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NATURAL SELECTION

With a heritage spanning more than a century, FRAENKISCHE Rohrwerke Gebr. Kirchner GmbH & Co. KG has developed a pioneering status in numerous engineering niches – not least in its high-performance stormwater management systems. Mr Stephen Herd – FRAENKISCHE's Australasian Regional Business Manager of Water Management Solutions – describes the innovative end-to-end systems, modelled on nature, that are safeguarding high-specification infrastructural assets across the world. ▶



FRÄNKISCHE



Intensifying environmental dangers were highlighted as one of the top trends set to impact development across the planet over the next 10 years, according to the World Economic Forum's most recent Global Risks Report, with 'extreme weather events' pinpointed as the single most prominent risk that humanity faces. In such a context, it becomes ever more vital that we protect our infrastructure from adverse weather events like storms – inevitably on the rise as a result of climate change, but whose effects are invariably exacerbated by the spread of urbanisation in practically all parts of the world. Resultantly, many cities and other built up areas simply cannot handle additional water discharge. "As a city grows with the addition of further developments – more carparks, more buildings, more roads, and so on – that obviously leads to greater surface water run-off and bigger flows, which, in turn, is why most cities will experience flooding at certain times," advises Mr Herd. "Having

place a system that can actually capture, store and detain water during a peak event – and then release it in a controlled manner into the network – is therefore what developers should now be striving for."

Having explored the natural water cycle – where the water that falls to earth is transported, treated by sedimentation or infiltration into the ground, stored above and below ground, and finally discharged into the environment – FRAENKISCHE has, over nearly three decades, developed a comprehensive stormwater management system that fully addresses the challenge of controlling water flow at those four cyclical stages. "What's impressive is that the company has essentially modelled nature to come up with its own four drainage principles – transport, treatment, storage and discharge," informs Mr Herd, whose business boasts three dedicated facilities for developing and manufacturing its drainage products in Europe today – two in Germany and another in France. Having

achieved considerable success with projects installed across Europe, FRAENKISCHE's sights are now increasingly set on strengthening its presence further afield – in the Middle East and Far East, where the firm sees strong opportunity to implement its advanced proprietary water treatment (SediFamily) and attenuation/ retention (Rigofill ST) systems.

Pioneering solutions

With roots stretching back to 1906, FRAENKISCHE has achieved many milestones over more than a century in operation, including numerous pioneering technology 'firsts' across four specialist business areas (Drainage Systems, Electrical Systems, Building Technology and Automotive and Industrial Products). As far as Stormwater Management solutions are concerned, the story begins in the 1990s, when FRAENKISCHE commenced work on its proprietary SickuPipe system. In 2002, the company's first-generation geocellular unit 'Rigofill inspect' was launched into the market for the purpose of stormwater retention/attenuation, while the first iterations of its SediPipe systems for stormwater treatment were launched in 2005.

It has been just over a decade since Otto Kirchner became the sole Shareholder and President, making FRAENKISCHE today a proudly third generation family-owned business. Since then, the company's innovative drive has showed no signs of diminishing, with its fourth-generation geocellular unit Rigofill ST – a stackable system for easy transport

and installation – launched onto the market in 2014, and to much acclaim.

In fact, FRAENKISCHE is today one of the only companies globally that can confidently claim to offer a full, end-to-end stormwater management solution. And that distinction, backed up by over a century of engineering prowess in the form of the wider FRAENKISCHE business, has earned the German-headquartered company its reputation for quality and innovation – one that has resulted in the deployment of FRAENKISCHE water drainage systems in countless high-spec public and private projects the world over.

Underlining its increasingly global reach, FRAENKISCHE understands the need for local expertise on the ground. As such, in Europe it operates either through its own daughter companies, its own staff members, trusted sales representatives or longstanding partnerships across the many jurisdictions in which it boasts a presence today. The company's more recent push into the Middle East, Asia and Australasia has seen new partnerships established in countries like China, India, the Philippines, Qatar, the UAE and also via its own man on the ground in Australasia, Mr Stephen Herd – an individual with over a decade's experience at an advanced international level in the field of water drainage solutions.

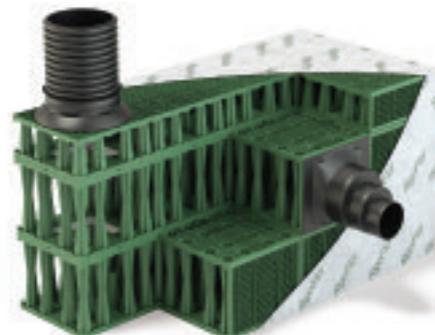
Restoring nature's cycles

Certainly, what sets FRAENKISCHE apart from the competition in both its established and nascent markets is the completely integrated nature of its solution, which encom-



passes the four aforementioned key principles of stormwater management – transport, treatment, storage and discharge. Nor is it coincidence that those four key pillars align closely with the sustainable principles of Water Sensitive Urban Design (WSUD) – a sustainable land planning and engineering design approach. WSUD integrates the urban water cycle – including stormwater, groundwater and wastewater management and water supply – into urban design in order to both minimise environmental degradation and improve aesthetic appeal. "One such principle is to protect natural systems – including waterways, oceans, creeks, and the groundwater table," advises Mr Herd, "while another is to integrate stormwater treatment with urban and landscape design, such as raingardens, wetlands, and infrastructure."

Another important WSUD principle is to reduce peak flows and runoff from the urban environment, simultaneously providing for infiltration and groundwater recharge, informs Mr Herd, emphasising that adherence to such a guideline should be a priority for new developments in water-stressed regions of the world. "Water Sensitive Urban Design principles dictate that you cannot develop land in a way that exceeds the original (pre-development) runoff flow rate. Of course, as soon as you construct a road or building, for example, you're adding hard surfaces to that environment, which means considerably more runoff," he points out. "And while you may have a monsoonal period –





FRAENKISCHE's solution it's simply a case of digging a trench and placing the system in it."

Not only is it a much swifter process to install such a pre-engineered module – once in, it is also far more straightforward to maintain, as Mr Herd elaborates. "With many of the drainage systems currently on the market, it's often impossible to actually get inside and inspect them. Yet with FRAENKISCHE, the entire cell system benefits from four-way inspectability and full accessibility. If required, you could run a camera through the entire system; it also gives you greater ability to jet/flush silt back into the control shafts to vacuum out. From an operations and maintenance perspective, that's obviously a huge tick in the box for municipalities, councils and water authorities." Further supporting such O&M activities, the company provides operations diaries for its treatment facilities, which help operators to follow and record the right maintenance steps.

The possibilities that FRAENKISCHE's system offers in terms of pipe connections are equally impressive. "All side wall plates have a multitude of pipe sizes (predefined 110-500mm diameter) that you can connect with, and we have a pipe connection adaptor that locks into position anywhere on the side walls," he advises.

Beyond that, developers can go deeper with a FRAENKISCHE system. "The Side Lateral Strength of the module at both 23°C and 40°C is much stronger, allowing this system to be installed at greater depths," informs Mr Herd, whose firm is now doing structural performance checks for installa-

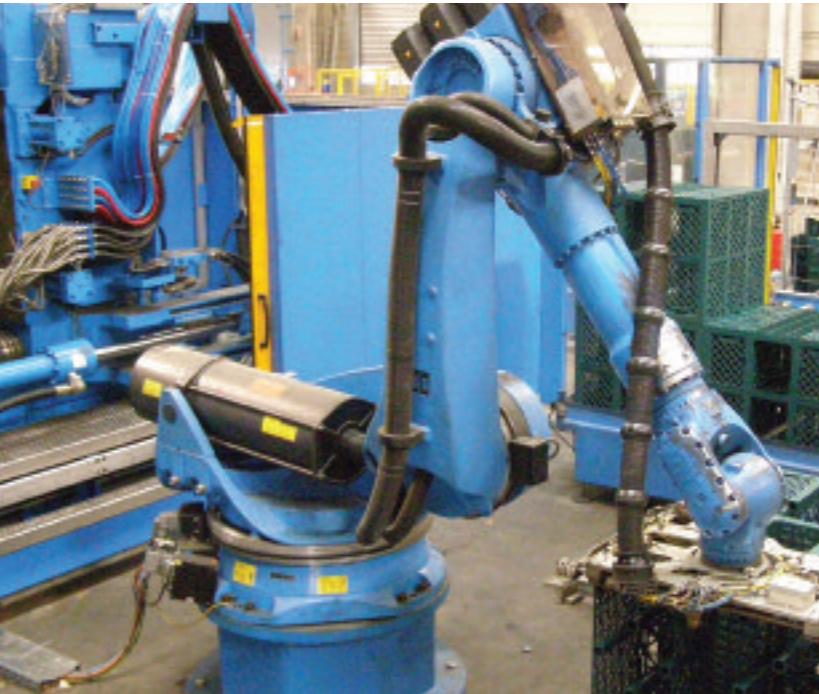
major peak rain and even flooding – in certain Asian countries, some such regions still nonetheless experience a shortage of potable water. As a result, the notion of A to B discharge is starting to lose credibility – instead, water is increasingly seen as a resource that needs to be harnessed, captured and reused. And that's where our holistic systems offer a real benefit, especially for developments in South East Asia and Australia."

Indeed, it is clear to see how FRAENKISCHE's own four principles of transport, treatment, storage and discharge align closely with those set out in relation to Water Sensitive Urban Design. "There's a major push to bring nature back into our cities and allow for greater biodiversity, which is essentially the natural process for the removal of contaminants," observes Mr Herd. "Obviously, the more we look after the environment, the better – but that doesn't necessarily mean incurring additional cost. The value engineering that we can bring to the table

from a design perspective means that such aspects can be managed and achieved cost-effectively."

Access all areas

Indeed, prior to installation or even arrival on-site, the exemplary German engineering of Fraenkische's water storage system is impressive in the efficiency benefits that it delivers, not least in the module's 'stackability', which makes shipping it in 40-foot containers a highly cost-effective process – even for projects located halfway across the world. "Not



only does it pack down, but it can also be constructed and installed very easily, while in terms of the system's strength, nothing compares," Mr Herd enthuses. "And as far as what's currently available in Asia and Australia, no system exists that has such an extensive product range. In Asia, there tends to be a lot of U-shaped drains, which need to be constructed on-site as concrete formwork spanning the length of the road. In contrast, with

Projects of prestige

Given such clear advantages across the board, it is little wonder why the German firm's highly engineered water drainage solutions have been selected for countless international flagship public and private projects to date.

FRAENKISCHE has already achieved an impressive project footprint across Europe – one example being the installation of a system for the former Carlsberg brewery complex in Copenhagen. In India too, the company has experienced good growth – one such development being a stormwater harvesting system installed in Hyderabad for leading conglomerate ITC. Elsewhere, FRAENKISCHE has experienced success in the GCC, where high standards and performance are typically the order of the day.

Delivered just a few months ago, FRAENKISCHE's stormwater drainage system for a major truck carpark as part of the multi-billion-dollar New Port Project (NPP) in Doha was certainly subject to very high-end specification, as Mr Herd describes: "As manufacturer, we were required to test the material at 40°C, because materials act differently under high temperatures as experienced in the Middle East. We had to

comply with a 50-year design life at 40°C, and to perform a long-term creep analysis at that temperature – a test that can take up to 10,000 hours to complete – in order to demonstrate our system's compliance not only to the specification but also to the design requirements," he advises.

Infiltration, detention and retention

Installed under a 60-tonne car park loading, the application centred on an infiltration or 'soakaway' system – typically deployed when no network exists. "Soakaway allows water to come in and the installed tank system creates storage – in this case, with a capacity of 3,398 cubic metres. Thereafter, the water infiltrates back out into the groundwater table. The tank itself is wrapped in geotextile before being buried in the ground, which prevents soil from entering the storage facility," advises Mr Herd, adding that FRAENKISCHE's tanks boast the highest void ratio (96 per cent air), meaning a smaller footprint and therefore less excavation.

Aside from infiltration, another key storage challenge that FRAENKISCHE's Rigofill ST

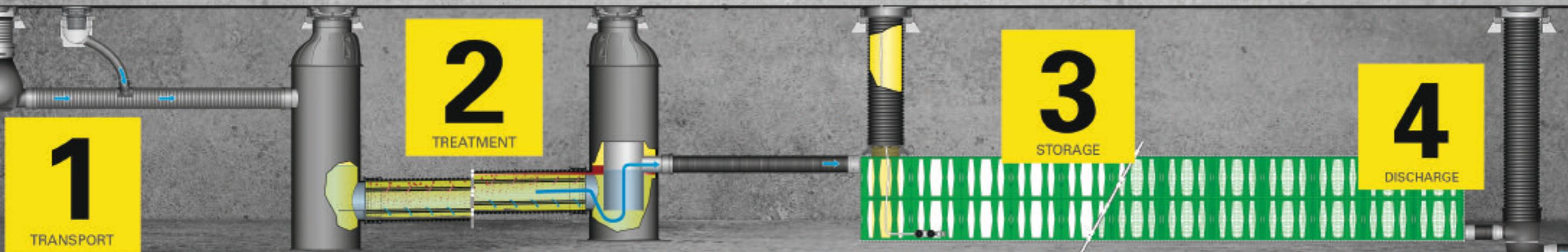
system family amply addresses is that of stormwater detention, which requires the tank system to be wrapped in a waterproof membrane to prevent water from escaping. Instead, it is stored in a tank connected to a flow control discharge system, allowing the speed at which the water is released back into the network to be regulated.

Finally, Rigofill ST can perform the much-needed process of retention – or stormwater harvesting – via the use of a waterproof membrane for capturing and storing the water. In such an instance, the tank will also feature a submersible pump, which allows the captured water to be pumped and reused as required. Regarding FRAENKISCHE's retention solution, one major application – certainly for Australia and particularly in remote areas – is that of the underground fire-fighting water reservoir.

Tried and thoroughly tested

Such mission-critical applications require systems that are built to last and which can consistently perform. And as one would expect of an internationally renowned busi-





ness – and not least given its strong German heritage – FRAENKISCHE sees quality as paramount. Indeed, its success to date has hinged on this strong cognisance of the need for high standards throughout its operations. And naturally, by the time any FRAENKISCHE drainage system reaches the market it has been thoroughly tested – through university studies, the company's own extensive R&D activities, site trials, and third party independent testing. "While we obviously have our own research department and testing facilities in-house, we always use third party testing bodies such as the BBA (British Board of Agrement), the CSTB, the German Institute for Building Technology and others for verifying our results," assures Mr Herd. "Indeed, to gain approval with a consultant, council or municipality, such independent third-party certification is absolutely vital."

Backing up that ethos is the company's compliance to the aforementioned CIRIA C680 industry standard, alongside accreditations relating to quality management (DIN EN ISO 9001:2008 and ISO/TS 16949:2009), environmental management (DIN EN ISO 14001:2009), and energy management (DIN EN ISO 50001:2011) systems. "Our company is offering the only plastic structural wall piping system to have an agreement from the German Railways. That indicates just how robust FRAENKISCHE pipes really are," points

out Mr Herd, adding that the company's pipes have also recently been approved for use underneath the rail track itself – another pioneering 'first' for the firm.

Changing mindsets, expanding opportunity

Certainly, rail and road, all the way through to entire mega-city developments, are applications where FRAENKISCHE identifies very strong growth potential as it further expands its geographical presence. "In

Europe we observe a strong demand for the high quality treatment of stormwater based on the European Water Framework Directive," notes Mr Herd. "However, beyond FRAENKISCHE's traditionally strong European base, we identify much demand across India, China, the Gulf region and Australasia – from densely populated areas where the need for storage, harvesting and/or infiltration of clean stormwater exists."

The company's stormwater management division is currently heavily involved in projects



across Qatar; the UAE, Kuwait and Oman. And while FRAENKISCHE has only recently started expanding its presence into Asia and Australasia, Mr Herd advises that he and his team are already making good headway in engaging at a high level with project owners throughout the Philippines, Malaysia and Indonesia, as well as those in Australia and New Zealand.

As the firm continues to strengthen its presence in new markets, the diversity of project scope that FRAENKISCHE can

accommodate will no doubt prove advantageous – catering, as it does, for projects requiring systems of 500-cubic-metre capacities, all the way up to mega city projects requiring 50,000 cubic metres of water processing power, and even far larger volumes on occasion. "One of our current projects in the Middle East has a volume of 290,000 cubic metres," reports Mr Herd. "And while you may not see those kinds of volumes in Australia, New Zealand or Asia, other sizeable challenges exist to contend with there – higher levels of rainfall, a higher intensity and considerable surface run-off, as well as major pollution issues, for instance." From areas at high-risk of flooding, to those suffering acute water scarcity, alongside areas vulnerable to fire fronts, such challenges require robust solutions – and few compare to FRAENKISCHE in that respect.

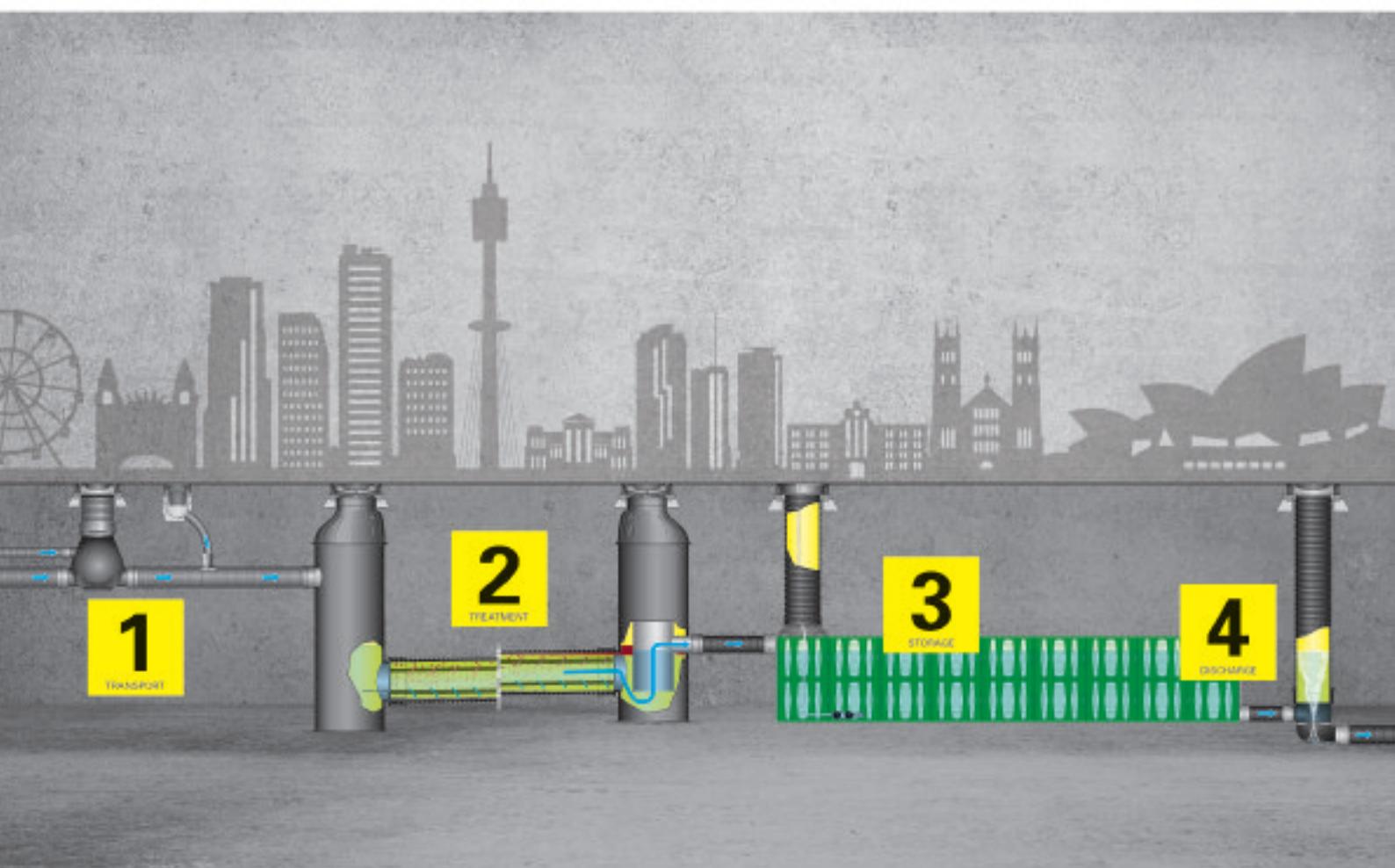
Unfortunately, not all of the world's stormwater management systems are engineered with the same resilience or respect for the entire natural water cycle. And incidences of system failures across South East Asia and Australia have worked to exacerbate the oft-acute water management challenges they are intended to ameliorate. As pressures on our built environment grow in tandem with further development work, and as climate change continues to aggravate a diverse array of water crises, a

change of mindset is clearly required in terms of how to safeguard essential infrastructure via holistic water management – in developing and emerging markets alike – says Mr Herd.

"Developers and consultants are increasingly being required to comply with standards based on WSUD or SuDS [Sustainable Drainage Systems] in terms of storage, treatment and discharge values. And we can seriously add value at that early design evaluation stage – we have the technical team and resources to provide the value engineering, construction drawings and calculations that will make the difference." Indeed, from efficient delivery and installation, to the impressive performance in fulfilling all four of the firm's principles, through to the ease with which operation, maintenance and inspection tasks can be undertaken – FRAENKISCHE's end-to-end stormwater management solutions are clearly the sustainable answer for future urban development. With myriad opportunities for FRAENKISCHE to add value to a diverse array of new developments – alongside its commitment to commencing local production when envisaged growth in such markets starts to come through – expect to see much more from this industry stalwart in high-specification projects across South East Asia and Australasia in the years ahead. □



Stephen Herd



4 challenges – 1 solution

This is how stormwater management is done today.

Where stormwater falls on paved surfaces it cannot drain away naturally. FRÄNKISCHE provides a system of perfectly matched components to ensure a reliable and efficient collection, treatment, storage and discharge of stormwater in any terrain.

Responsibility towards mankind, nature and the economy: Systematic stormwater management.