

**WHITE PAPER #4**

# The Four Levels of Collaborative Intelligence™

*Moving from Facts to Innovation with AI*

*The greatest value of AI may not be in helping us know more facts. It may be in helping us move more quickly toward insight, judgment, creativity, and innovation.*

## Introduction

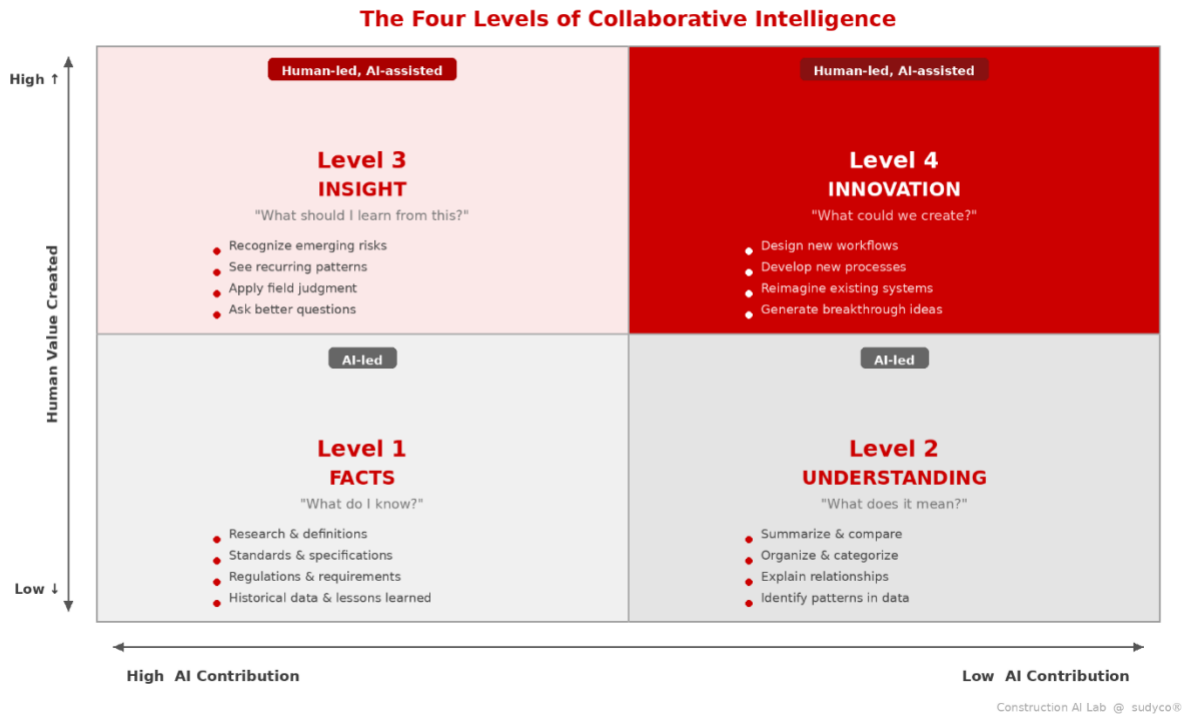
This white paper was inspired by a discussion of learning models used by Alpha School, an innovative educational organization exploring how AI can support personalized learning. One concept that stood out was the idea of depth of knowledge — a progression from basic information acquisition through deeper understanding, insight, and ultimately innovation.

While originally developed in an educational context, this concept translates directly and powerfully to how construction professionals can learn and work alongside AI. Most professionals today use AI primarily to find information, draft communications, generate summaries, or automate routine tasks. These are genuinely useful capabilities — but they represent only the beginning of what is possible.

This white paper introduces the Four Levels of Collaborative Intelligence — a framework for understanding what AI is actually capable of, where human intelligence remains irreplaceable, and where the greatest opportunities for competitive advantage in construction truly lie.

## The Framework at a Glance

As you move from Level 1 to Level 4, AI contribution decreases and human value created increases. The four levels build on each other — organizations that develop capability at the lower levels create the foundation for reaching the higher ones.



## The Four Levels

### LEVEL 1 Facts — "What do I know?"

The first level of collaborative intelligence is about accessing and retrieving information. AI is exceptionally fast and thorough at surfacing research, definitions, standards, specifications, regulations, historical data, and lessons learned. For most construction professionals, this is where their relationship with AI begins.

**Where AI excels — examples in construction:**

- What does this specification section require?
- What is the standard purpose of a Request for Information?
- What are the key provisions of this contract clause?
- What OSHA regulations apply to this scope of work?

*Facts are essential — but for many professionals, AI use begins and ends here. Facts alone rarely change project outcomes.*

### LEVEL 2 Understanding — "What does it mean?"

The second level moves beyond raw information into meaning. Here, AI helps construction professionals make sense of what they know — organizing, summarizing, comparing, and explaining information in ways that reveal relationships and context. This is where data becomes useful.

**Where AI excels — examples in construction:**

- Summarize this subcontractor coordination meeting.
- Compare Design-Bid-Build and CMGC delivery methods for this project type.
- Explain the practical meaning of this specification section.
- Organize these field notes into categories by trade and risk level.

*Most current AI applications in construction operate primarily at Levels 1 and 2. This is valuable work — but it is not yet where competitive advantage is built.*

**LEVEL 3 Insight** — *"What should I learn from this?"*

The third level is where learning becomes distinctly more valuable — and more human. Insight requires recognizing patterns across information, understanding implications, seeing risks before they surface as problems, and applying judgment developed through years of field experience. AI can help organize the conditions for insight to emerge, but humans must do the essential interpretive work.

**Where human judgment leads — AI supports:**

- Why do coordination failures keep recurring on this project?
- What pattern is emerging across our change order history?
- What risks are we systematically overlooking in preconstruction?
- What assumptions about this owner relationship may no longer be accurate?

*Insight is where information begins to influence decisions in ways that matter. This is often where real competitive advantage begins to emerge.*

**LEVEL 4 Innovation** — *"What could we create that does not exist today?"*

The fourth level is where collaborative intelligence reaches its full potential. Innovation moves beyond understanding existing conditions and focuses on creating something genuinely new — new workflows, coordination processes, business models, or approaches to partnering and project delivery. This level requires the full combination of knowledge, experience, judgment, and human imagination. AI can help develop, refine, and implement innovative ideas — but the creative spark and the courage to act on it remain irreducibly human.

**Where human imagination leads — AI accelerates:**

- How could project coordination meetings be completely redesigned to eliminate waste?
- What new process could systematically reduce rework across trade partners?
- How can we get decisions to happen faster by using small focused teams?
- What new business model could emerge from our organization's capabilities in this AI era?

## From Facts to Innovation: A Real-World Example

The four levels are easier to understand when they are seen in action. The following example shows how a real construction situation moves through each level — and how AI and human judgment each contribute at different stages.

*A project manager on a major roadway project discovers an unknown underground utility while excavation is underway. The utility was not shown on the plans. Underground utility markings had been completed before construction began, yet no utility owner has claimed responsibility for the facility. The utility appears to be a 6-inch steel conduit located approximately five feet below grade and running parallel to the roadway. If the utility is active, damaging it could disrupt critical services and create substantial liability. If it is abandoned, construction may be able to proceed more quickly. Unfortunately, no one knows which is true. Work in the area is delayed while the project team attempts to determine what the utility is, who owns it, and what actions must be taken.*

### Level 1 — Facts: “What do I know?”

The project manager begins gathering information. Using AI, the project team quickly reviews utility maps and as-built drawings, historical project records, utility company information, project specifications, contract requirements, utility correspondence, and field photographs.

AI organizes all of this into a Utility Investigation Summary that identifies known facts, unknown information, potential utility types and owners, required investigation actions, and potential project impacts.

Instead of searching through dozens of documents and emails, the project team now has a clear picture of what is known, what is unknown, and what still needs to be determined.

### Level 2 — Understanding: “What does it mean?”

The project manager and Resident Engineer review the information together. Although they now understand more about the utility itself, they still cannot determine ownership or whether the facility is active or abandoned.

During the discussion, the Resident Engineer mentions that he serves on an internal agency committee exploring how AI might help the agency make better use of information it already collects. The project manager responds:

“If somebody could figure out a way to solve this problem faster, it would save projects a tremendous amount of time and money.”

The utility problem is eventually resolved through traditional investigation methods. But the comment stays with the Resident Engineer — and sparks a larger question.

**Level 3 — Insight:** *“What should I learn from this?”*

At a later committee meeting, the Resident Engineer shares the experience. A headquarters representative explains that every change order across the agency is categorized for reporting and trend analysis. One of those categories is: Unknown Utility Relocation.

As the committee explores the idea, they realize something important. The agency has accumulated years of change orders in this category — and within those records may be utility descriptions, sizes, materials, depths, locations, investigation outcomes, ownership determinations, and schedule and cost impacts.

The information was never collected to solve future utility problems. It was collected to administer projects and track change trends.

The insight emerges: the agency already possesses years of experience dealing with unknown utilities — but that experience exists only as isolated project records. No one has ever analyzed the information collectively to identify patterns that could help future project teams.

**Level 4 — Innovation:** *“What could we create that does not exist today?”*

The committee launches a pilot project. Using AI, they analyze years of change orders categorized as Unknown Utility Relocation — extracting and organizing information across hundreds of projects, identifying relationships between utility characteristics, project locations, ownership determinations, and investigation outcomes.

The agency develops the concept of a Utility Discovery Intelligence System. When a future project discovers an unknown utility, the team enters all the known information, like what our project team had, and AI compares it against years of agency experience to produce an investigation report:

**UTILITY DISCOVERY INTELLIGENCE SYSTEM**

*AI-Generated Investigation Report*

**MOST PROBABLE UTILITY OWNERS**

- Regional Telecommunications Provider — 62%
- Electrical Utility Company — 21%
- Former Communications Company (later acquired) — 9%
- Local Agency-Owned Facility — 5%
- Unknown — 3%

**PROBABILITY OF STATUS**

- Active — 68%
- Abandoned — 32%

**HISTORICAL AGENCY EXPERIENCE**

- Similar facilities identified on 14 previous projects.
- Eleven were ultimately determined to be telecommunications conduits.

- Average investigation time was 38 days.
- Similar discoveries most frequently occurred in transportation corridors constructed between 1955 and 1975.

#### RECOMMENDED INVESTIGATION ACTIONS

- Contact the Regional Telecommunications Provider utility engineering group.
- Review historical corridor utility agreements. (AI can help)
- Contact utility asset management personnel.
- Review previous projects with similar discoveries.
- Verify active status before any disturbance occurs.

The utility still requires investigation. The owner must still confirm responsibility. The facility must still be treated safely until its status is verified. However, instead of beginning with complete uncertainty, the project team now begins with informed probabilities and a prioritized investigation plan.

***The innovation was not created by AI. It was created by people who connected a project problem, organizational knowledge, and AI's ability to identify patterns across large amounts of information. AI accelerated the analysis. Human curiosity created the question. Human insight recognized the opportunity. Human creativity transformed that insight into something capable of improving future project performance. This is the essence of Collaborative Intelligence™.***

## From Productivity Tool to Strategic Advantage

The construction industry has always rewarded the professionals who think most clearly under pressure. AI does not change this. What it changes is the speed at which the first two levels — gathering facts and building understanding — can be completed. When AI can compress hours of research and summarization into minutes, attention is freed for the work that creates the most value: developing insight, exercising judgment, and generating innovation.

For construction executives and owners, this is not a productivity story. It is a strategic one.

***As AI increasingly handles information and summarization, human value shifts decisively toward insight, judgment, collaboration, creativity, and innovation.***

The organizations that learn to use AI as a genuine partner in developing insight and driving innovation will create far more durable competitive advantage than those who use it only to move faster through the first two levels. This is not a distant future. It is a choice available to construction leaders right now.

## The Roadmap to Collaborative Intelligence

Collaborative Intelligence is not simply the use of AI tools. It is the intentional partnership between human and artificial intelligence — each contributing what it does best — to achieve outcomes that neither could reach alone.

| AI ACCELERATES                                 | HUMANS CONTRIBUTE                    |
|--|--------------------------------------|
| <i>Facts and research</i>                      | <b>Judgment and context</b>          |
| <i>Information synthesis and summarization</i> | <b>Values and relationships</b>      |
| <i>Comparison and categorization</i>           | <b>Insight and interpretation</b>    |
| <i>Pattern recognition support</i>             | <b>Creativity and imagination</b>    |
| <i>Drafting and documentation</i>              | <b>Leadership and accountability</b> |

Together, these contributions create the conditions for deeper insight and breakthrough innovation. The goal is not to replace human thinking. The goal is to free construction professionals to spend more time doing the kinds of thinking that matter most — the thinking that creates value, solves real problems, and shapes the future of how projects get built.

**The Four Levels of Collaborative Intelligence provide a roadmap for how construction professionals can learn, think, and create value in an increasingly AI-enabled world.**

Construction AI Lab Research Team

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