assessment, including a hydrological and topographic study, analysis of average precipitation, soil type, and identification of flood or erosion risk zones.

The system should complement existing drainage networks, sewers, and natural systems, so the possibility of integration with current infrastructure must be assessed. Above all, it is important to clearly define the main objectives of the system implementation to strategically size it accordingly.

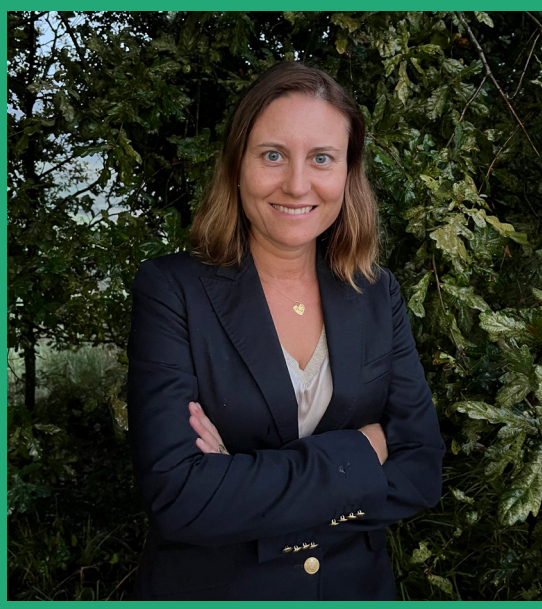
Current regulations and standards must always be verified. The systems implemented should be certified and comply with official technical guidelines and standards for the intended function.

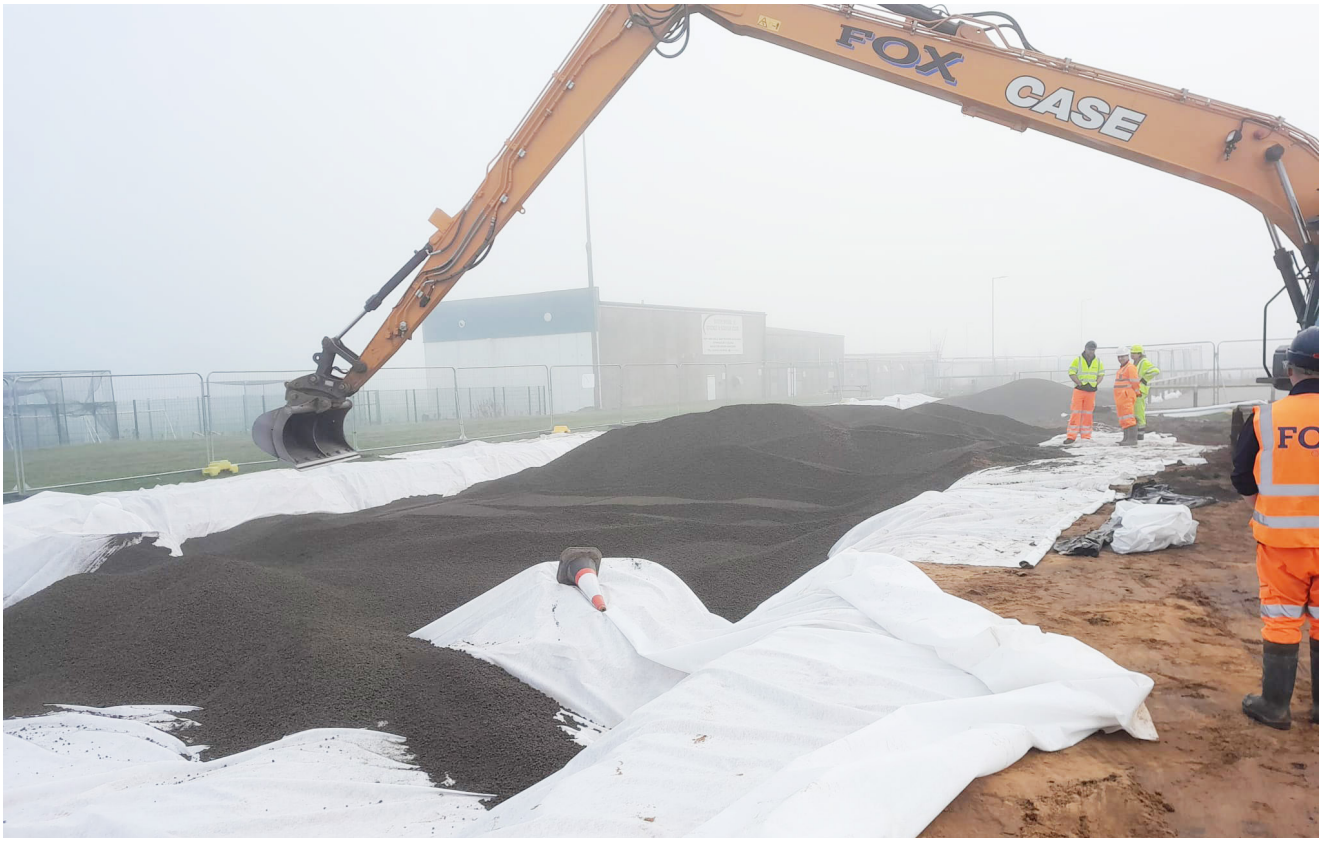
How can Leca and Saint-Gobain contribute to promoting nature-based solutions such as green roofs and efficient stormwater management? What kind of support or collaboration is essential to drive these solutions within the construction sector?

One way to promote and implement nature-based solutions is through the development and innovation of expanded clay-based products—for example, improving lightweight substrates for green roofs to enhance drainage, water retention, and plant establishment, or designing efficient water retention and infiltration solutions such as bioretention systems and underground water reservoirs.

On the technical support side, the creation of best practice manuals, digital tools for designing and sizing sustainable systems, and professional training are key to promoting the application and benefits of nature-based solutions. It is also important to establish partnerships and pilot projects, and support initiatives related to sustainable construction.

To drive these solutions in the construction sector, I believe a collaborative model is essential bringing together companies, universities and research centres, government, the private sector, and industry associations. Sharing knowledge, combined with financial and regulatory incentives, can accelerate the adoption and promotion of these solutions.





BLACKPOOL ROAD PROJECT UTILISES OVER 5000 M³ OF LECA® LWA FOR GROUND STABILITY

A major new road development is set to connect Amy Johnson Way and Common Edge Road, tackling the challenges of soft coastal ground. To ensure a stable and durable foundation, over 5,000 m³ of Leca Lightweight Aggregate (LWA) was specified for the project.

Project Overview

A new road development project has been launched to connect Amy Johnson Way and Common Edge Road in Blackpool, Northwest England. Due to the site's proximity to the sea, the area presents soft ground conditions, posing significant challenges for construction. To address these challenges, over 5,000 m³ of Leca LWA has been specified to enhance ground stability and support the required infrastructure.

Civil Engineering specialists George Cox & Sons LTD were appointed as the main contractors for the project, overseeing the construction and implementation of the new road development.

PROJECT INFORMATION

Project: Blackpool Highway Construction

Main contractor: George Cox & Sons LTD

Client: UK Government

Leca product: Leca® LWA (10-20mm)

Project Scope and Objectives

The primary aim of this development is to improve connectivity and facilitate the construction of new business units, thereby contributing to economic growth and job creation on the Fylde coast.

The road will originate from Amy Johnson Way, situated between Multi-Ply and Seneca House, and traverse the old Common Edge playing fields before joining Common Edge Road, just north of South Shore Cricket Club and opposite Lytham St Annes Garden Centre.

Additional Works Include:

- Widening Common Edge Road to accommodate increased traffic flow.
- Demolishing a house on School Road to allow for junction widening.
- Modifying the intersection of Common Edge Road and School Road.
- Creating an access road connecting Oakwood Close to the new route.
- Implementing designated lanes for traffic entering the new road.

Leca LWA was chosen as a lightweight fill material, significantly reducing load-induced settlement.

The presence of soft ground made conventional construction methods unsuitable for the project.

Challenges and Engineering Solutions

The presence of soft ground made conventional construction methods unsuitable for the project. To mitigate these issues, Leca LWA was chosen as a lightweight fill material, significantly reducing load-induced settlement and providing a stable foundation for the highway. This innovative approach enhances soil stability while maintaining structural integrity, ensuring long-term durability for the new road.

Conclusion

The strategic use of Leca LWA has played a crucial role in overcoming soft ground conditions, enabling the successful construction of this essential infrastructure project. Upon completion, the new road will enhance regional connectivity, support business growth, and improve transportation efficiency, all while minimising traffic disruption and ensuring long-term sustainability for Blackpool's transport network.

Infrastructure | Norway

LECA® LWA INSTALLED INSIDE HESTNESTUNNELLEN FOR SUPERIOR DRAINAGE & FROST PROTECTION

Leca Norway is supplying 3,000 m³ of Leca Lightweight Aggregate (LWA) for Hestnestunnellen, part of the major InterCity project Kleverud - Sørli - Åkersvika. This is an important development for future rail transport between Oslo and Hamar, where 30 km of new double rail track will be built. The project is a turnkey contract and Leca LWA is used in the tunnel to ensure drainage, frost protection and the fire water system in the trenches.

Svein Olav Barikmo from Leca and Operations Manager Thomas Storlien from Veidekke inside Hestnestunnellen.

Innovative Solutions Reduce Greenhouse Gas Emissions

Hestnestunnellen, being built by Veidekke for Bane NOR, is a 3.1-kilometre-long rock tunnel that will improve capacity and reduce travel time between Oslo and Hamar. The tunnel is part of a groundbreaking environmental project where innovative methods have reduced concrete consumption by 80%, equivalent to 70,000 m^3 of concrete and a CO_2 reduction of 15,000 tonnes. As a result, the project won Veidekke's Scandinavian Environmental Award for 2024.

Leca® LWA - A Sustainable Solution For Tunnelling

Leca Norway will deliver Leca LWA using the pneumatic blowing method, which makes it possible to transport and place the material quickly and efficiently in the tunnel.

This solution contributes to:

- Low weight: Reduces the load on the tunnel structure
- Efficient drainage: Ensures that water is channelled away from the tunnel infrastructure
- Frost protection: Protects water and fire water systems from freezing
- Easy installation: Blows directly into place, saving time and labour
- Sustainable: 100% reusable and produced with a low carbon footprint

PROJECT INFORMATION

Project: InterCity project Kleverud

Client: Bane NOR

Main contractor: Veidekke

Leca product: Leca® LWA 10-20mm

Visit The Construction Site

To get a closer insight into the project, Leca Norway recently visited the Tunnel at Espa. Operations Manager Thomas Storlien from Veidekke welcomed us, drove us into the tunnel and gave a thorough review of the project's progress and innovative solutions. It was particularly interesting to hear about how systematic pre-injection has made it possible to reduce the need for traditional water and frost protection.

An Important Project For The Future Of Transport

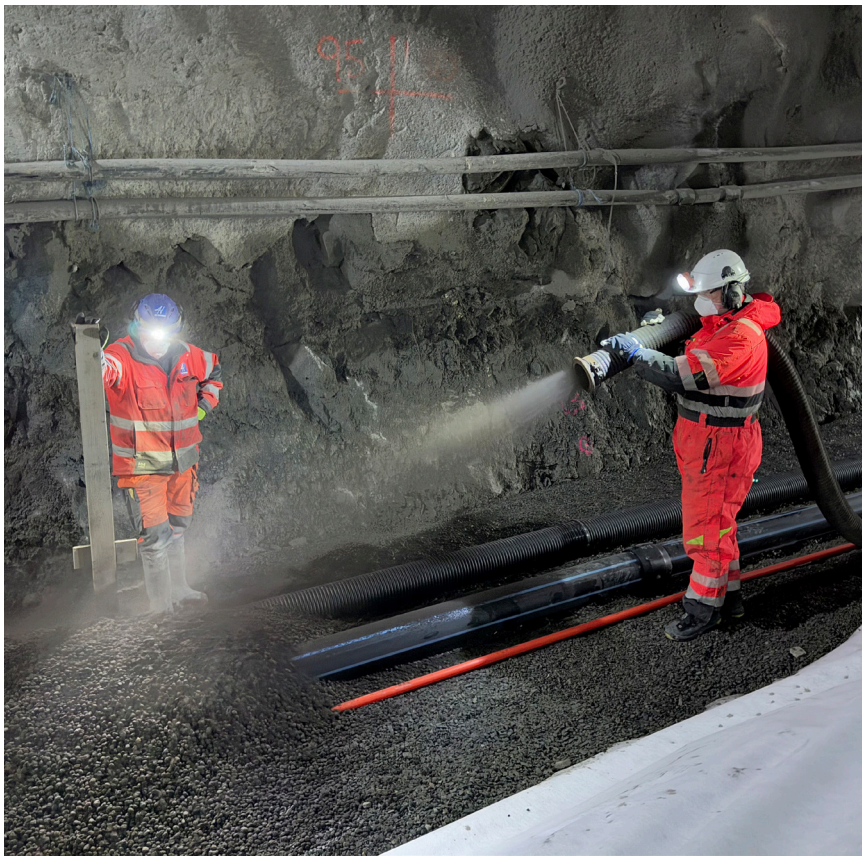
Hestnestunnellen is a key element in the development of a more efficient and climate-friendly railway network in Norway.

When the double track is completed, it will provide:

- Shorter journey times between Oslo and Hamar
- More passenger trains per hour in both directions
- Increased capacity for climate-friendly freight transport
- Reduced emissions through innovative construction methods

Leca Norway is proud to contribute to a project that combines efficiency, sustainability and future-oriented infrastructure. We look forward to following the development further and continuing our co-operation with Veidekke and Bane NOR.

Leca LWA is blown into place in Hestnestunnellenen. Efficient and precise laying ensures good drainage and frost protection around the pipes in the trench.



Infrastructure

Finland

The newly built Puotila school provides a sustainable and spacious setting for students.

A RELIABLE SOLUTION FOR SCHOOL CONSTRUCTION LIGHTWEIGHT FILL

A multi-purpose school building was constructed in the Puotila district of Helsinki, providing facilities for over 500 primary school pupils and 70 preschoolers. Local community groups also use the building during evenings and weekends.

The project was carried out by the Finnish construction company Lujatalo Oy using a lifecycle model, covering the design, construction, and 20 years of maintenance and upkeep. The City of Helsinki commissioned the school, which was completed and taken into use in autumn 2022.

In the design process, energy efficiency and low carbon footprint were key considerations. More than 15% of the building's energy comes from renewable sources, including rooftop solar panels and a geothermal heating system. The architectural design was led by Verstas Arkkitehdit, a Finnish firm known for designing several school buildings in the country.

PROJECT INFORMATION

Project: Lightweight fill at Puotila School courtyard

Client: City of Helsinki

Main contractor: Lujatalo Oy

Earthworks contractor: TekniRak Oy

Leca product: Leca® LWA 4–32 mm

Over 2,000 m³ of Leca LWA was used for the lightweight fills at Puotila School.

Challenging Ground Conditions Called For A Dependable Solution

The school's site had soft clay soil, a common condition in the Helsinki area, made more complex by the demolition of the old school building. To ensure stability, the new building was founded on piles, and significant soil replacement was carried out. Lightweight fills were used to reduce ground pressure, particularly around the building's perimeter and above underground water and sewer lines.

Originally, foam glass was specified for the lightweight fills. However, TekniRak Oy, the earthworks contractor, proposed switching to Leca LWA. *"The deciding factor was delivery reliability,"* explains Tero Pynnönen, Site Manager at TekniRak Oy. *"There had been issues with the availability of the alternative material, but Leca LWA deliveries arrived right on schedule."*

Leca LWA was already familiar to Pynnönen. *"About ten years ago, we used Leca LWA for parking area fills in Vantaa. The material is lightweight, easy to handle, and performs well,"* he notes.

On-Time Deliveries Ensured Smooth Workflow

Over 2,000 m³ of Leca lightweight aggregate (LWA) was used for the lightweight fills at Puotila School. The material was delivered directly from Leca Finland's Kuusankoski plant and unloaded straight into the excavation site, eliminating the need for on-site storage.

"Urban construction sites don't have space to stockpile materials. Deliveries must arrive exactly when needed," Pynnönen emphasizes. *"We received up to 300 cubic metres per day with just two trucks. That amount of Leca LWA covers a large area quickly."*

Lightweight fill reduces ground pressure around the building and utilities.

Infrastructure

Poland

LECA® LWA ENABLES THE COMPLETION OF A BICYCLE PATH CONSTRUCTION

In June 2021, the Marshal's Office of the West Pomeranian Voivodeship signed an agreement to complete the construction of a section along the Chełszcząca River and Lake Dąbie. This near 23-kilometre stretch is part of the popular 300-kilometre Route Around the Szczecin Lagoon, and also a key segment of the Blue Velo trail – which runs from the seaside to the south of Poland. The 2.5-metre-wide path runs along the crest of a flood embankment, through green areas, offering views of the vast waterbody, flocks of birds, and charming wild beaches.

Challenging Construction Conditions

The construction works involved both improvements to an existing 14-kilometre section of the route, and the preparation of a new segment approximately 8 kilometres long. The project posed a significant challenge due to difficult soil conditions and the subsidence of the flood embankment over a 2-kilometre stretch.

It was necessary to develop a supplementary design and reach an agreement with the Polish Waters National Water Management Authority, which owns the embankment crown. The long-awaited completion of the investment came after 22 months of work, in April 2023.

PROJECT INFORMATION

Structure: Flood embankment along the Chełszcząca River and Lake Dąbie

Location: Szczecin Dąbie

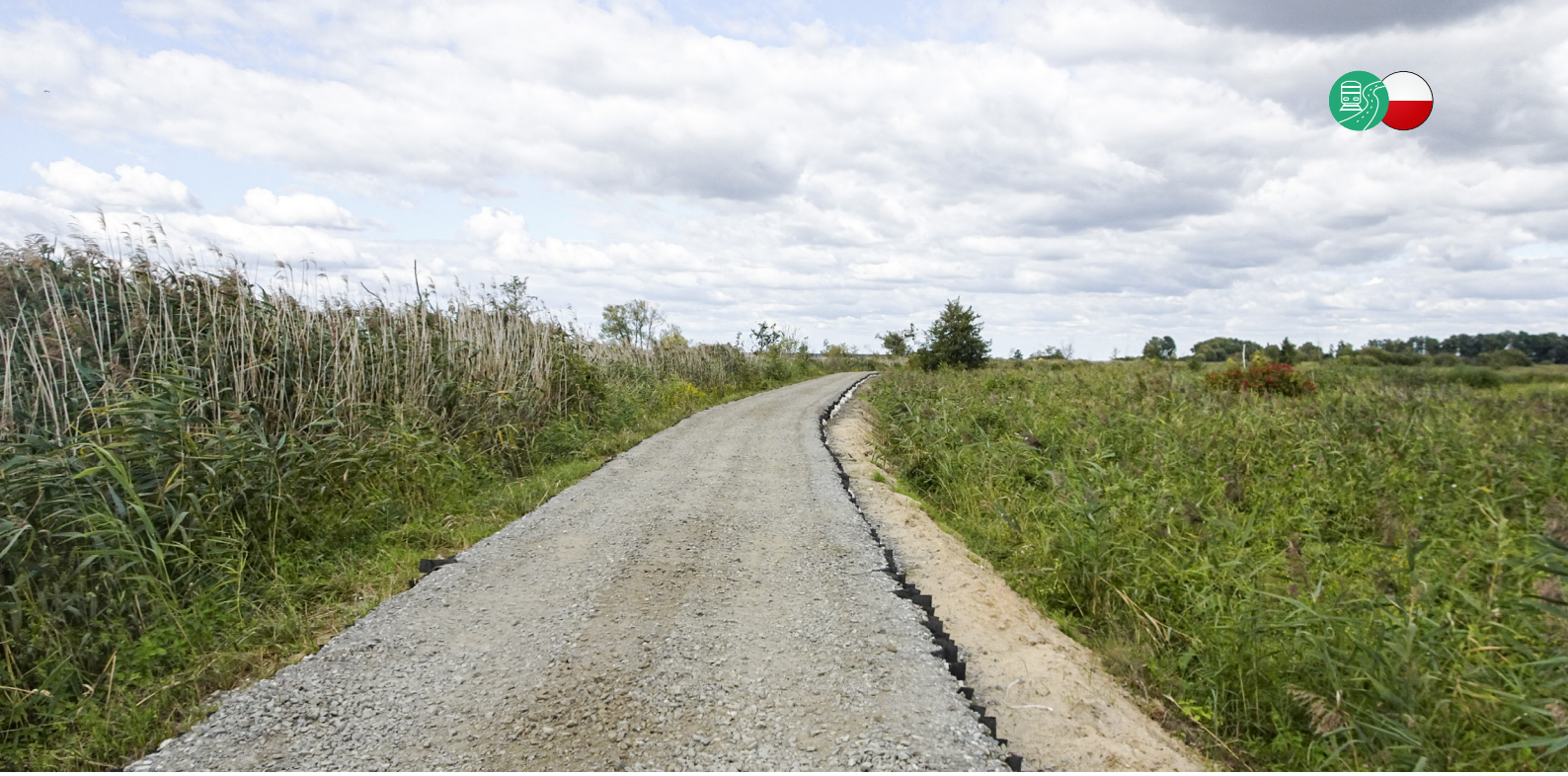
Design: DiM Ryszard Kowalski

Geotechnical design: Geotechnika Jerzy Rzeźniczak

Contractor: KRISTONE, Krystian Suda

Construction date: 2022

Leca product: 2,500 m³ of Leca® LWA GEOTECHNICAL 8/10-20 RX

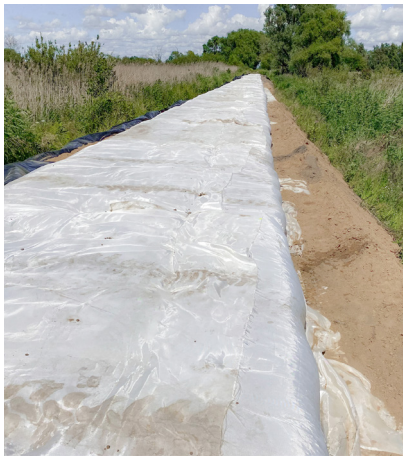


Leca LWA Geotechnical 8/10-20 RX is several times lighter than natural aggregates or soil.

Problem Description

The construction of a pedestrian and bicycle path on the existing flood embankment along the Chełszcząca River and Lake Dąbie in Szczecin aimed to provide a safe and comfortable space for cyclists, pedestrians, and active recreation enthusiasts, while simultaneously serving as flood protection for the adjacent areas.

The project assumed the bicycle route would be positioned at an elevation of 1.85 meters above sea level, with the embankment crown width set at 3.5 meters. Analysis of the longitudinal cross-section of the planned route revealed that the current elevations of the embankment crown varied significantly, most often falling below the designed elevation. The depressions ranged from 20 to 49 cm, while the width of the embankment crown ranged from 3.5 meters to as narrow as 2.3 meters. The primary cause of these variations was the settlement of the structure due to the presence of weak organic soils in the area.

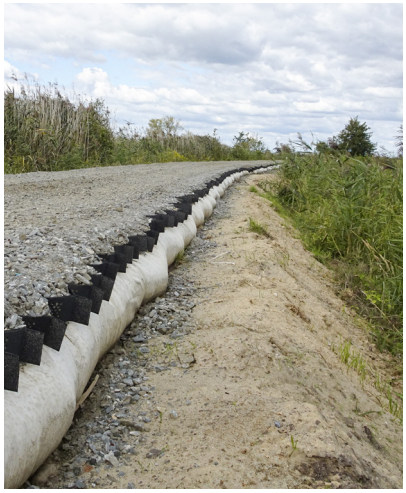


Structural fill in the form of "mattresses" made of lightweight expanded clay aggregate wrapped in geosynthetic fabric

Solution

Due to the previously described challenging soil conditions and the risk of excessive settlement, Leca LWA was used to raise and widen the embankment crown. Leca LWA Geotechnical 8/10-20 RX is several times lighter than natural aggregates or soil, which significantly reduces load and, consequently, minimises settlement.

The structure was designed and constructed using “mattresses” made of expanded clay aggregate wrapped in geosynthetic fabric. The embankment slope and the substructure of the embankment crown were built with 40 cm thick mattresses. On top of this, a 20 cm layer of 0–31.5 mm aggregate was laid within a geogrid to form the surface.

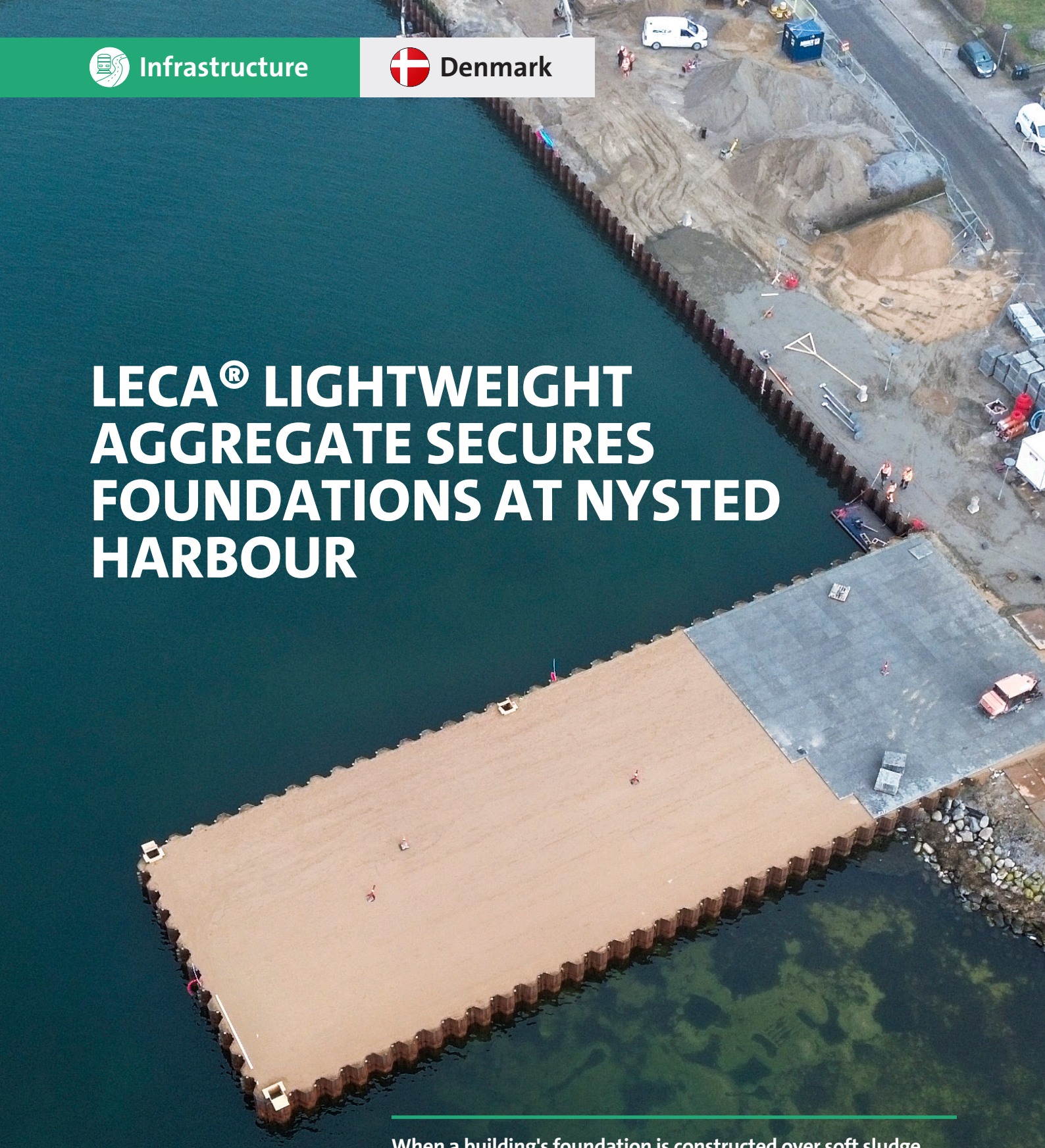


Next, a 20 cm thick surface layer made of 0–31.5 mm aggregate was laid within a geogrid.

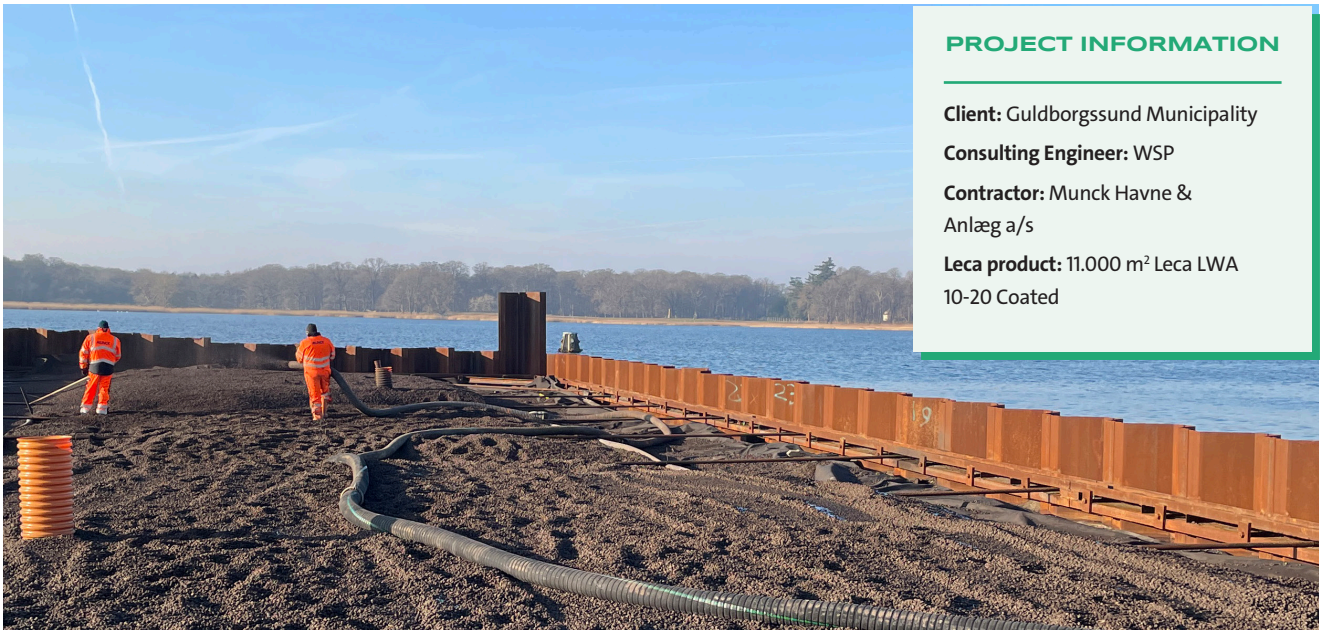
Infrastructure

Denmark

LECA® LIGHTWEIGHT AGGREGATE SECURES FOUNDATIONS AT NYSTED HARBOUR



When a building's foundation is constructed over soft sludge deposits, a lightweight and stable backfill is essential to minimise the risk of settlement. For this reason, the project consultant specified lightweight fill in the construction of a sheet pile cell at Nysted Harbour. Munck Havne & Anlæg selected Leca Lightweight Aggregate (LWA) as the optimal solution—offering both technical benefits and economic value.



PROJECT INFORMATION

Client: Guldborgssund Municipality

Consulting Engineer: WSP

Contractor: Munck Havne & Anlæg a/s

Leca product: 11.000 m² Leca LWA 10-20 Coated

Leca LWA properties make it ideal for port construction.

Why Leca® Lightweight Aggregate?

Leca LWA was chosen thanks to expert guidance, efficient delivery, and greater cost-effectiveness compared to alternatives such as cellular glass. Its low self-weight was critical in reducing load on the substrate, helping to ensure a stable and durable structure.

Efficient Delivery and Installation

A total of six loads of Leca LWA were delivered, with each load containing 100 m³ of material. To optimise placement, the aggregate was pneumatically blown through an extra-long hose—allowing even distribution of 100 m³ of material in just 2 to 2.5 hours, with only two operatives needed.

This method offered a clear advantage over traditional excavator placement, which would have been difficult due to the site's soft fill conditions.

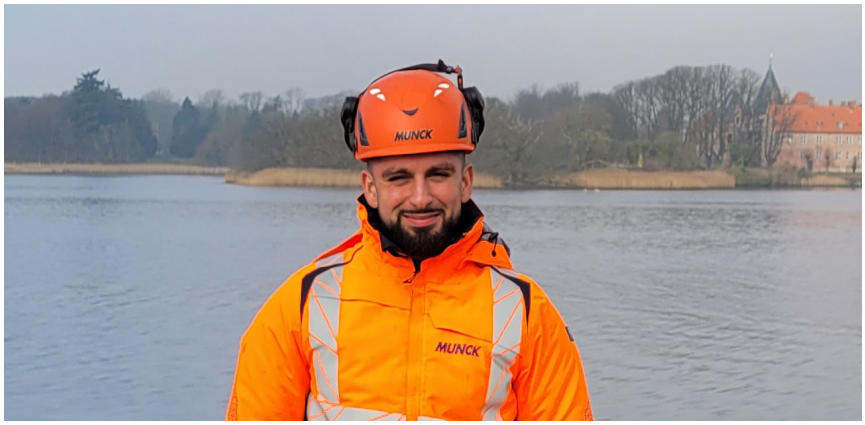
Strong Communication and Positive Collaboration

Artin Pakravan, Project Manager at Munck Havne & Anlæg, praised the cooperation with Leca Danmark: *"The communication has been extremely satisfactory. Leca made a strong effort to ensure a positive customer experience."*

The team at Munck Havne & Anlæg was highly satisfied with the project's execution and sees Leca LWA as a preferred solution for future works requiring lightweight aggregate.

About the Project Manager

Artin Pakravan, 25, joined Munck Havne & Anlæg in September 2023. He finds harbour and port projects particularly rewarding due to the varied technical disciplines involved—ranging from earthworks and foundations to concrete works and paving. These projects demand strong collaboration and problem-solving skills, which he values greatly.



This is the first time Artin Pakravan has worked with Leca LWA, but it certainly won't be the last.

Infrastructure

Spain

SMART FILLING WITH LECA® LWA: STABILITY AND SPEED IN THE RECONSTRUCTION OF THE EL CASTRO VIADUCT

Following the collapse of the El Castro viaduct on Spain's A-6 motorway, urgent reconstruction demanded speed, safety, and stability. Over 8,000 m³ of Leca Lightweight Aggregate (LWA) was used to create stable working platforms for deep piling in steep, geotechnically complex terrain.

The collapse of a viaduct is one of the most critical scenarios civil engineering can face. When such an event affects a key infrastructure like the Autovía del Noroeste (A-6)—which handles over 18,000 vehicles daily and plays a vital role in connecting Castilla y León with Galicia—the technical and logistical challenges escalate significantly.

This was the case with the El Castro viaduct, where the collapse of spans 1 and 2 of the A Coruña-bound carriageway in June 2022 required an immediate response. In this emergency context—marked by the need to act with speed, safety, and precision—it was decided to demolish the remaining structure and rebuild two new independent viaducts, supported by deep foundations and built under extremely demanding geotechnical conditions.

Leca® LWA Enables Safe Piling Platforms in Challenging Terrain

One of the key elements of the intervention was the use of Leca LWA as a technical solution to create safe and stable working platforms on which to execute the piles for the new piers. Over 8,000 m³ of this lightweight material were used to facilitate operations in a steeply sloping environment, with difficult access and geological conditions posing significant stability risks.

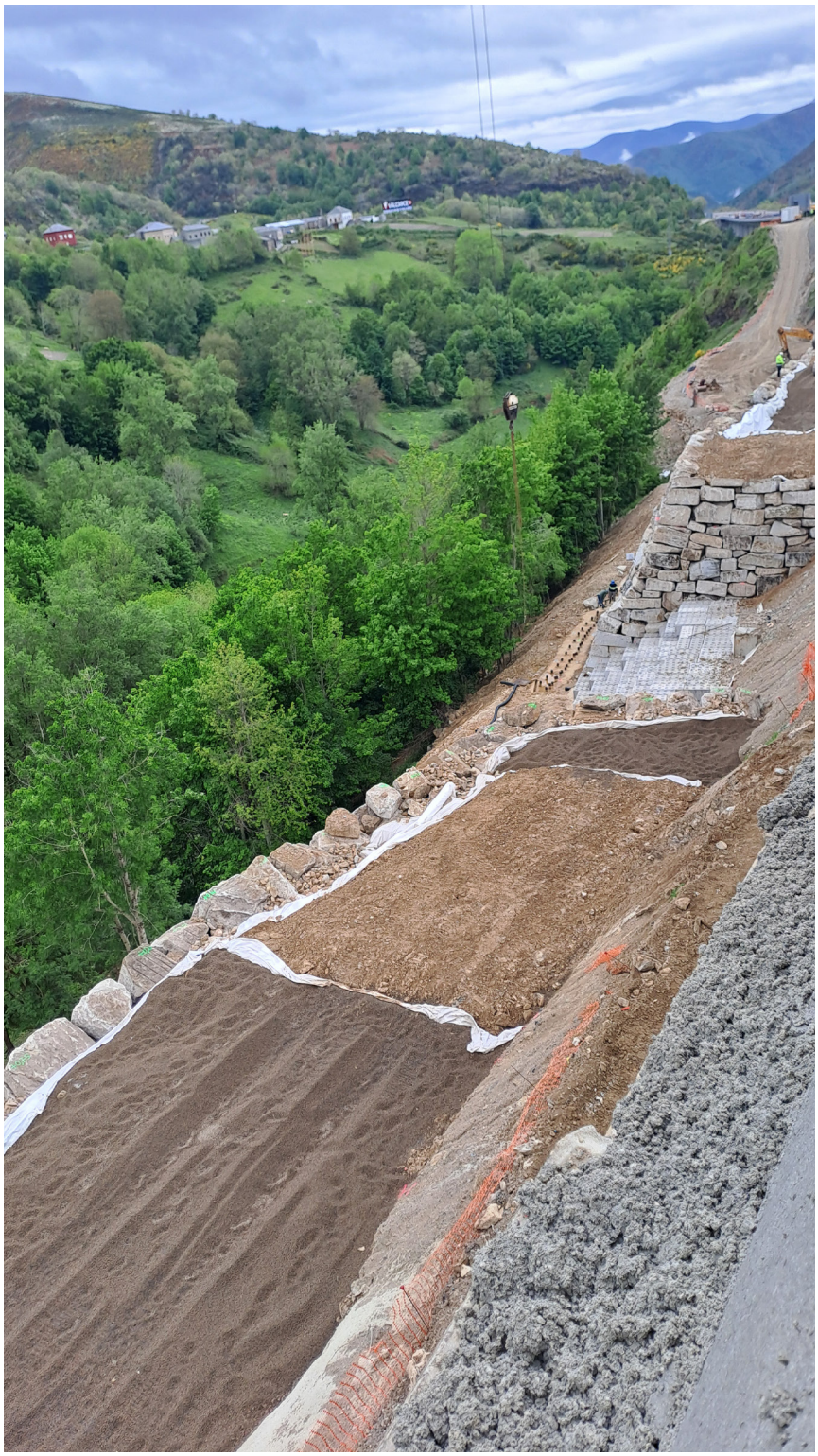
According to the technical reports produced after the incident, the collapse was not due to a conventional structural failure, liquefaction, or generalised landslide. The investigations ruled out a loss of load-bearing capacity in the soil as the direct cause, but did identify a series of geotechnical circumstances that critically contributed to the failure.

Geological Complexity Triggers Progressive Settlement at Pier P2

In particular, pier P2 experienced a settlement of nearly two meters. This pier was founded on a stratigraphy dominated by highly fractured limestone and extremely weathered layers that, in some zones, behaved similarly to soft soils. The combination of such complex geology with potential cross-sectional losses in the piles due to internal erosion or dissolution led to a progressive, non-explosive failure—yet severe enough to compromise the stability of the deck.

Additionally, groundwater infiltration and circulation were detected, likely accelerating the degradation of the terrain surrounding the existing piles. Under these conditions, safety margins were extremely narrow, justifying the complete dismantling of the affected viaduct.

The reconstruction of the viaduct was planned with a clear priority: to minimise execution time without compromising quality or safety. Two new parallel viaducts were designed, each consisting of an isostatic structure with precast beams and deep foundations. These foundations required the installation of large-diameter, deep piles, anchored into competent formations on unstable slopes, without natural flat areas to support heavy machinery.



Leca® LWA Provides Stable, Low-Impact Platforms for Pier Construction

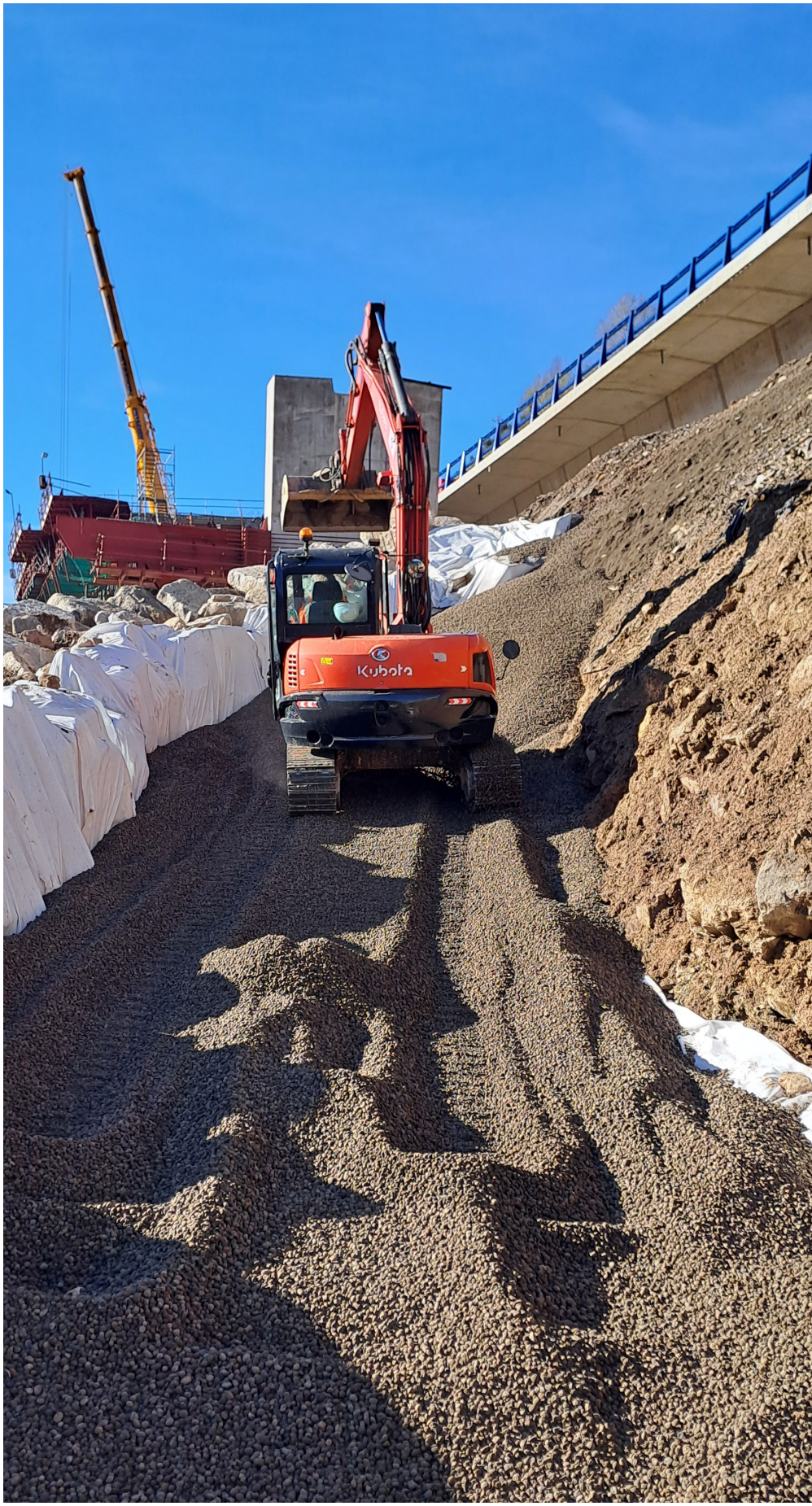
The chosen solution was to create specific working platforms for each pier using Leca LWA. This material, with a bulk density of around 275 kg/m³, allowed the formation of significant fill volumes without compromising overall slope stability or inducing excessive settlement near the pile locations.

The platforms were built in stepped terraces and retained with rockfill, which provided lateral confinement and additional drainage capacity. These platforms supported piling rigs that installed the new deep foundations—often in highly constrained access conditions and under tightly scheduled operations.

One of the project's biggest challenges was ensuring a continuous and reliable supply of over 8,000 m³ of Leca LWA required to construct the platforms. Due to limited access for standard transport trucks, intermediate stockpiling areas were designed on the decommissioned carriageway. From these points, the material was transferred to the installation area using on-site construction vehicles. This, combined with a sustained and precisely coordinated logistics plan, allowed the teams to meet tight deadlines.

High-Efficiency Logistics Ensure Continuous Supply of Leca® LWA During Peak Construction

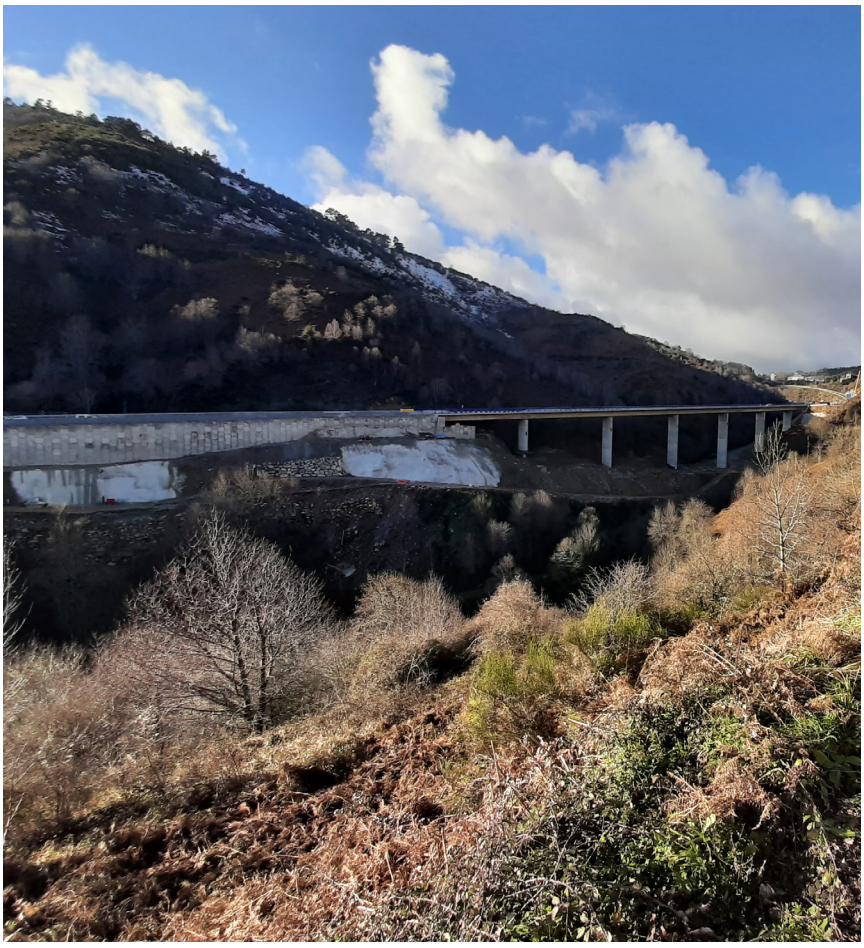
During the peak construction weeks, delivery rates reached up to 8 truckloads per day, with surges of up to 12 trucks on critical days. This responsiveness was made possible by the relative proximity of the production plant and seamless coordination between the site management,



execution teams, and the material supplier.The selected grain size—Leca LWA 10/20—was specifically chosen to facilitate spreading and compaction using light equipment without compromising the material's overall mechanical performance.

Using Leca LWA for deep pile working platforms on sloping terrain offers several advantages over conventional fill solutions such as selected soils, rockfill, or granular subbase materials:

- Load Reduction on the Ground: As an extremely lightweight material, LWA minimises active and passive earth pressures on the slope, significantly reducing the risk of sliding.
- Effective Drainage: Its porous structure promotes the dissipation of pore water pressures, which is essential in areas with frequent groundwater presence.
- Ease of Placement and Compaction: The material can be easily handled using light equipment and allows for the creation of large working areas without major earthmoving operations.
- Structural Compatibility: It provides a stable and level base for piling machinery, even on steep slopes.
- Fast Installation: Its simple handling and low weight enable rapid progress, which was crucial in meeting the Ministry of Transport's tight schedule.



Leca® LWA: A Low-Carbon Choice for Modern Construction

Moreover, from an environmental perspective, Leca LWA has a significantly lower carbon footprint than other high-volume construction materials, particularly considering that it is manufactured using renewable biomass as fuel.

The intervention at the El Castro viaduct demonstrates how civil engineering can respond effectively and efficiently to emergency situations—combining thorough diagnosis, optimized design, and intelligent material selection.

The use of Leca LWA 10/20 as lightweight fill for the working platforms not only enabled the safe execution of deep foundations in a highly complex setting but also played a decisive role in keeping the works on schedule and ensuring the safety of operations.

In a context where infrastructures increasingly face challenging ground conditions, environmental constraints, and tighter project timelines, solutions like this reinforce the critical role of innovative materials in 21st-century engineering.

PROJECT INFORMATION

Project: Emergency repair works on the Castro viaducts

Client: Ministry of Transport and Mobility Affairs

Main contractor: UTE Copasa y Grupo Puentes

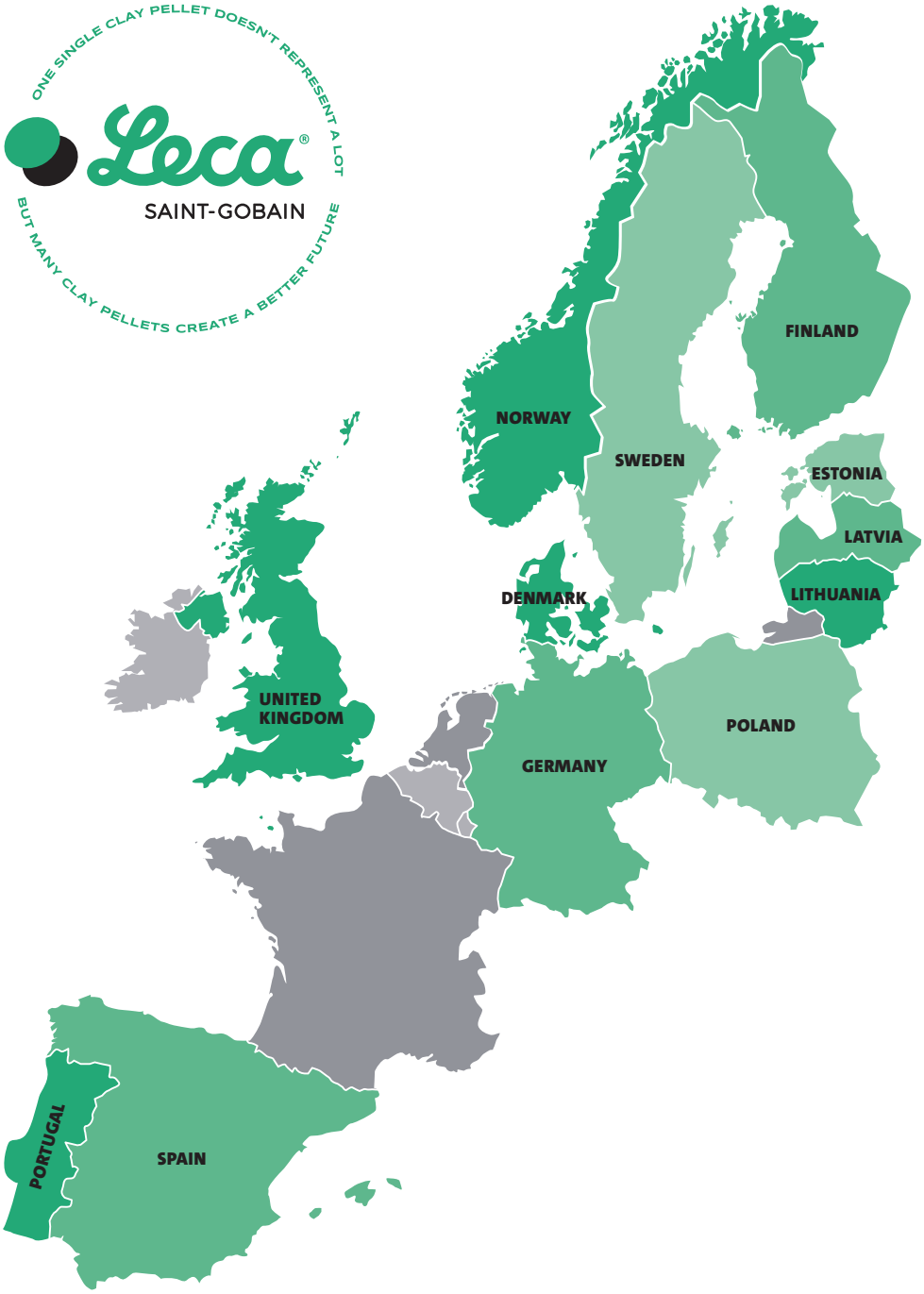
Engineers: Ingeap

Leca product: Leca® LWA (10-20mm)

Volume: 8.500 m^3

ONE SINGLE CLAY PELLET DOESN'T REPRESENT A LOT
BUT MANY CLAY PELLETS CREATE A BETTER FUTURE

Leca®
SAINT-GOBAIN



Denmark
Randersvej 75
8940 Randers SV
→ leca.dk

Germany
Rahdener Str. 1
21769 Lamstedt
→ fiboexclay.de

Norway
Årnesvegen 1
2009 Nordby
→ leca.nok

Spain
C. de María de Molina, 41
2 Planta, 28006 Madrid
→ arlita.es

Estonia
Peterburi tee 75
Tallinn 11415
→ leca.ee

Latvia
Daugavgrīvas iela 83
LV1007 Riga
→ leca.lv

Poland
Krasickiego 9
83-140 Gniew
→ leca.pl

Sweden
Finnögatan 1
582 78 Linköping
→ leca.se

Finland
Strömberginkuja 2
00380 Helsinki
→ leca.fi

Lithuania
Menulio 7
LT04326 Vilnius
→ leca.lt

Portugal
Estrada Nacional 110, s/n
3240-356 Avelar
→ leca.pt

United Kingdom
Saint-Gobain House, East Leake,
Loughborough, Leicester, LE12 6JU
→ leca.co.uk

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Leca International A/S - Robert Jacobsens Vej 62 A - 2300 Copenhagen S - Denmark