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"Success is a combination of passion, preparation, and perseverance. Believe in your abilities and have the courage to chase your dreams."

-Wayne Huizenga Sr.

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The Evolution of Innovation: Flexible Porous Paving

Nearly forty years ago, flexible porous paving was merely a concept in the brain of Kevin Bagnall as he experimented with recycled tire granules and aggregate. During that time, Kevin labored overseas in the United Kingdom installing safety surfacing- a flexible surface composed of recycled tire shred and an Ethylene Propylene Diene Monomer (EPDM) granule. The recycled tire rubber granule, combined with the durable synthetic EPDM rubber, is widely used for various outdoor applications, such as playgrounds, due to its excellent weather resistance and safety features.



Still tweaking his concept, Kevin embarked on an adventure,

founding the company Cushion Deck, which was later renamed Cushion Deck International when he immigrated to the United States in 1992. Kevin was convinced that the idea of creating a pathway



system that was more than safety surfacing was key due to the fact safety surfacing did not offer a large takeout of recycled tire product. He wanted to create a market that would support a high tonnage takeout of recycled tire granule that would answer a problem. That problem was identified quickly through the realization of K.B. Industries Inc. (KBI) in 2001.

Through ingenuity, determination and bit of luck, Kevin produced the world's first flexible porous paving for infrastructure in 2001, naming his brainchild Flexi-Pave - now known as KBI Flexi®-Pave. Afterwards, Kevin acquired a few Pilot Programs on which to test his new product. The first pilot program was in Clearwater, Pinellas County, Florida, wherein

the local county government commissioned KBI to construct a sidewalk using KBI Flexi®-Pave- a recycled tire-aggregate monolithic in a residential subdivision. Along the proposed site were planted well-established Live Oak trees approximately every twenty feet. Across the street, the sidewalk was to be set in concrete, and the reason for this scenario was quite simple. The concrete sidewalks were constantly lifting and cracking from tree root intrusion, creating a liability issue from trip and fall hazards.





Upon a postmortem of the Pinellas County Pilot Program site some years later, it was found that the **concrete** path laid at the same time as the KBI Flexi®-Pave required **dozens** of maintenance visits and repairs. In sharp contrast, **KBI Flexi®-Pave** required **zero** repairs and/or maintenance in the same time span, delivering a maximum Return of Investment. Moreover, this Pilot Program exercise also proved KBI Flexi®-Pave could provide a steady savings of maintenance/repair expenses as well as possible trip and fall litigation settlements and associated expenses- all which affect the local tax digest. Additionally, Flexi®-Pave was found to improve ADA compliance.

Clearly, the next stage of evolution was Engineering Acceptance. Gaining proper engineering buyoff was both a time-consuming process and a necessary exercise; however, while KBI waited nearly eight years for that coveted acceptance, KBI Flexi[®]-Pave was still being installed throughout the domestic United States. In 2010, K.B. Industries expanded overseas, forming KBI UK Ltd to begin a similar journey that would immediately recognize the U.S. testing and successes of KBI Flexi[®]-Pave, understanding that the United Kingdom would undergo similar testing for the UK Engineering community. Graham D. Pell was appointed as the Managing Director of the UK company to carry out Kevin Bagnall's vision.

Engineering acceptance of the product was not the only hurdle; it was also engineering acceptance of the substrate. This was an essential part of the equation. The question had to be answered: What is a suitable substrate on which KBI Flexi®-Pave can sit? After many trials and error, the substrate was composed of 4 inches of crushed stone with 1 ½ to 2 inches of KBI Flexi®-Pave installed atop the stone. The whole system would hold roughly 0.6 gallons of stormwater per square foot, providing a natural water vault capacity before it begins to drain into the subgrade- or rather, the soils underneath the KBI Flexi®-Pave. All these facts remained crucial parts of Engineering acceptance.



Thus, it has been a continuum as the Engineering community has embraced the material. In fact, the Engineering community taught KBI more about the material than they originally knew, creating more uses for the product. One of the most significant lessons learned was KBI Flexi®-Pave contains 23% pore space wherein a natural biofilm is produced, capable of removing up to 83% dissolved nitrates and upwards of 86% dissolved orthophosphates as stormwater traverses through it. Nutrient loading occurs when pesticide and herbicide runoff leaches into open water bodies, ultimately contributing to



harmful algae blooms. KBI Flexi[®]-Pave helps abate this threat naturally by passively cleaning stormwater before it reaches open water body supplies.

By focusing on the solution, Kevin Bagnall recognized the opportunity for a high-tonnage takeout of scrap tire granules and the multitude of problems KBI Flexi[®]-Pave could solve. Indeed, KBI Flexi[®]-Pave is the only porous paving solution in the world able to boast such claims.



Trip and Fall Hazard Mitigation: Solving a Civic Nightmare

Trip and fall accidents are among the most common causes of injury in the United States, affecting thousands of people every year and represent a significant risk in residential, commercial, tourist and



hospitality districts. Sidewalks and pathways are integral to urban infrastructure, enabling mobility and fostering community connectivity. However, the presence of trip and fall hazards poses significant risks to public safety. These hazards not only create physical danger but also expose property owners and managers to legal and financial liabilities. Recognizing and mitigating these risks is essential for creating safer environments.

One of the most prevalent causes of trip and fall incidents is uneven surfaces. Sidewalks can become uneven due to tree roots, erosion, or poorly executed repairs. These irregularities

create stumbling points and significantly increase the risk of accidents, particularly for the elderly or disabled. Cracks and potholes may form over time due to environmental wear and tear, such as freezing and thawing cycles. These defects are particularly dangerous on pathways with heavy foot traffic, as they can lead to missteps and falls.

In 2024, the average settlement amount for slip and fall cases in the United States was approximately \$250,872, with a median settlement of \$60,000- the latter being more representative of typical outcomes. These figures include both private and public defendants, but when it comes to government entities, the payouts tend to be lower and more difficult to obtain due to sovereign immunity protections and strict procedural requirements.



In fact, last year the states with the highest average trip and fall settlements- particularly for cases involving uneven surfaces such as racked sidewalks, misaligned pavers, or poorly maintained curbstended to be those with dense urban populations, active plaintiff bars, and fewer statutory caps on damages. Based on aggregated case data and legal reporting, the States with the highest average payout in 2024 were as follows:



• **California:** Known for large jury verdicts and a high cost of living, average settlements often exceeded \$100,000, especially in Los Angeles and San Francisco counties.

• **New York:** Particularly in NYC, where sidewalk liability laws hold property owners accountable, average payouts ranged from \$75,000 to \$150,000, with some multimillion-dollar verdicts.

• Florida: With a high volume of personal injury claims and a favorable litigation climate, average settlements hovered around \$80,000-\$120,000, especially in Miami-Dade and Broward counties.

• Illinois: Chicago's Cook County saw averages in the \$70,000-\$110,000 range, driven by aging infrastructure and active legal advocacy.

• **Texas:** While tort reform has capped some damages, urban centers like Houston and Dallas still reported averages around \$60,000-\$90,000, particularly in cases involving municipal negligence.

These figures reflect both settlements and verdicts, and they're influenced by factors like injury severity, legal representation, and local tort laws.

The structural breakdown of traditional sidewalks, regardless of material (concrete, asphalt or pavers) is an ever-present problem faced by local governments and requires extensive ongoing maintenance and associated costs. The main causes of sidewalk failure and liability exposure are typically tree root intrusion, subsidence of the sub-base, freeze-thaw cycles, and erosion washout beneath the sidewalk surface. Boasting 24 years of tested, proven results, KBI Flexi[®]-Pave is the world's first flexible porous paving solution designed specifically to mitigate these hazards.

Made from recycled wire-free scrap tire rubber granule, fracture-faced aggregate and KBI's proprietary binding agent, KBI Flexi[®]-Pave maintains superior flexibility, even in extreme weather conditions. The expansion and contraction capabilities act as one big expansion joint; therefore, the material does not crack in harsh temperatures or adverse weather conditions, and nearby tree roots are supported through groundwater recharge. KBI Flexi[®]-Pave can even be installed in subzero temperatures, as proven in Yellowstone National Park, replacing the deteriorating asphalt around the geyser basins.



Moreover, KBI Flexi[®]-Pave significantly releases hydrostatic pressure particularly in flood conditions by allowing water to infiltrate through its surface at a porosity rate of 3,000 gallons per square foot per hour while also removing upwards of 83% dissolved nitrates and 88% dissolved phosphates within the pore space, thus reducing runoff and minimizing impacts on the built and unbuilt environments. In contexts where hydrostatic pressure is a concern, such as beneath concrete slabs or near foundation walls, KBI Flexi[®]-Pave can act as a buffer. By promoting drainage, KBI Flexi[®]-Pave prevents excessive hydrostatic pressure from building up, which can lead to structural damage, cracking, or the failure of waterproof barriers. This is particularly important in regions with high groundwater levels.

Ultimately, this lends to stormwater management by keeping the water where it belongs- in the earth and not in stormwater systems. Furthermore, KBI Flexi®-Pave can be used juxtaposed with concrete or asphalt in parking lots to keep stormwater on site due to its porosity, thus reducing stormwater runoff into combined sewer systems through clever engineering and, in specific cases, mitigates stormwater taxes.

Product Life Cycle Analysis:

Impervious vs Pervious Paving Solutions

While cost is an important factor in the decision-making process, it is not the only factor. According to research conducted by Southern Illinois University's School of Engineering, the comprehensive study looked at the life cycle and associated costs of both traditional and permeable paving. It was discovered that porous paving solutions, such as KBI Flexi®-Pave, are more sustainable than traditional paving, cutting maintenance expenses throughout its life cycle. In fact, when the research team analyzed the alternatives in 20-year, 30-year, and 40-year analysis periods, they considered not only initial construction and maintenance costs but also stormwater treatment costs as well. The results of the study showed what we already knew. Traditional paving such as concrete showed to have the lowest initial cost; however, over the course of 20-plus years the porous paving proved to be more economical.

This is further evidenced by the longevity of KBI Flexi[®]-Pave, as installed more than twenty years ago.



Case Study: City of Key West, Florida

As the southernmost city in the continental United States, Key West, Florida enjoys all the benefits expected in a coastal city surrounded by crystal clear water. Every year, approximately one million vacationers and nearly one thousand cruise ships visit its port, making it a top vacation destination. In fact, tourism and hospitality-a major economic driver-contributes significantly through hotels, restaurants, museums, and attractions like the Ernest Hemingway Home and Mallory Square. Old Town historic district is the epicenter of this activity, generating millions of dollars in annual revenue from visitor spending.



In order to provide a safe and trouble-free destination, Key West's government leaders searched for solutions to stormwater management, maintenance and safety challenges in and around the Old Town district. In previous years, the City of Key West had faced numerous incidents involving slips, trips, and falls in and around the tree surrounds, leading to costly litigation.

The Green Partnership Program[™] (GPP) offered by KBI allowed the City of Key West to solve all of their tree surround issues while minimizing costs and maximizing installation flexibility. The KBI's GPP is designed for agencies with their own maintenance staff, including municipal, commercial or large campus facilities. This program provides training and tools to solve everyday infrastructure problems. Maintenance staff are trained and certified by KBI instructors in the use of KBI Flexi®-Pave. After completing the Green Partnership Program training, the City of Key West, FL completed their first phase of tree surrounds on Duval Street, and the results were phenomenal.



Installing KBI Flexi[®]-Pave through KBI's Green Partnership Program saved the City of Key West and its taxpayers roughly \$90,000 of their initial Phase One capital budget. The product reduced maintenance costs by over 80% on City tree surrounds while solving all their ongoing stormwater challenges due to alternative product migration (i.e. small stones or mulch) and stormwater runoff. Perhaps most importantly, since its installation more than fifteen years ago, the City effectively eliminated all trip and fall liability issues caused by degraded tree surrounds.

According to Rod Delostrinos, a former Community Service Deputy Director for the City of Key West, "A number of

potential solutions were tried to include small stones, mulch, asphalt, and metal grates. "



Mr. Delostrinos continued, "No one option proved to be the total solution. That is to say until we found a product called KBI Flexi®-Pave. Today, we continue to use KBI Flexi®-Pave around our plantings and have no safety issues to date." The City's prior Urban Forestry Manager, Cynthia Domenech Coogle, also noted the porosity of the KBI Flexi®-Pave, stating the material had also made a significant positive impact on the tree foliage.



In fact, within its first three years of installation, the City of Key West had already seen a Return of Investment, saving nearly a quarter million dollars in taxpayer funds. Today, that number could be estimated to have a value of over a million dollars in overall savings.



From the Chairman's Desk

08/08



Kevin Bagnall, CEO & Chairman Atlantic Power & Infrastructure, Corp.

Andrew Carnegie once said, "Teamwork is the ability to work together toward a common vision. The ability to direct individual accomplishments toward organizational objectives. It is the fuel that allows common people to attain uncommon results."

As I reminisce over the last few decades of this journey, I am truly humbled. Today, I look at where I've been and where we are going, and it excites me. Consider the different uses of KBI Flexi[®]-Pave. We always knew that the multiple uses of KBI Flexi[®]-Pave is enormous in the sensibilities of architectural and engineering infrastructure use. The message is now clear. It's not selling; we've come beyond that. Now, it's educating the public that our products are tested, proven and available for next generation infrastructure use. As for this team, our adventure is just beginning. Stay tuned!