

WHITEPAPER

Locana
EVERYTHING LOCATION

Deliver Projects with Efficiency and Effectiveness Using Modern GIS

Transform IT operations with enterprise integration, web services, and field mobility



The need for transformation

The construction industry continues to grow, driven by shifts in capital availability, evolving social and environmental priorities, and continued urbanization. Indeed, the global construction market grew from **\$14,503.87 billion in 2022** to \$15,461.84 billion in 2023 at a compound annual growth rate (CAGR) of 6.6%. By 2027, a whopping **\$130 trillion** will be invested in capital projects alone.

And digital transformation will play a vital role in the future growth of **construction**, with **Deloitte reporting** that developers and contractors continue to invest heavily in technology. While construction has been historically slow to adopt digital technologies, more major and mid-sized companies alike are turning to enterprise IT to expand business opportunities and boost profits.

Why? Companies want to employ data-driven processes that reduce costs and ensure timely project delivery. Doing so supplies a key competitive differentiator in a market driven by thin margins. In addition, more recent challenges like supply chain disruptions, increased competition, worker shortages, and rising material costs increase the need for digital transformation.

Yet as many construction companies embrace enterprise technology, they often face complex legacy IT environments. This results from multiple systems and solutions, such as ERP, CRM, and planning applications, that work in isolation.

To overcome these challenges, many companies deploy modern GIS, which integrates business systems through the power of location. Modern GIS is an enterprise solution that connects systems, improves data, and employs location analytics and map-based visualization. In addition, it enables early issue identification and response to changes on the ground and facilitates information sharing and communication. Ultimately, modern GIS facilitates deploying enterprise technology to deliver projects on time and on budget.

Benefits you gain:

- Optimize strategic planning and scheduling
- Improve tracking resources, assets, and progress
- Synchronize and simplify processes
- Enhance decision-making and communication
- Reduce the risk of project overruns



The digital construction challenge

Digital transformation remains a top priority for construction businesses, but challenges remain. For many, a lack of enterprise technology and systems integration tops the issues undermining success. By one report, **30%** of engineering and construction firms use applications that don't interoperate. These systems and applications often include ERP, CRM, and others, such as advanced project scheduling solutions (like Oracle Primavera P6) and department-level solutions such as risk management.

And while many of today's leaders in capital projects and construction employ department-level GIS, they often lack a comprehensive geospatial strategy. Even the most prominent companies with teams of GIS analysts often don't employ enterprise GIS that supports other groups across a project lifecycle.

With siloed systems, disparate databases, and stand-alone applications comes duplicate data, discrepancies, and a lack of access. Managing cost, building information modelling (BIM), financials, project scheduling data, and CAD drawings becomes timely and complicated. Over **51%** of firms also reported manually transferring data, which is inefficient, costly, and time-consuming.

Further, many companies still perform tasks, such as project costings, using simple spreadsheets. Unfortunately, this process increases redundancy

and the risk of error. For example, one person will receive a version change request and make edits, and instead of saving it to a team-wide version, they save it to their personal computer. As a result, multiple versions with different data get shared throughout departments.

And the use of paper-based maps and legacy CAD drawings that haven't been digitized only add to the problem. In addition, data that could benefit several teams get stored in locations with limited access.

GIS helps overcome these challenges by unifying data and providing sophisticated analysis using location. When you employ the geography of a project—the location of resources, materials, personnel, and equipment—you see how each piece of the project puzzle fits within a geographic framework. As a result, answers materialize, including the current status of a project and what actions should occur, when, and where.

Developing a modern enterprise GIS requires mapping your current geospatial state and identifying where you want to go to meet business objectives. Then, you develop a strategy that prioritizes the systems you want to integrate, the GIS applications that will support workflows, and decision support that strengthens your business offering.

Challenges:

- Disconnected systems and software
- Disparate databases and applications
- Increasing volumes of data
- Lack of data visibility and cohesion
- Inadequate resource allocation
- Risk of schedule overruns
- Inaccurate forecasts and decisions
- Poor planning and scheduling
- Ineffective project monitoring
- Lack of visibility and coordination

Connecting organizations, people, processes, and more

Modern geospatial technology enables **an interdisciplinary approach** to planning, program management, fieldwork, and community engagement.

Perhaps at its most fundamental level, it provides **an integration platform**. Using enterprise GIS software like Esri ArcGIS, you can connect systems, applications, and data. You open data silos from traditional department-level software and applications that can transform planning, design, construction, and operations in the office and the field.

Enterprise geospatial technology supports **location analytics**, which delivers new insights that would otherwise be missed. For example, you can perform **queries** on a construction site, such as what and where are current activities, planned projects, supply levels, and environmental requirements. And powerful **visualization** provides easy-to-understand project progress and status against projected timelines. GIS also enables the collection and analysis of imagery from drones and other aerial platforms to detect and visualize changes onsite.

For example, you can capture and develop spatial data layers, such as parcel data and aerial imagery, and apply analytical tools to determine material volumes and movement. Decision-makers can quickly calculate truckload requirements to resupply stockpiles and validate invoices from hauling companies.

Modern GIS can **combine different data types**, such as schedule/P6, estimate, budget and cost forecasts, and BIM. You democratize data using map portals, enabling anyone to access tools and information from anywhere. In addition, data published as web services can be consumed in desktop and mobile GIS applications on demand. Construction teams in multiple departments work together to share location-based data in their

workflows to accomplish tasks quicker and more accurately.

Companies can **remove traditional barriers** that result from a department-level GIS framework focused primarily on only making maps on request. Instead, with an enterprise approach, you empower users to analyse, visualize, and make maps using web applications.

You **reduce IT complexity** inherent in disparate systems, databases, and locally stored data that creates duplicate, erroneous, and out-of-date information. In addition, you enable comprehensive collaboration between teams using an enterprise approach to application and data sharing.

Modern GIS can **connect design and project work** using automated functions and digital tools. It facilitates better information exchange between engineering and field operations, which improves infrastructure planning, analysis, and data capture from inception to delivery and post-work documentation. Planners and field crews work smarter, faster, and with greater accuracy.

It provides **a more complete, data-driven picture** and holistic view for developing plans. It facilitates improved data exchange during work to address unplanned items that invariably occur.

For example, planners may not understand the natural world constraints in place on the ground—whether it's:

- physical items: buildings, assets, or infrastructure not digitally captured
- scheduling issues: out-of-sequence events or conflicting tasks in the same location
- community interactions: adjacent schools or hospitals
- environmental concerns: air or noise pollution

Modern GIS enables integrating and displaying these types of data and data streams to enhance decision support.

Lastly, modern geospatial provides a new level of **mobile mapping**—solutions like **Locana's Lemur** supply field crews onsite with GIS capabilities designed around their specific workflows. In addition, the tools can be tailored for non-GIS workers to perform tasks using a streamlined and intuitive user interface. As a result, staff can easily capture accurate GIS data in the field without specialized training or equipment.

You can answer questions such as:

- Where do I locate staging areas of people, materials, and equipment?
- What additional electric, gas, and water networks are needed?
- What is the environmental impact on the surrounding area?
- Where are health and safety hazards before, during, and after the life of the project?
- What, when, and where are environmental checks needed?
- How do I know if my project is on schedule?
- How do I know what's changing on my site as the building gets built?



Increase opportunities. Reduce risk.

Modern geospatial supplies several strategic business and IT benefits that reduce the risk of rework. You provide an enterprise environment that streamlines systems and data flows and reduces waste. You manage authoritative data for assets, parcels, rights-of-way, utilities, people, equipment, supplies, scheduled work, and regulatory requirements. You replace paper maps and drawings with digital records that are more easily edited and distributed. Intuitive, user-friendly applications and maps ensure the adoption and usage of a single source of truth across project teams.

Improve decision-making: Enhance strategic planning and scheduling using a shared, continuously updated map across the construction site. Web services allow easy access to data, ensuring a single source of truth used by staff in multiple departments. Leverage an accurate view of where and when work will occur to make critical assessments and evaluations.

Enhance business processes: GIS-driven processes ensure better results, from permitting and design to as-builts, the supply chain, job site workflows, and project handover. Mobile GIS harmonizes situations and status in the field and the back office through timely data exchange. Augment location intelligence to your existing applications to thoroughly understand the surrounding environment and inform decisions.

Increase operational efficiencies: Understand past, present, and future processes using a layered data view of job site locations so that you can involve the right people in the right place at the right time. Equip teams with location intelligence and maps to support decision-making and continuous operations improvement. Automate and synchronize tasks to keep work moving forward without delay.

Lower costs: You can overcome the many challenges that add time and waste while slowing project progress. Geospatial technology helps simplify your backend IT stack to automate map production. It reduces the need for data inquiries from disparate siloed systems and waiting for data uploads. Leverage up-to-date, accurate, and complete data that ensure project timelines and lower costs.

Enhance communication: Use maps and spatial data to provide an intuitive means of communicating and collaborating on issues, opportunities, results, forecasts, and more. Solicit feedback using project maps that depict project impacts. Provide readily available dashboards to executives and senior leaders to track costs and progress.

Reduce risk: Increase safety, reliability, and work coordination using accurate data. Track and trace materials, such as concrete, onsite or in transit to ensure proper approvals. Validate other kinds of data during collection so that a construction manager or engineer can review them before they are incorporated into the system.

An enterprise-wide location advantage

Develop location-based workflows that improve every aspect of construction, including planning, design, building, operation, and maintenance. By understanding the spatial context of your plans and processes, you can sequence and carry out duties quickly and efficiently. You execute tasks using comprehensive, geographically enriched data. In addition, you discover relationships, patterns, and trends that would otherwise remain buried in data.

Scheduling

Connect GIS with scheduling applications so you can map project work. You can visualise and analyse scheduling data to develop detailed plans based on integrated data from multiple sources. Quickly identify problems early in the scheduling process to ensure timely project completion and proper sequencing. Analyse dependencies, conflicts, and opportunities between different groups to problem-solve and proactively stay on time and budget.

Project management

Operate using web portals allowing anyone to access project-specific functionality, tools, and information from anywhere. In addition, project managers can use robust visualization tools to perform what-if scenarios on planned projects to reduce risk before work begins.

Real-time data sources and project dashboards can give managers a high-level view of activity. Mobile GIS eliminates manual data entry, accelerates project progress for front-line staff, and provides mobile functionality to field leaders.

Environmental management

Ensure proper use of materials and governance of natural resources by applying unique geospatial functionality. Map activities, analyse historical data, and combine the latest environmental survey data to ensure sustainable capital projects. Adhere to guidelines and best practices that protect land, wildlife, and people using government data through web services and data captured in the field. Reduce waste and emissions while meeting sustainable operations goals and protecting biodiversity.

Resource management

Integrate diverse datasets into a common operating picture with live data feeds. Visualise people, materials, equipment, vehicles, and more on a map. Easily collect and update data from the field to maintain inventory throughout the project. Location intelligence achieves integrated insight into future demand so that companies can optimize supplies throughout a project's timeline. Transform supply chains using location to connect relevant stakeholders and foster collaboration.

Performance monitoring

Understand when a project is on time, ahead, or behind schedule using map-based dashboards that depict crucial KPIs, such as total cost and performance over time. View data depicting where and when additional resources are needed and set up live data feeds for continuous monitoring. For example, set up tracking devices for dump trucks and bulldozers to monitor vehicle locations and movement.

Stakeholder engagement

Use dynamic maps to collaborate and communicate with government and private stakeholders. Attain public project input and feedback using web maps that show real-time views of work locations, timetables, activities, and progress. Using powerful communication applications like Esri ArcGIS Storymaps, visually tell the story of work taking place, why it's being done, how it will impact people, and how an area looks before and after project completion.

Health and safety

Use geospatial technology to ensure proper staff, medical supplies, and staging areas. Use location-based processes to track health and safety issues, where they occurred, and potentially why. Integrate health regulations and requirements into the systems, applications, and data for construction work and project delivery. Monitor data in real-time to immediately identify potential issues and address concerns. In addition, provide new teams coming onsite with the health and safety information and detailed map reports to stakeholders and the public.

Asset management

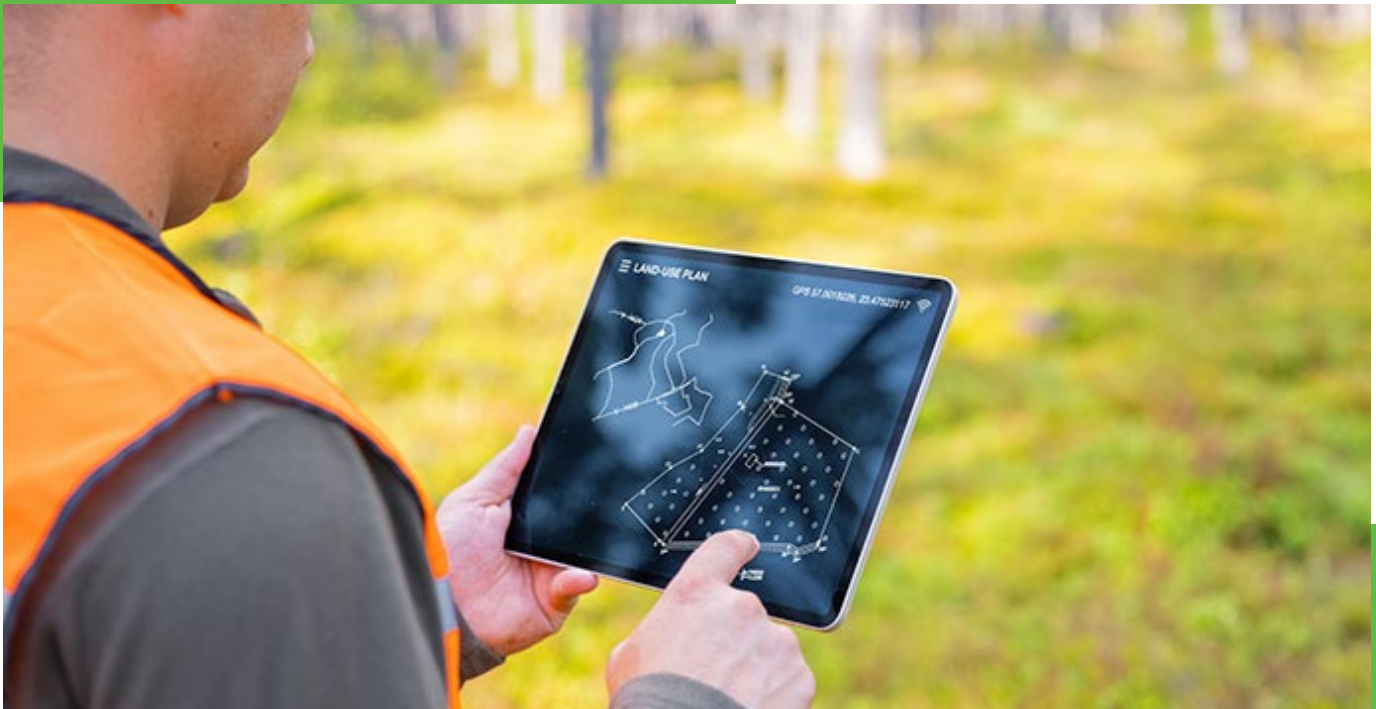
Effectively source and monitor materials, equipment, and vehicles to understand movement and usage. In addition, proactively predict when to replace or restock resources before depletion, ensuring continuous operations with little downtime impacting project delivery. Visualise and track assets, maintain historical records, monitor performance, and optimize inventory levels using GIS.

Track and traceability

Meet compliance requirements to improve and streamline processes. Trace assets from the manufacturer to procurement, engineering, installation, maintenance, and retirement. Reduce manual data entry and redundancy while ensuring accountability through barcoding, operator qualifications verification, and materials list validation.

Digital twins

Leverage GIS as an ideal platform for integrating and displaying a digital twin. Companies can integrate CAD, BIM, and imagery asset management data to display and interact with construction projects in a 3D environment. In addition, a spatially enabled, model-centric digital twin is perfect for digital data capture and maintenance efforts using mobile solutions. GIS also makes it easy to connect new capabilities that take raw image products captured from an optical sensor or laser point cloud to develop a finished digital twin data product.



Modernize with a trusted construction partner

For companies seeking to transform their operations using a modern geospatial approach, Locana can help. We collaborate closely with customers to **develop a strategy** that doesn't require high software costs or a rip-and-replace implementation model.

Locana has partnered with major construction companies for decades to transform their IT ecosystem by supplying cross-functional GIS capabilities that improve the entire construction lifecycle. As a result, we have the expertise and insight to help modernise your IT performance.

Built on years of acquired industry knowledge, expertise, and service, Locana's deep understanding of construction processes allows us to cater solutions based on our client's needs and objectives. We leverage a unique delivery model using innovative insights, best practices, and lessons learned from previous customer projects. We partner with leaders in software and services, from Esri to Oracle and beyond. And our "vendor independent" approach means that customers have more options to implement solutions that fit specific business and technology requirements.

Ready to discover how to deliver projects on time and within budget using modern geospatial? Visit to **learn more**.

Locana

Contact Locana today to learn more about how you can deliver projects efficiently and effectively with modern GIS.

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[Locana.co](https://locana.co)



info@locana.co



303-713-3230