CGS Immersive

Walk Future Projects On Site at Full Scale with Mixed Reality

A mixed reality job-site workflow for walking tomorrow’s designs on today’s site.

REPORT

01 How construction teams see tomorrow's work on today's site

What if you could walk a finished construction project months before the first crew arrives?

This walkthrough is not in a glossy video experience and not as a 3D model on someone's laptop, but rather on the actual site, at full scale, with the people who'll have to live with project decisions.

That's the ambition behind this CGS Immersive project for A5 Rail. A5 Rail is a specialist railroad services firm that focuses on squeezing more value out of every mile of track for its clients. The team brings hands on experience from complex freight yards, mainline upgrades, and public private rail projects, combining engineering, construction, and project delivery know how.

A5 Rail and CGS Immersive are using mixed reality to put crews into a full-scale view of projects before anyone touches the track and experiences real risks. OVRLAI is CGS Immersive's mixed reality job-site app that drops engineering-grade models into the real site so teams can walk future work at true scale.

Instead of asking teams to imagine how future assets will fit into the real environment, our mixed reality workflow drops engineering-grade models into the actual site so decision-makers can walk the work at true scale. Using XR passthrough and CGS Immersive's briefing and review tools, your organization stands where the work will happen, sees what's coming, and cuts off problematic design ideas while they're still easy to change.

The focus isn't on headsets. It's on giving construction and infrastructure teams something they've never really had before: a dress rehearsal for reality.

02 Why 2D plans fail construction and infrastructure teams

Most major decisions in construction and infrastructure still live in slide decks, drawings, and models on flat screens. People shuffle PDF sets across a table, take quick site walks, and then do the hardest part in their heads: imagine how it will all come together in the real environment.

That can work, but it makes every review a test of imagination. A clearance looks fine in plan view. An access route seems workable in a 3D export. A construction sequence sounds reasonable in a meeting where nobody is wearing PPE. Then the asset shows up, and the site, the design, and day to day operations stop lining up.

By that point, options shrink, fixes cost more, and schedule, safety, and service are all at risk.

Insight doesn’t come from observing designs. It comes from experiencing them.

03 What makes this mixed reality workflow different from traditional VR and AR

For years, immersive tech was sold as virtual spaces and floating overlays. It made great trailers and so-so tools. The work here goes in the other direction.

The site stays real. The stakes stay real. The engineering data stays real. Passthrough mixed reality takes engineering grade models and drops them into the live site at true scale so teams can walk them, not just watch them.

Traditional VR is brilliant when you want a fully simulated world, but it pulls you away from the actual environment you care about. Standard AR is handy for quick overlays, but often too shallow for the layered, messy decisions in big projects. In this experience, the real world remains the main stage; mixed reality just lets the future step onto it.

04 How mixed reality turns plan reviews into full-scale job rehearsals

With client partner A5 Rail, CGS Immersive built a way for teams to stand on an active site, see future designs in mixed reality, and walk a proposed alignment as if it already exists.

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Instead of sitting in a meeting room arguing over what a drawing means, people stand where the asset will live and look at the same full scale model. The conversation changes fast: does this actually fit, where does it block access, how does this feel for workers, drivers, passengers, or residents, and what has to move before this becomes a real world problem?

That shift goes beyond one rail project. The same pattern works anywhere large physical changes intersect with complex operations, including ports, utilities, energy, campuses, and airports. Teams stop waiting for reality to reveal the weak spots; they rehearse the future, adjust, and then build.

05 How OVRLAI works on a live job site

The job site becomes the workspace.

Someone puts on the headset and launches OVRLAI, our mixed reality job-site app within TeamworkAR. There's no virtual lobby and no cartoon environment. The real site appears around them: ballast, concrete, fencing, equipment, sky. OVRLAI uses passthrough and boundary suppression so digital track, structures, or other planned assets appear in that real environment, exactly where they're supposed to go.

The experience is fully hand tracked. No controllers to learn, no extra gadgets to worry about. People reach out to grab a length of track, a structure, or a piece of plant, pinch to open menus, slide assets into position, and interact directly with the engineering data in front of them. It feels closer to handling a physical mock up than wrestling with a new interface.

The workflow stays intentionally simple:

01 Choose a model.
02 Align it to the site.
03 Lock it.
01 Walk it.

The goal is to let everyone see the work the way they will live it later and change it now if it does not feel right.

06 How full-scale mixed reality helps teams spot risks earlier

Current state and future, side by side.

Inside OVRLAI, teams compare what is there today with what is coming. In the rail scenario, existing tracks and proposed tracks split into separate layers so people can focus on: where clearances tighten, how crossovers and junctions behave, which access paths stay safe and which vanish, and how future work will sit alongside live operations.

Teams walk the route, lean into problem areas, toggle elements on and off, and spotlight sections that need another design pass. Design, construction, and operations no longer carry three different mental pictures of the same change. Everyone is standing in the same version of tomorrow.

Over time, that shared view turns into a kind of a shared visual language for accelerated reviews and briefings: “let’s go look at it” replaces “let’s argue about which drawing is right.”

The time required to move from design review to final stakeholder sign-off was compressed by multiple weeks, as non-technical owners could walk the design on site and provide instant approval.

07 Real-world example: finding a platform and track clearance problem in advance

Imagine a busy station that needs a new piece of track and a small platform extension.

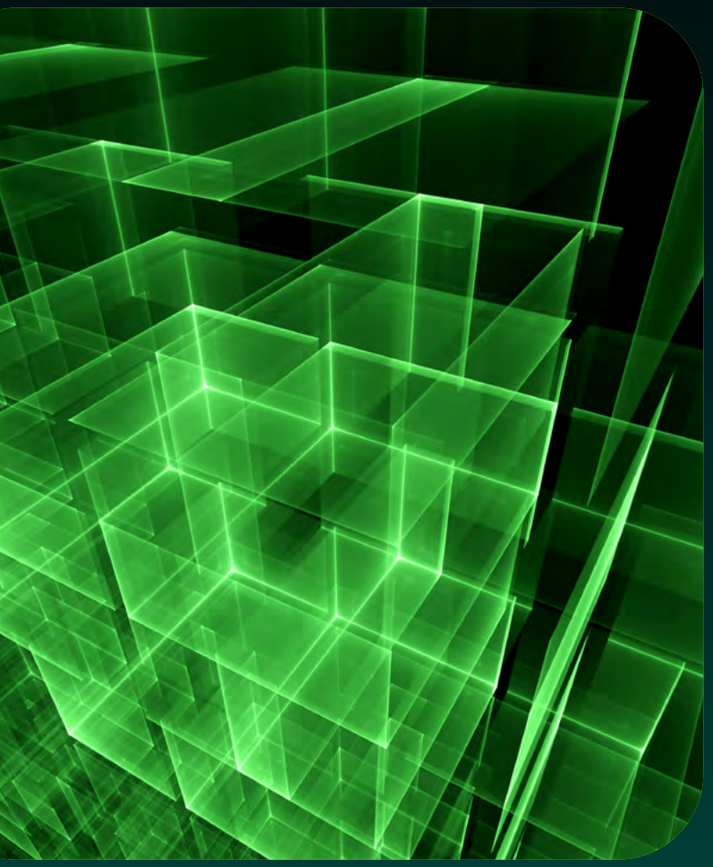
On paper, the gap between the track and the platform edge passes every check. In a slide deck, everything lines up. In OVRLAI, the project team stands on the actual platform, walks the future track at full scale, and immediately feels how tight that gap will become once people, barriers, and equipment are in place.

Nobody needs to squint at a cross section and guess. They are standing in the future and can feel the problem.

With mixed reality, the tough conversation about redesign, scope, or sequencing happens months earlier, instead of finding it when schedules are tight and options are limited during commissioning.

By identifying this clearance issue, the team avoided a late-stage redesign that would have delayed commissioning by several weeks.

08 OVRLAI cuts through 3D noise on-site



Infrastructure models are not neat little objects. They're full of overlapping layers: enabling works, demolition, new builds, temporary works, utilities, no-go zones, safety envelopes, and all the things crews care about that spreadsheets tend to hide.

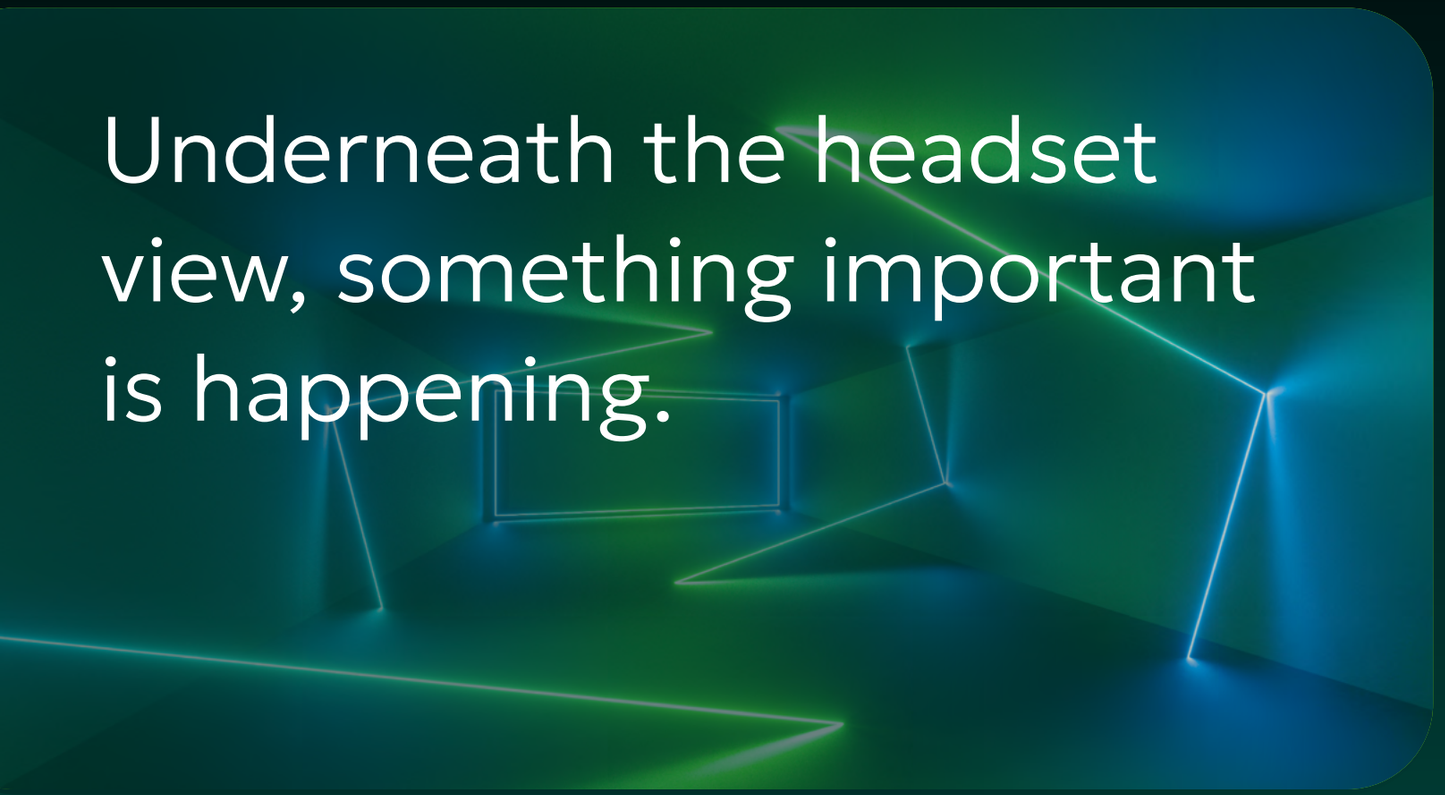
The layers and toggles built into OVRLAI make it easy to strip out the noise and bring only the relevant work, constraints, and safety information into view:

- Want to see only removals? Turn off everything else.
- Want to bring in no go zones and buried services? Switch those layers on.
- Want the end state without legacy clutter? Hide the old and view the new.

On paper, that might look like a UI detail. At three in the morning in the rain, it's the difference between "I can't tell what I'm looking at" and "I can see exactly the slice of the project we're talking about."

Teams don't need more information. They need the right view of it for the decision in front of them.

09 How CAD and BIM models are transformed for real-time mixed reality



Underneath the headset view, something important is happening.

The team takes heavy engineering files like CAD and BIM and runs them through a pipeline that trims them down for real time use but keeps the structure that matters: layers, groups, hierarchy, and naming. The models become light enough to run smoothly on site while staying smart enough to filter by phase, discipline, or constraint instead of collapsing into one giant blob.

People don’t have to know that to walk the future alignment at full scale on the real site. But it’s why the experience feels like a serious tool rather than a one off visual stunt. And if a technical team wants the details, the product team can walk them straight through the pipeline.

10 How OVRLAI reduces rework, delays and “how did we miss that” moments

Make better decisions before costs are locked in.

All of this is playing out against a bigger backdrop: aging workforces, capital-intensive assets, and infrastructure backlogs that leave very little room for rework. For construction and infrastructure owners, the value shows up as fewer surprises and more predictable launches. Teams spot issues early, get stakeholders aligned on a shared, full scale view, and avoid late stage clashes that blow up schedules and trust.

For delivery partners and design teams, it becomes a sharper review loop. Designs are tested in context, constraints stand out sooner, and “what if we moved this?” can be answered on the spot, standing on the real ground.

For operations teams, it’s a way to see how future work collides with access paths, work zones, existing assets, and day-to-day reality before crews arrive. People can walk the next shift ahead of time instead of discovering the pinch points in the middle of it.

None of this works if the experience is roughly right. The team maintains true to design scale from the original model into the headset so a tight clearance in a drawing still feels tight in mixed reality and holds up when someone pulls out a tape measure on site.

The pattern applies anywhere large physical changes meet complex operations, including utilities, energy networks, ports, airports, logistics hubs, manufacturing campuses, and beyond.

11 How OVRLAI runs in the real world: one experience, different ways in

On site, Meta Quest headsets deliver the full mixed reality effect: stereoscopic 3D, passthrough, and hand tracking. That's where the spatial sense lands—the instant "this is too close," "that's in a good place," or "this won't work when it's dark and busy."

Not everyone needs a headset to get value. iPad support gives supervisors, clients, and adjacent teams a familiar way in. They can stand on site or sit in a meeting room, move around the same model with touch, and switch layers through a simple interface.

Same models. Same scale. Different comfort levels.

And the story is bigger than a single app. The experience sits on top of CGS Immersive's three pillars, built in collaboration with world class partners like Meta and Unity:

- **TeamworkAR** is CGS Immersive's enterprise mixed reality platform that turns workspaces into learning and support zones, giving teams real-time guidance, collaboration, and "see-what-I-see" help on any device, so they solve challenges faster and train by doing.
- **Cicero AI** to keep the right project knowledge, layers, and context within reach.
- **Transformation consulting** to weave these tools into real planning, briefing, and delivery rhythms—so they change how work happens, not just how it looks in a demo.

That's the difference: CGS Immersive is a transformation partner that uses and builds the right technology, with the right partners, for practical, high stakes use cases—so teams get outcomes, not just another cool piece of kit.

12 How CGS Immersive works differently

The Test Kitchen series isn't a gallery of cool experiments that never leave the lab. It's where CGS Immersive teams up with clients and subject matter experts to tackle live operational problems and build future forward projects that change how work gets done **end-to-end, from the first "what if" conversation through field trials and rollouts across sites.**

There's a simple bar for anything we graduate out of the Test Kitchen: it must change how decisions get made, how ready people are when they show up, or how closely the outcome matches (or exceeds) the original intent. If it can't move at least one of those levers in a meaningful way, it doesn't ship.

In this project, that filter produced a mixed reality workflow that lets teams see future infrastructure in context, challenge assumptions before work begins, and build a stronger base for planning, readiness, and execution. We start with a focused strategy huddle, pressure test ideas on real sites, then lock in what works through playbooks, training, and day to day routines.

CGS Immersive combines mixed reality, project context, and workflow change to help teams make better decisions before work hits the site.

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Mixed reality turned plan reviews into full-scale job rehearsals on the actual site. We removed multiple weeks from the design sign-off cycle, caught clearance risks months earlier, and avoided the late-stage redesigns that usually hit schedules and budgets hardest.

— **Mark Allen**, Chief Operating Officer, A5 Rail LLC

Want to see how it works in your world?

If you run stations, substations, depots, yards, plants, ports, or campuses and you recognize the pain of only seeing the real problem when everyone is already working on site, or the challenge of bringing new technical talent up to speed as your experienced workforce retires, this is the kind of story we should talk about.

What makes this different is not just the visualization. CGS Immersive helps clients move from focused strategy sessions to on-site mixed reality reviews, then carries what works into playbooks, training, and day-to-day routines so better decisions hold up in the field.

Our team can help you explore how passthrough experiences could let you “walk the future before you build it” on your own projects.

SCHEDULE A CONVERSATION

