Regionally connected by Napoli-Sorrento Railway, Reggio Calabria Highway, Naples International Airport, and Marina di Stabia, Pompeii Italy boasts one of the most infamous volcanoes in the world Mt. Vesuvius. But thanks to the successful efforts of brilliant engineering to tame this once-behemoth of nature, Pompeii’s 22nd-century’s one million citizens can now enjoy its relaxing coastal climate along the Mediterranean Sea.

After a devastating mid-twenty-first century explosion that wiped out millions of people and billions in infrastructure, Pompeii literally rose from the ashes thanks to the Phoenix Project, an infrastructural solution for economic and environmental sustainability. Pompeii’s engineers constructed an underground piping network to manage the volcano’s volatility and convert this deadly liability into its greatest infrastructural asset. Mechanical and civil engineers designed and constructed pressure-relieving graphene pipes drilled into Vesuvius’ core that slowly release gases to maintain constant, safe pressure with minimal environmental impact. An elemental converter captures and transforms poisonous gases into products like ethanol biofuel, used to help power the electrical grid. Our volcanic geothermal system uses the remaining super-hot gas to flash-vaporize water into steam, creating the pressure to rotate turbines and generate more electricity. At lower elevations, graphene pipes tap into Vesuvius’ magma chamber and release lava to flow channels that divert the molten rock to a construction manufacturing plant and slowly cool it into pumice. When crushed and combined with volcanic soil, the pumice creates a strong, cheap, easy to manufacture, and thermally efficient concrete aggregate used for Pompeii’s buildings and structures, including aqueducts, which deliver fresh water to Vesuvius Community Forest, where citizens benefit from its many natural resources. The city’s water cycle begins when saltwater pumped from the Mediterranean Sea and through Vesuvius’ core evaporates into steam. The steam rises through durable graphene pipes before cooling and condensing into Vesuvius Reservoir near the top of the volcano. A dam releasing the water creates Vesuvius Falls, which supplies Pompeii’s underground pipes and distributes water to the populace. Turbines within the falls capture its kinetic energy, and help fuel the pumps, which deliver the Mediterranean water to Vesuvius. As for waste disposal, underground collection tubes deliver refuse to conveyor belts near the bottom of Vesuvius, which feeds the debris into the belly of the beast, where its 1,200º Celsius temperatures produce natural incineration. Pompeii’s citizens learn about Vesuvius’ many infrastructural uses when visiting Vesuvius
Educational and Recreational Learning Center at Pompeii University. After hiking the scenic trails along the volcanic cliffs, visitors can travel underground to see its infrastructural assets at work.

As for transportation throughout the rest of the city, liquid grid-patterned walking and biking paths at street level provide a healthy, efficient, safer and emotionally pleasing way for citizens to navigate much of Pompeii’s downtown. A liquid grid merges the streamlined travel of a traditional grid with more natural bends and curves to slow down bikers, increase pedestrians’ awareness of their surroundings, and provide natural pockets of tree clusters along the pathway. Walkers share space with rentable solar-powered enclosed bikes wired with speed controls and collision prevention systems to avoid pedestrians. Enclosed bikes provide protective mobility for elderly and handicapped citizens. For longer travel, Pompeii converted former downtown roads, now covered with many feet of volcanic ash, into an underground transit system. Autonomous pods travel along the interior walls of underground electromagnetic tubes that parallel our liquid grid above. Pods attach to the interior walls of our travel tubes, giving them 360º maneuverability around traffic, while a gyroscope capsule within, keeps passengers upright. Coordinated by our quantum computer, both below ground pods and above ground bikes are
rented commodities whose availability and locations are found through our city’s travel app, which increases their use and decreases the amount of traffic and demand for parking space.

Many of our pedestrian paths lead to public squares filled with movable matter, constantly rearranging to produce visually pleasing and diverse sculptures, water fountains, and places to sit and mingle. Cafés and storefronts often surround these squares, providing places to eat, shop, and gather. Underground transit stations and bike rental kiosks in each square provide easily accessible and convenient transitions across modes of transportation. Pompeii’s most famous square, Rock Italy Plaza, provides captivating entertainment experiences, rewarding visitors with prodigious gladiator-like battles, riveting chariot races, rock concerts, and movie extravaganzas on the ultimate movable matter stage. An aluminum oxynitride dome overhead protects our stage and guests from the elements. When subjected to an electrical charge, a liquid-crystal film within the dome transforms the roof into an entertainment canvas. Added to the projections on the surrounding buildings and floor of the plaza, Rock Italy immerses guests into an all-consuming and diverse world of entertainment.

After an unforgettable night at Rock Italy, many residents return to one of Pompeii’s Interlace residential complexes, which consists of six-story apartment blocks stacked in a hexagonal arrangement to form large, open, permeable courtyards. Engineered wind tunnels and strategically placed pools and fountains within these shaded courtyards create naturally air-conditioned oases amidst Pompeii’s blazing summer heat. Roman style baths and pools, natural public-shared gardens and playgrounds, along with open air cafés serve as public spaces within the Interlace complex, which provides 112% more usable green space than in comparison to a vacant field with an equal footprint.

Centrally located public service blocks within our Interlaces contain urgent care facilities, which handle most medical needs and prevent overcrowding at Pompeii’s downtown hospital. Children partly learn about sustainability within the public school block by caring for one of the Interlace’s many gardens. Adjacent to schools, emergency personnel provide on-site security for the residents and their children.
Pompeii’s infrastructural solutions provide more efficient, safer, cleaner energy production and waste disposal, superior construction material, and pedestrian-friendly mobility. Now integrated into residential living, recreation within shared spaces along with safe and convenient social services provide population-pressured urban communities with suburban-like amenities. No longer living in fear of a Vesuvius eruption, Pompeii boasts a healthier, happier socially-connected populace.

Dirty, crowded, and unappealing public space designs of the past produced serious problems for urban centers. Common eyesores, including costly polluted brownfields and previously-developed greyfields presented health hazards, drove down land values and
discouraged development, including businesses looking for investment opportunities. After Vesuvius erupted, Pompeii became one large brownfield, with most of its infrastructure buried. That old infrastructure suffered from poor aesthetic building design and structurally inferior materials built around inaccessible public locations. Vehicles and overcrowded streets compounded the problem. Surrounded by uninviting blank walls, hard to find entrances, and little seating or accommodations within, many of these public spaces seemed destined to fail.

By contrast, post-erupted Pompeii’s placemaking design improves comfort, sociability, and the diversity of experience for residents. Devoting more land to placemaking creates an intimately embedded, readily accessible network of public spaces throughout the entire city. Pompeii’s highlights include Vesuvius Educational and Recreational Learning Center, Pompeii’s Ancient ruins, and Interlace courtyards, public spaces designed within residential complexes. Others, like Rock Italy, are strategically placed convergent points found by pedestrians who wander along our natural-flowing pathways. Cafés and storefronts frame these gathering places where citizens enjoy multiple culturally-relevant social experiences in a safe and comfortable environment. Others spaces provide completely different experiences including Vesuvius Community Forest, where Pompeii’s citizens enjoy whitewater rides in Aqueduct Park or the benefits of a biodiverse natural environment. Changing smart murals on buildings alert pedestrians to these recreational opportunities and provide alluring diversions during city walks. Absent of motorized vehicles at street level, Pompeii’s network of public spaces raises land values throughout the city and provides increased tax revenue that is reinvested to further improve city services.

Of course, tapping into a volcano does have its tradeoffs. Countermeasures and contingency plans are required to ensure public safety given the uncertainty of Vesuvius. A network of carbon fiber-shielded sensors throughout Pompeii’s underground tunnels monitor levels of heat, pressure, and gases while NASA ICE satellites above measure topographic changes to detect early warning signs of trouble. While adjustments to gas and magma releases ensure the volcano remains dormant, above-ground evacuation procedures and wind turbines, hydroelectric and other clean energy sources are in place in case the volcano becomes increasingly volatile or fails to generate enough power.
Pompeii’s team of engineers braved the city’s challenges. Chemical engineers developed and built the volcanic geothermal system in the city and attended to the thermodynamics of changing lava into a usable, safe energy solution for Pompeii. Automation engineers programmed and coordinated the computers, equipment, and peripherals within the public spaces, while transportation engineers designed and scheduled the flow of goods in and out of the city and the movement of residents throughout. Finally, as the city of tomorrow is highly dependent upon software and computerized equipment communicating as one entity, electrical engineers played a vital role in developing and running our quantum computer.

Together, Pompeii’s engineers designed the Phoenix Project, which tamed the beast of nature that left Pompeii a brownfield of ashes and transformed its destructive power into a modern infrastructural marvel of tomorrow.

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