Bentley Infrastructure Cloud for Transportation

Bringing Teams, Projects, and Asset Data Together for **Better Outcomes**

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Better Outcomes Across the Infrastructure Lifecycle

Behind every infrastructure project and every physical asset is data waiting to be unlocked, unleashed, and illuminated, resulting in insights into infrastructure intelligence.

From connecting critical information and workflows across the infrastructure lifecycle to leveraging artificial intelligence-driven insights, infrastructure intelligence is how you can build a more sustainable and resilient future.

Whether you need to:

- Rapidly generate different design concepts based on a range of inputs and constraints,
- Create immersive 3D environments of infrastructure assets where construction progress is captured, current, and actionable,
- Or automatically know when something is wrong with the health or safe operability of your assets,

Infrastructure intelligence is the key to solving and overcoming some of today's biggest challenges.

Infrastructure Lifecycle Challenges

Design and build firms, infrastructure owners, and their supply chain stakeholders must effectively manage infrastructure projects and assets across the lifecycle from design and build into operations.

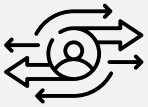
These teams need to:

Increase the efficiency of designing, building, and operating infrastructure due to the increasing complexities of increased client demands and workforce challenges.

Manage and govern data to support collaboration workflows for engineering, construction, and asset performance within and across organizational boundaries.

Manage the flow of information in and between organizations for efficient design, construction, and operations, with effective coordination of work between many different teams.

Utilize trustworthy and actionable asset data to **make better-informed decisions**.



Leverage data from engineering technology, information technology, and operations technology (ET, IT, and OT) to improve project delivery and asset performance.

Improve asset performance and reliability with a single, holistic, and up-to-date view.

Challenges in the Transportation Industry

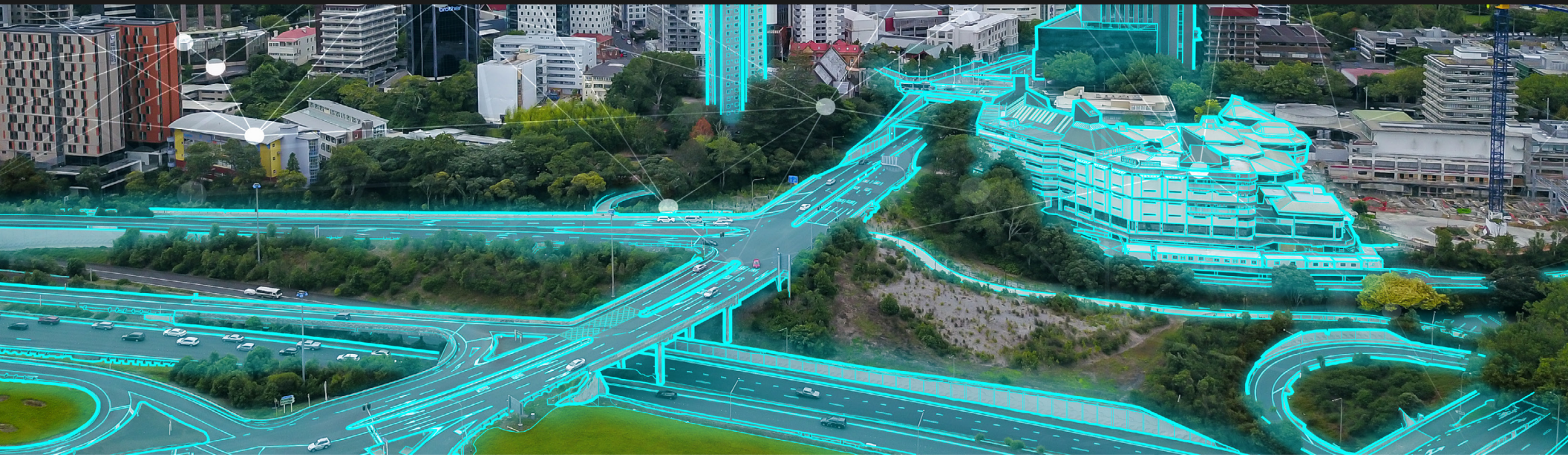
Owner-operators, contractors, and construction firms need to **work more efficiently and affordably** to control costs and complete projects within budget and time constraints.

Digital delivery directives require **digital strategies and technologies,** including using 3D models for project bidding to improve the collection, management, and use of information throughout the asset lifecycle.

Agencies need to **utilize government investments** in new road and rail networks in timely and effective ways to increase the levels of service, safety, and reliability that the traveling public today demands and deserves.

The industry is constantly battling with aging assets, tighter budgets, skilled labor shortages, and increasing project complexity, as well as how to decarbonize.

Information gaps between job sites, project teams, and stakeholders make it even more difficult to make decisions, track progress, and resolve issues.



How Bentley Infrastructure Cloud Can Help

Bentley Infrastructure Cloud brings teams, projects, and asset data together in secure managed environments to execute work, resulting in better outcomes across the infrastructure lifecycle. It offers purpose-built workflows for users across all phases of the asset lifecycle. Powered by the iTwin® Platform, seamlessly integrated with Bentley Open applications, and providing common data environments, Bentley Infrastructure Cloud delivers project delivery, construction management and asset performance capabilities through three key applications:

- **ProjectWise,** which provides a connected data environment to help designers and engineers produce higher quality digital deliverables.
- **SYNCHRO,** which enables constructors to simulate plans in 4D and capture as-built progress for digital twin handover.
- **AssetWise,** which empowers owners with asset lifecycle information within evergreen digital twins to help improve the reliability, performance, compliance, and safety of their infrastructure assets.

Bentley Infrastructure Cloud Benefits

Bentley Infrastructure Cloud is your ultimate destination for managing infrastructure data that can be relied on to make informed decisions, allowing you to better design, build, and operate more sustainable infrastructure.

Bentley Infrastructure Cloud:

- Manages the flow of information throughout the lifecycle in a trusted environment to efficiently and effectively collaborate across team and organizational boundaries.
- Provides governance through an open, federated environment to ensure that the right people have the right information at the right time, giving users the ability to create, edit, view, search, analyze, manage changes, and share asset and project information according to their function or need.
- Unlocks value with open access to data across the lifecycle by enabling the reuse of best practices and implementation of standards, helping you gain new insights through change management.
- Augments existing file-based workflows with data-centric workflows enabled by the iTwin Platform to streamline change management.

Use Cases

Bentley users are working on innovative projects that use data in groundbreaking ways. They see clear strategies for accelerating infrastructure intelligence, including reusing digital components and incorporating operational data from IoT sensors and drones into evergreen digital twins.

Image courtesy of ACCIONA.

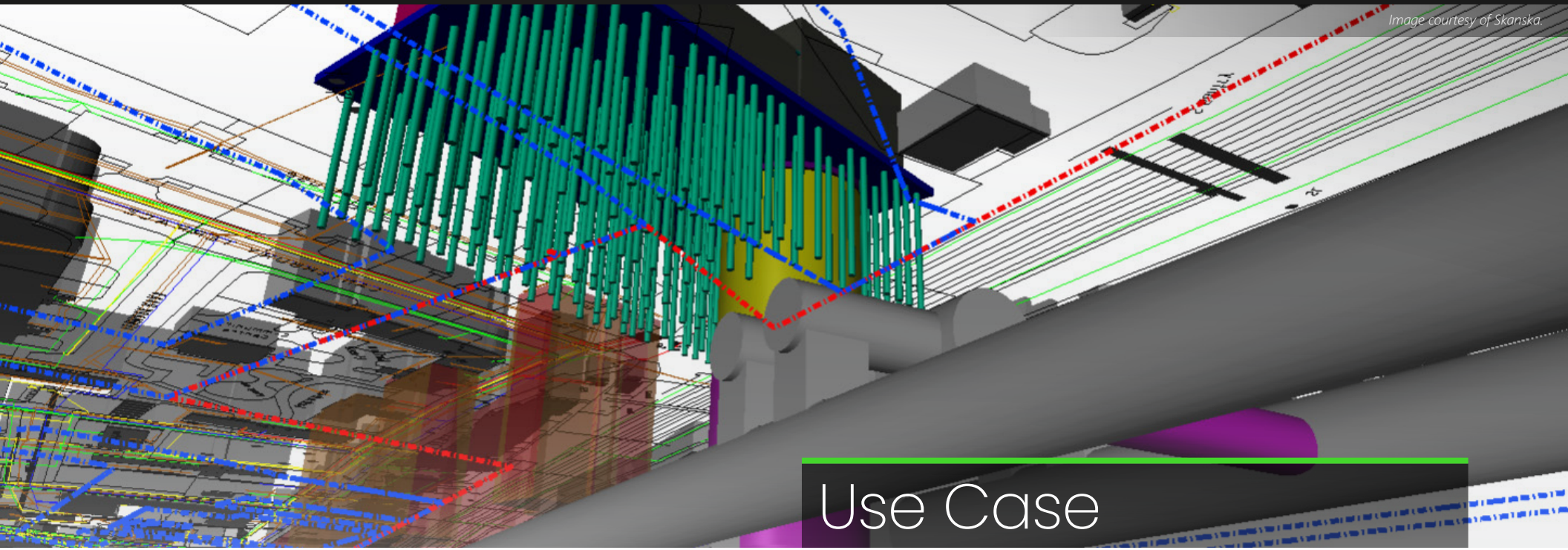

Image courtesy of WSB.

Use Case

TH 169 Redefine Elk River Project

As part of the Minnesota Department of Transportation's (MnDOT's) TH 169 Redefine Elk River initiative to support the roadway's lifecycle management and long-term maintenance, WSB wanted to share complex 3D model information between design, construction, and asset management teams. WSB faced challenges updating the design model with the construction data, as well as integrating the information with asset management systems. They needed an open digital platform to integrate all data without losing valuable information.

Leveraging Bentley Open applications, iTwin, and the design (ProjectWise) and build (SYNCHRO) capabilities within Bentley Infrastructure Cloud, WSB imported data from MnDOT and other asset management systems into the design models and integrated them with the construction process data. Bentley applications reduced costs and resource hours while delivering the as-built model. Using the iTwin Platform to create digital twins early in the engineering process facilitated collaboration that supported seamless data and model integration throughout construction and operations.



Use Case

Skanska Costain STRABAG Joint Venture (SCS)

The High Speed 2 (HS2) rail network consists of three phases, with the first phase spanning 200 kilometers between Birmingham and London. Skanska Costain STRABAG Joint Venture (SCS) was awarded two of the main civil works contracts to formulate and deliver a design scheme to be approved by the client and stakeholders. SCS needed interoperable technology to implement a comprehensive, collaborative BIM strategy to accommodate the existing British railway systems and approximately 6,000 utility assets, as well as to coordinate a geographically dispersed, multidiscipline team.

SCS used the design (ProjectWise) and operate (AssetWise) capabilities of Bentley Infrastructure Cloud to establish a connected data environment, providing the project team real-time access to trusted information wherever and whenever it is needed through Bentley Open applications. The connected data environment facilitated early contractor involvement and increased productivity and design assurance, helping the team identify and resolve costly errors to save an estimated GBP 1 million. Bentley's integrated software portfolio enabled SCS to improve productivity, saving significant time. Using Bentley applications to implement a collaborative BIM strategy underpinned by standard digital workflows improved data quality.

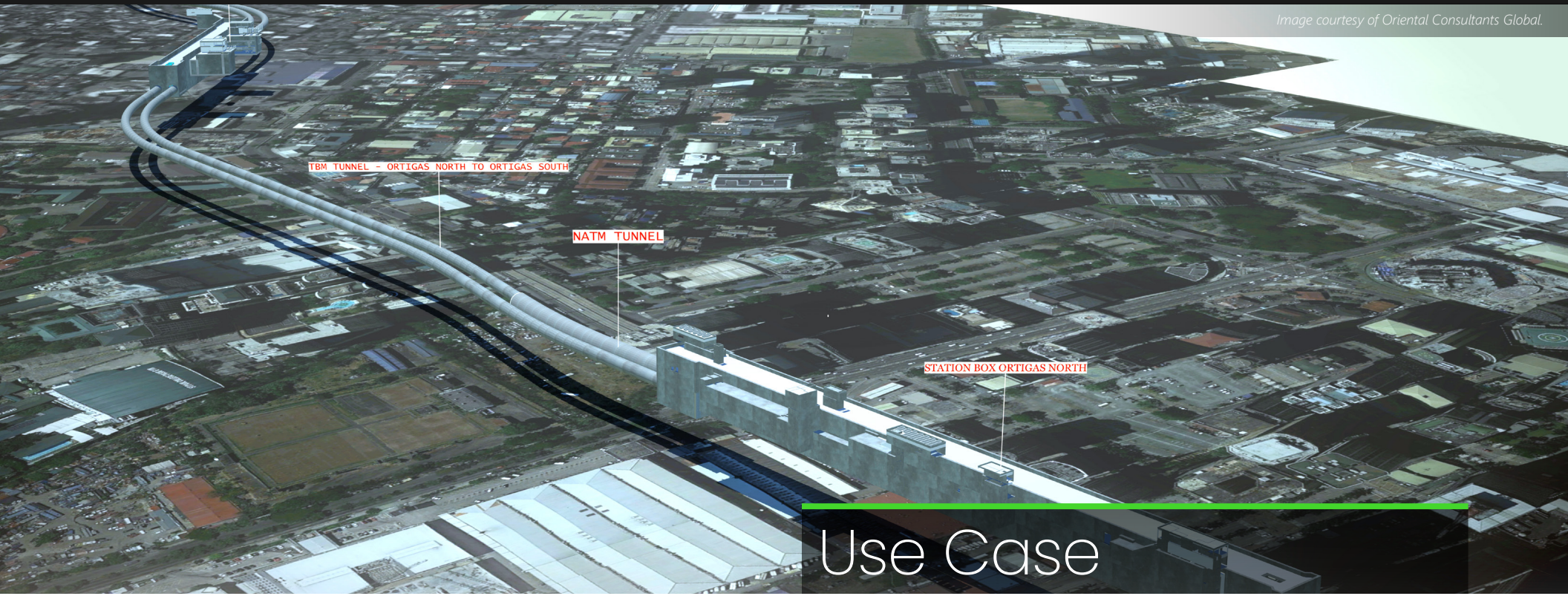


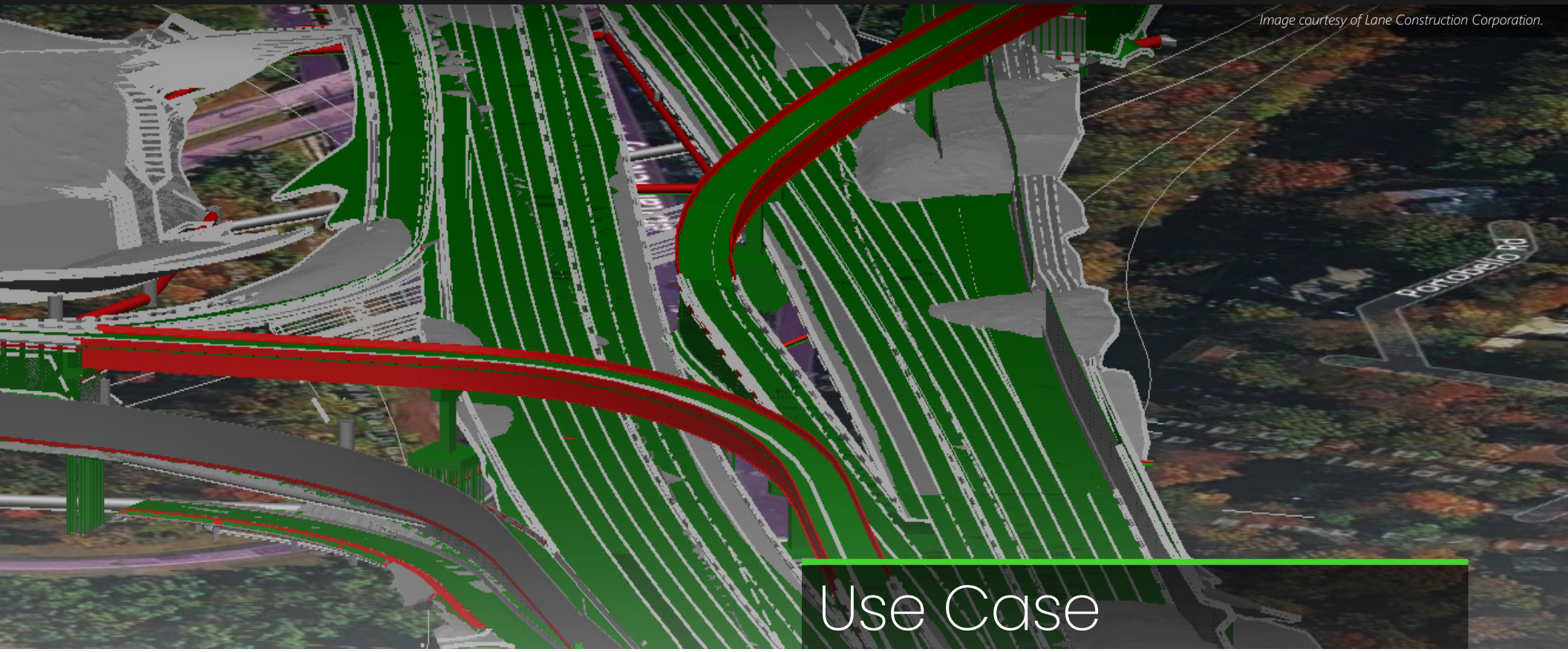
Image courtesy of Oriental Consultants Global.

Use Case

Metro Manila Subway Project (MMSP) Phase One

The Philippines Department of Transportation initiated the Metro Manila Subway Project (MMSP) to ease traffic congestion and provide safe, reliable transportation for the National Capital Region, also known as Metropolitan Manila. Phase one of the MMSP traverses six cities and includes 13 underground stations and a train depot covering 28.8 hectares above ground. The scope of the project presented communication and coordination challenges that current applications failed to address. The project team realized that the implementation of collaborative BIM workflows, proactive risk management, and cost monitoring would require a connected data environment.

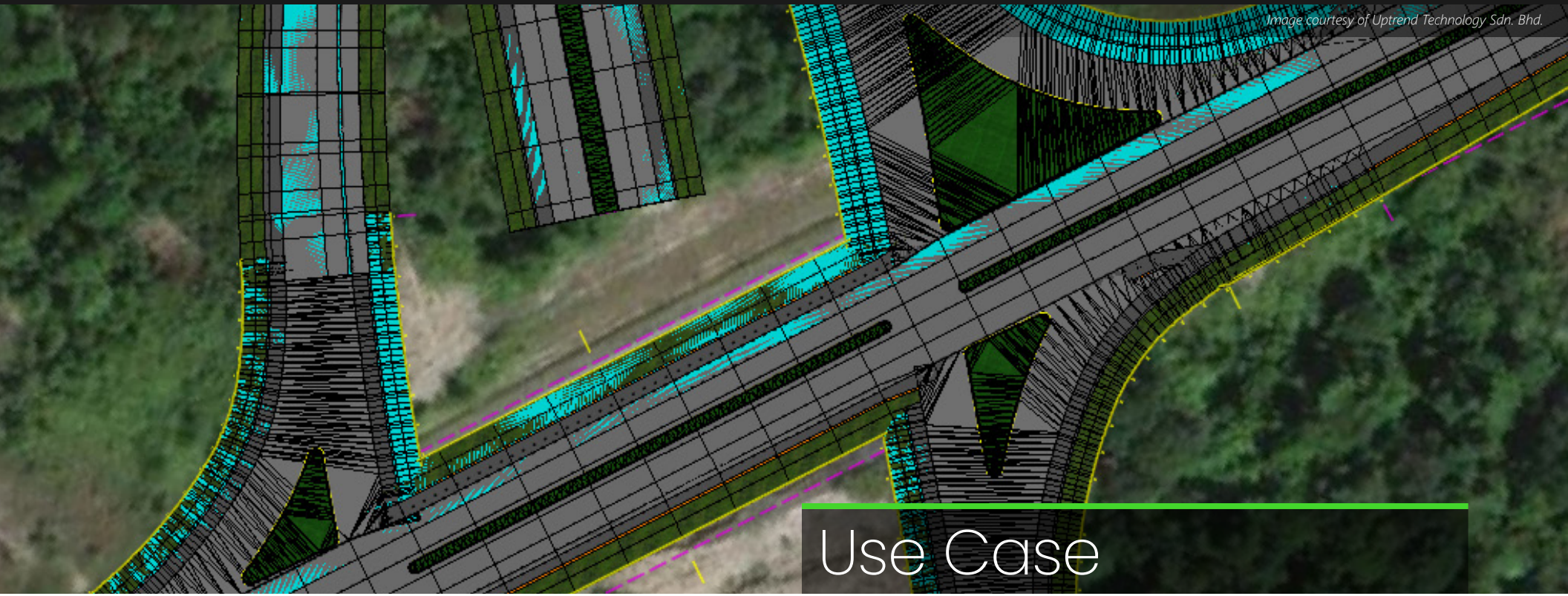
Leveraging Bentley Infrastructure Cloud's design (ProjectWise) capabilities and iTwin, the project team developed a common digital engineering system and a single source of truth that enabled real-time data sharing and optimized collaboration, saving 5,000 resource hours within the project's first six months. Combined with Bentley Infrastructure Cloud's construction simulation (SYNCHRO) capabilities, the integrated technology solution identified and resolved 50 clashes, eliminating rework, shortening the project schedule, and saving costs. The successful BIM implementation has already achieved an ROI of over USD 600,000.



I-495 Express Lanes Northern Expansion (NEXT)

To improve local travel times, access control, and safety along the I-495 corridor in Fairfax, Virginia, officials initiated a plan to add 2.5 miles of new high-occupancy travel lanes and three miles of shared-use paths to the roadway. They faced challenges constructing the lanes given the size and scope of the project, as they needed to ensure delivery on time and within budget. Lane Construction partnered with WSB to build a 3D model of the design, requiring integrated cloud-based technology to minimize costs and accelerate the project schedule.

Leveraging Bentley Open applications, iTwin, and Bentley Infrastructure Cloud's design (ProjectWise) capabilities, they established a connected data environment and 3D model facilitating real-time collaboration and transparency. Using Bentley Infrastructure Cloud's construction (SYNCHRO) capabilities to link the model with the construction schedule, they identified 15 redundant tasks, eliminating 60 days from the schedule by shortening construction. The digital solution identified clashes prior to construction, reducing risks, costs, and impacts to the traveling public and environment.



Use Case

Digital Engineering Support Services for Northern Coastal Highway, Sarawak, Malaysia

To promote and ensure balanced economic growth across Sarawak, the North Coastal Highway will connect to the main Pan Borneo Highway, enabling accessibility to rural areas of the state. The 89-kilometer, four-lane, dual-carriageway includes the construction of seven bridges over major crossings amid hilly terrain. Uptrend Technology is supporting digital engineering deliverables throughout the project lifecycle and faced coordination challenges among the remote multidiscipline team and stakeholders. They sought to establish a connected digital environment and a single source of truth.

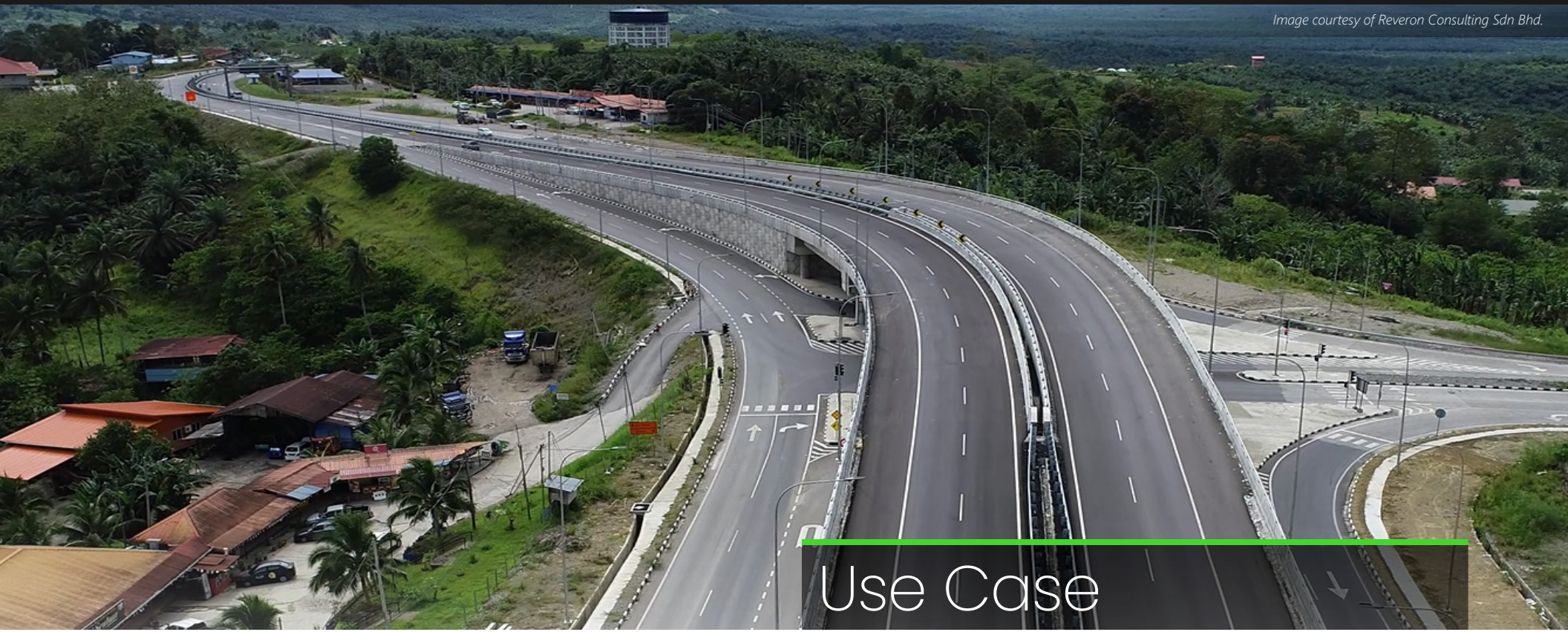
They selected Bentley Infrastructure Cloud's design (ProjectWise) capabilities as the common data platform along with Bentley's Open applications, facilitating collaborative design and streamlining workflows to improve data sharing for review and approvals by 80%. Working in a coordinated digital environment saved the design management team 30% in clash detection time, mitigating on-site construction changes and improving the quality of deliverables by 20%. As part of their digital framework, the use of iTwin Capture and Bentley Infrastructure Cloud build (SYNCHRO) capabilities will further facilitate planning during the construction stage for better visibility and site progress monitoring.

Use Case

Evolve to Digital Ecosystem for New Capital City of Indonesia

As part of Indonesia's new capital city megaproject to create the world's best smart and sustainable city, Waskita Karya is constructing toll road infrastructure to improve connectivity and shorten travel time. The company is the main contractor for the 6.675-kilometer section 5A of the total 75.62-kilometer planned highway. The project presented extreme terrain and design compatibility issues with an existing bridge on a tight construction schedule. Waskita Karya needed to accelerate precise multidiscipline decision-making to keep the project on schedule.

They selected Bentley Infrastructure Cloud's design (ProjectWise) capabilities, Bentley Open applications, and iTwin to generate digital twins and establish a real-time design review environment. Bentley Infrastructure Cloud's build (SYNCHRO) capabilities helped to communicate the construction plan and schedule. The integrated digital twin solution facilitated early clash detection, reducing design time by 40% and optimizing the road alignment, saving potential rework equivalent to IDR 12.5 billion. Bentley applications eliminated 20,000 truck movements during initial construction, saving 32,800 liters in diesel fuel consumption. Establishing a digital framework is expected to yield timely deliverables and additional construction cost savings.



Use Case

Pan Borneo Highway, Sabah

The 706-kilometer Pan Borneo Highway, currently under construction, will run from Sindumin in the southwest part of Borneo to Tawau in the southeast, connecting numerous major cities and smaller towns to improve accessibility throughout the island. With a large project divided into 35 separate work packages, the government mandated all contractors, including Reveron Consulting, use a connected data environment (CDE) and BIM techniques for development and construction.

Reveron used Bentley Infrastructure Cloud's design (ProjectWise) capabilities to establish a CDE that unified all project data and enabled stakeholders to review work and resolve design issues. Project teams then used drones to capture over 79,469 images and processed them in iTwin Capture, generating a high-fidelity 3D model of the roads, bridges, and surrounding buildings. The data was synced into iTwin and Bentley Infrastructure Cloud's construction (SYNCHRO) capabilities. The digital workflow improved communication, reduced design time by 5%, and minimized risk and on-site rework.

Image courtesy of ABM Knowledgeware Pvt. Ltd.

Use Case

Implementation of Digital Project Management System for Versova Bandra Sea Link Project

Located off the western coast of Mumbai, the Versova Bandra Sea Link (VBSL) project aims to reduce traffic congestion in the metro area through the construction of a 17-kilometer bridge connecting Versova to the Bandra Worli Sea Link in Bandra. The project presented challenges considering its open sea location, compounded by coordinating multiple stakeholders on a stringent timeline and budget. ABM Knowledgeware was part of a consortium tasked with implementing a 5D BIM digital platform for successful operation and maintenance, and needed integrated BIM, construction simulation, and asset management software.

Leveraging Bentley Infrastructure Cloud's design (ProjectWise) and operate (AssetWise) capabilities, ABM created a connected BIM and asset management platform, enabling multiple parties to collaboratively model the project and digitally manage all asset deliverables. Integrating Bentley Infrastructure Cloud's build (SYNCHRO) capabilities facilitated seamless model integration to establish 4D visual construction scheduling and 5D cost estimation. The Bentley-based engineering management solution saved significant time, streamlining workflows and accelerating approvals to keep the project on schedule and within budget, while reducing waste and rework.

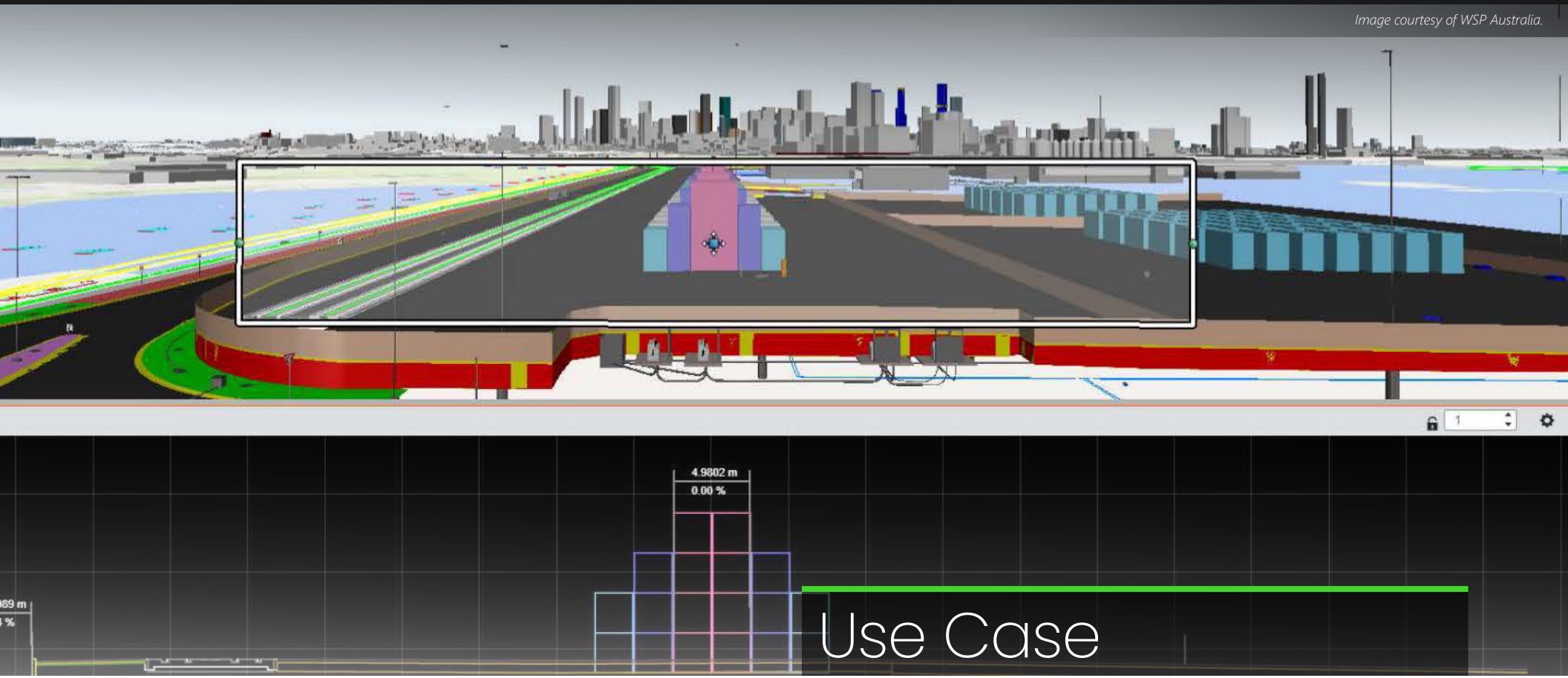


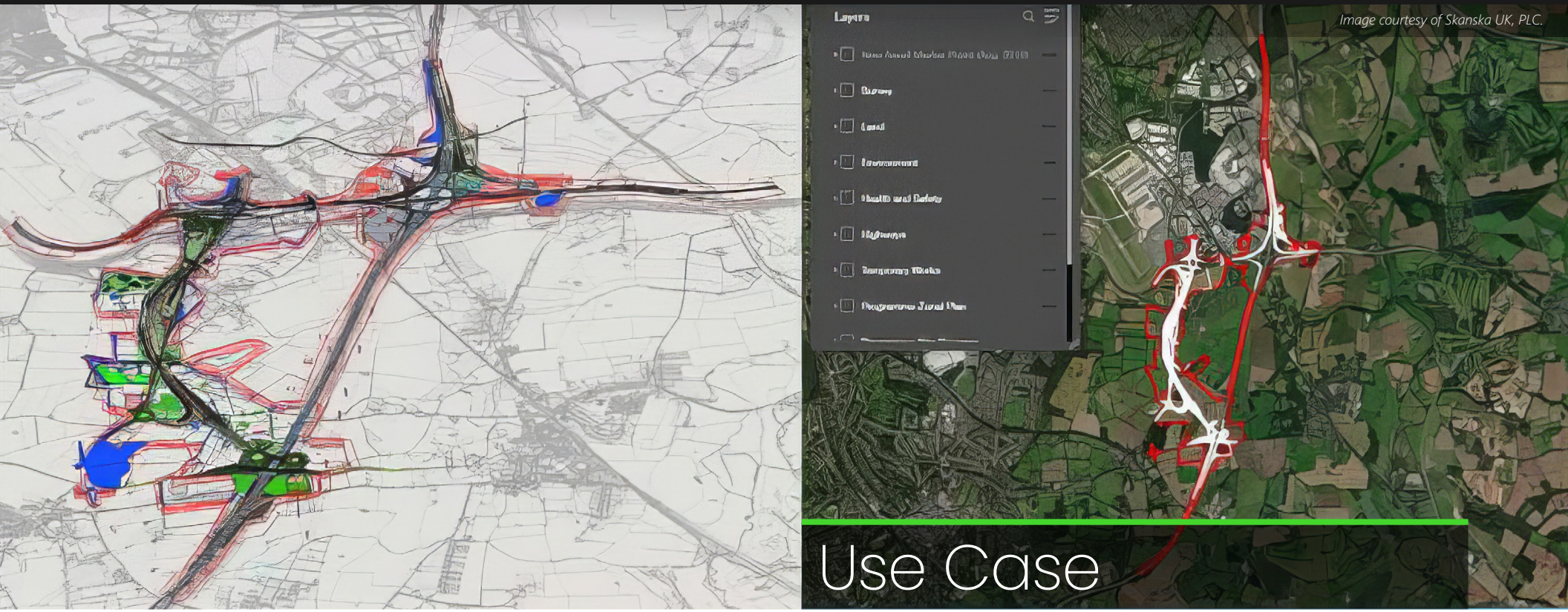
Image courtesy of WSP Australia.

Use Case

Implementation of Digital Workflows on Infrastructure Projects

Recognizing the pivotal role of effective information management and the limitations of previous technology approaches, WSP sought a comprehensive digital solution that could streamline data management and facilitate efficient collaboration while building trust in new digital workflows. They needed user-friendly, integrated technology applications that foster a holistic approach to data management, ensure compliance with ISO 19650 standards, and support a widespread digital shift.

Turning to Bentley Infrastructure Cloud, WSP used its design (ProjectWise) and build (SYNCHRO) capabilities, along with iTwin, to enhance decision-making and deliver superior project outcomes. Leveraging Bentley applications, design teams can collaborate, visualize, and review the design model in real time. Using their Port Rail Transformation Project (PRTP) as an example, WSP saved approximately 300 resource hours, reducing rework and the project timeline.



M42 Junction 6 Improvement Scheme

The M42 Junction 6 Improvement Scheme was initiated to reduce vehicle congestion, facilitating reliable transport and accommodating traffic growth in Birmingham. The project includes a new 2.4-kilometer dual carriageway, two new roundabouts, and a new pedestrian and cyclist overbridge to provide a safe and environmentally friendly roadway crossing. Skanska is delivering the project with a 100% digitization goal, eliminating siloed data and disparate information exchange, as well as addressing environmental risks. Therefore, they sought an integrated 4D/5D modeling solution.

Leveraging Bentley Infrastructure Cloud's design (ProjectWise) and build (SYNCHRO) capabilities, Skanska established a connected data environment and 4D construction model to cre ate a collaborative virtual construction sequence. Bentley's integrated digital solution streamlined workflows and provided a digital construction rehearsal, enabling the team to save earthworks equivalent to 163 tons of carbon emissions and GBP 5.86 million in soil transport costs and fees. Through 4D construction simulation and 5D cost estimation, Skanska saved 10 hours of the initial planned program time, enabling them to open the roadway to the public 13 hours ahead of schedule.

Beckton Depot Upgrade – Maintenance Facility Building

As part of their Rolling Stock Replacement program, Docklands Light Rail initiated a project to upgrade the Beckton Depot to handle heavy train maintenance activities. The project included designing a new maintenance facility, including building and renovating an existing wheel shed. Arcadis is responsible for design and delivery of the project and faced challenges coordinating a globally dispersed team and voluminous multisourced data, compounded by integrating new and existing infrastructure and systems on a tight timeline. They realized that they needed to establish a connected digital data and collaborative modeling environment.

Arcadis selected Bentley Infrastructure Cloud's design (ProjectWise) capabilities as the common platform to store, access, and share models and data across the various locations. Then, they used Bentley Open applications to perform coordinated 3D modeling. With Bentley Infrastructure Cloud's build (SYNCHRO) capabilities, they linked the 3D models to the contractor's program, facilitating clash detection and keeping the project on schedule. The integrated technology solution streamlined modeling workflows and enhanced planning and decision-making, improving efficiencies by 20% and reducing design costs by 10%. Working in a dynamic digital environment reduced rework and optimized change management, avoiding project delays.

It All Starts with Data

What the most advanced firms are already doing today:

Lighting up their dark data

Reusing data through **seamless interoperability** across applications, throughout the infrastructure lifecycle

Enjoying a **consistent** UX

Realizing the **value** of that data beyond handover

Monetizing newly uncovered **digital integration** business opportunities

Bentley Infrastructure Cloud...

- **Allows you to manage and leverage all your engineering data,** maximizing its potential for generative artificial intelligence.
- **Unifies digital project deliverables and enhances model-centric workflows** with smart sheets, enabling 2D/3D hybrid workflows and connecting traditional file-based and BIM data-centric workflows to deliver value faster.
- **Embodies Bentley's commitment to openness and interoperability** with industry standards, including IFC, BCF, CFIHOS, Mimosa, DEXPI, and third-party file formats.

Contact us for Better Outcomes Across the Infrastructure Lifecycle

Learn More