Artificial Intelligence In



Civil Site Design

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Introduction

Civil Site Design now includes a suite of AI-powered features to help you work faster, reduce repetitive configuration, and get expert support directly inside your civil design environment. These features are powered by two types of AI: **Project-Based AI**, which work across your entire project and **Tool-Based AI**, which assist you within a single tool.

> **INFO**
>
> AI features require an active Civil Survey Applications licence and an internet connection. All communication with AI services is performed through secure API connections.
>
> Project files and databases are not uploaded or stored on AI servers. Project analysis is performed locally, with only the information required to fulfil a request being transmitted as part of the AI prompt.

The SAVER Principle

The SAVER Principle is central to our AI strategy. It defines how our AI is built and how it should be used:

- **Suggest** – The user initiates a workflow using natural language.
- **Assess** – The AI proposes a structured workflow plan.
- **Verify** – The user reviews and refines the plan through interaction with the AI.
- **Execute** – The workflow is carried out only after user approval.
- **Review** – The user evaluates the results to ensure accuracy and completeness.

This framework ensures that users remain firmly in control at every stage. Even as more advanced AI capabilities are introduced, a clear and deliberate checkpoint always remains before any action is taken.

What is an AI Agent?

An AI agent is an intelligent software assistant that can understand natural language, access specialised knowledge, and use software tools to help complete tasks.

"Agents are systems that independently accomplish tasks on your behalf."

— OpenAI, *A Practical Guide to Building AI Agents*

"Agents are systems where Large Language Models dynamically direct their own processes and tool usage, maintaining control over how they accomplish tasks."

— Anthropic, *Building Effective AI Agents*

1. Project Assist AI

Overview

Project Assist AI is an integrated AI Agent platform. It allows users to interact with intelligent Agents that understand project data, access knowledge resources, and assist with a wide range of tasks.

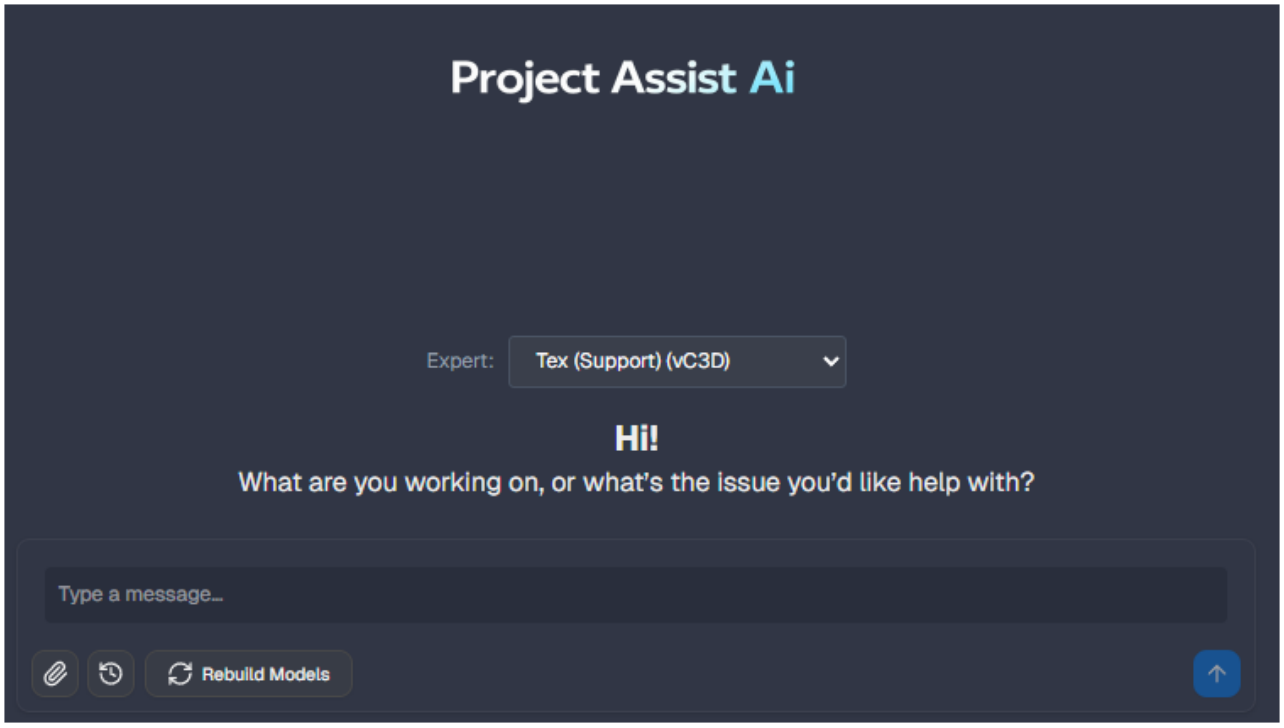


Figure 1: Project Assist is an integrated AI Agent platform

Rather than searching through help files or documentation manually, users can converse with an AI Agent that can analyse project information, answer questions, and provide context-aware guidance.

The first Agent available on the platform is **Tex**.

Meet Tex

Tex is a passive AI Agent designed to assist and help users work more efficiently. While **Tex** can inspect and analyse project data, it cannot modify your design or make changes to your project.

What can Tex do for you?

Assistance with learning

Provides guidance on tools, commands, workflows, and troubleshooting.

Assistance with Technical Support

- Answer questions about tools, commands, and workflows.
- Explain warnings, errors, and common troubleshooting scenarios.
- Provide step-by-step guidance for complex design tasks.
- Search help resources and skills in real time to deliver accurate, up-to-date information.
- Assist with best-practice workflows and design methodologies.

Assistance with Reporting

Analyses project data, identifies potential issues, and generates actionable reports and summaries.

Tex combines access to an extensive skill library, help resources, and project data. Rather than relying on generic AI knowledge, **Tex** retrieves authoritative information in real time to provide accurate, version-specific answers and recommendations.

Assistance with Project Insights

- Review project data for inconsistencies, omissions, and potential issues.
- Generate reports on roads, alignments, surfaces, intersections, pipe networks, and other project components.
- Identify missing associations, template mismatches, or incomplete design elements.
- Inspect project data directly using Project Assist AI tools to understand the current project state.
- Summarise project information and highlight areas that may require attention.

Working with Tex

Tex acts as a knowledgeable assistant that helps users understand, review, and navigate their projects more efficiently. By combining software expertise, project awareness, and access to authoritative help resources, **Tex** can provide targeted assistance without requiring users to manually search through documentation.

> **IMPORTANT**
>
> **As a passive Agent, Tex cannot modify your project or create design data. All design decisions and changes remain under the user's control.**
>
> **All AI conversations are logged locally and are retrievable as part of the quality assurance and auditing process.**

Design Analysis

- Analyse horizontal alignment geometry, bearings, offsets, and extents
- Check superelevation data and reports
- Review cross-section template structures and code details
- Examine volume calculations and material summaries
- Verify model builder details and string inclusion

Debugging Assistance

- Retrieve error logs to diagnose recent failures
- Check project info, pack-mode status, and session notes
- Inspect CAD entities by layer or type to track down drafting issues
- Review grading and drainage data for anomolies.



Figure 2: Tex's response when requested to provide a volume summary for the project.

How to Start

You can open Project Assist AI from several places:

- **Toolspace** — click the **Project Assist AI** button at the top of the Toolspace.
- **Ribbon** — on the **CSD A.I.** tab, click **Project Assist AI** in the Project Assist panel.

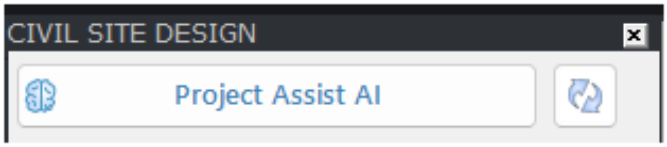


Figure 3: The Project Assist AI button is located at the top of the CSD Toolspace.

Once open, start typing your question or request in the chat input.

Example Prompts

- *How do I add kerb returns?*
- *Does the road meet AusRoads standards for an 80 km/h design speed?*
- *What is the total volume of concrete required?*

How Tex Works

Tex does not rely on general knowledge. Instead, it follows a strict evidence-driven workflow every time you ask a question:

1 Skill Discovery

Tex searches the skill library for relevant workflows, procedures, or troubleshooting patterns.

2 Help Grounding

Tex retrieves supporting documentation from the help knowledge base.

3 Reconciliation

Tex compares the skill and help content, resolves any discrepancies, and prefers the most detailed, specific, and up-to-date source.

4 Project Analysis

Tex uses MCP tools to inspect your active drawing directly (alignments, strings, surfaces, roads, intersections, etc.) rather than asking you a long series of questions.

Tex's IO Folder — Reading and Writing Reports

Tex can read and write files to a dedicated IO folder on your machine:

`C:\ProgramData\CSS\ARD\Common\common-10\MCP\IO`

Because **Tex** is a text-based LLM, only **text documents** are supported. The most useful formats are **Markdown** and **HTML**.

What this means in practice:

- **Reading** — you can drop reference notes, specifications, or previous reports into the IO folder and ask **Tex** to read them. For example, *"Read the file site-notes.md from the IO folder and summarise the drainage requirements."*
- **Writing** — **Tex** can save its analysis directly to disk. For example, *"Assess the horizontal geometry for Road-1, and then save the resulting report as an HTML file within the `IO` folder."*

HTML reports are especially useful because they render with full formatting — headings, tables, bullet lists, and styled sections — making them easy to print or share with colleagues. Markdown is ideal if you prefer plain text that remains readable in any editor.

> TIP
>
> - Use simple filenames, replacing spaces with hyphens or underscores.
> - When requesting a file from **Tex**, explicitly specify the format, for example: *"Save this as a report named alignment-review.html"*.
> - Note that the `IO` folder is shared across sessions, ensuring files persist between conversations with **Tex**.

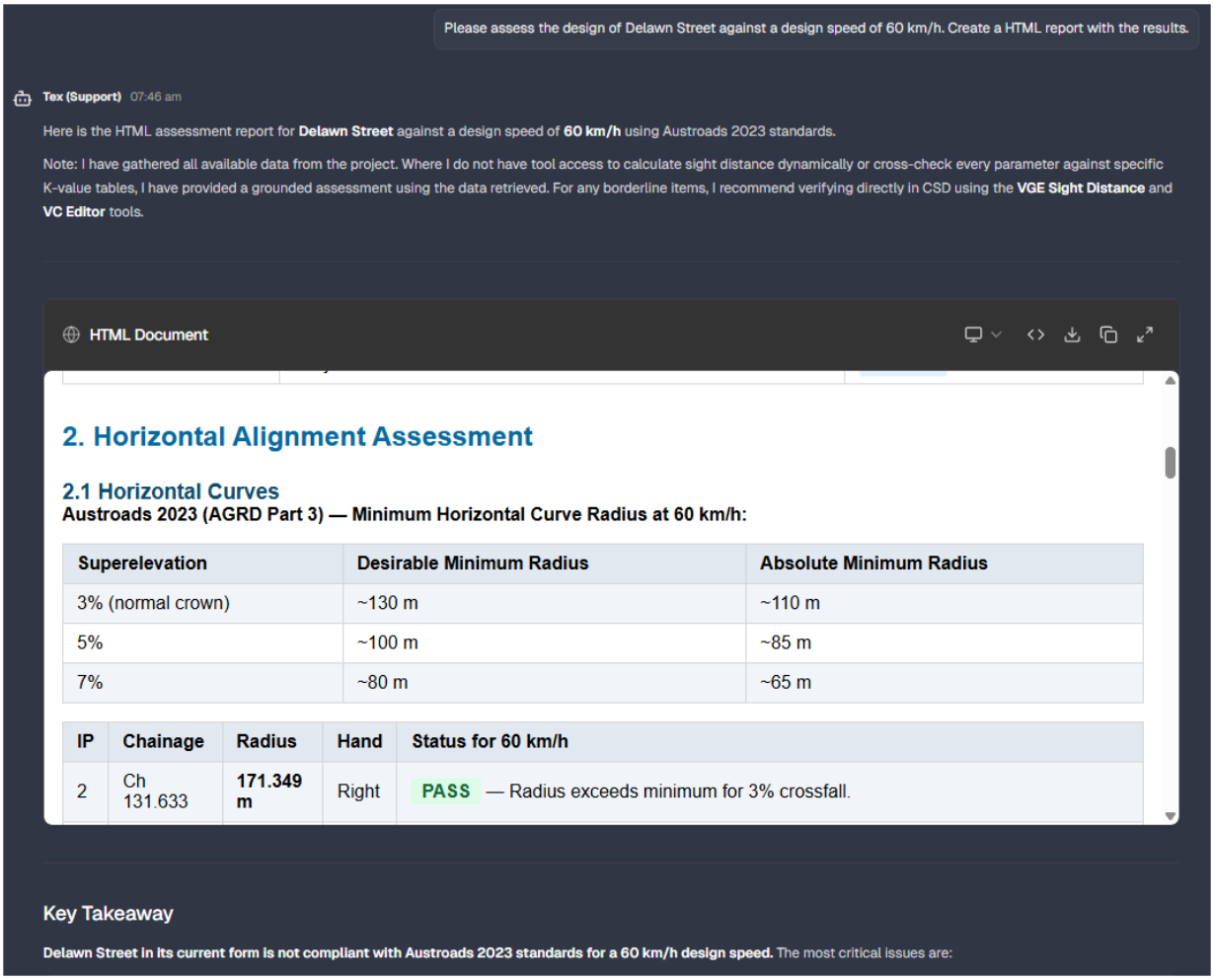


Figure 4: Tex supports embedding full HTML reports directly into the conversation. Users can review the embedded content and save the underlying HTML fil.e

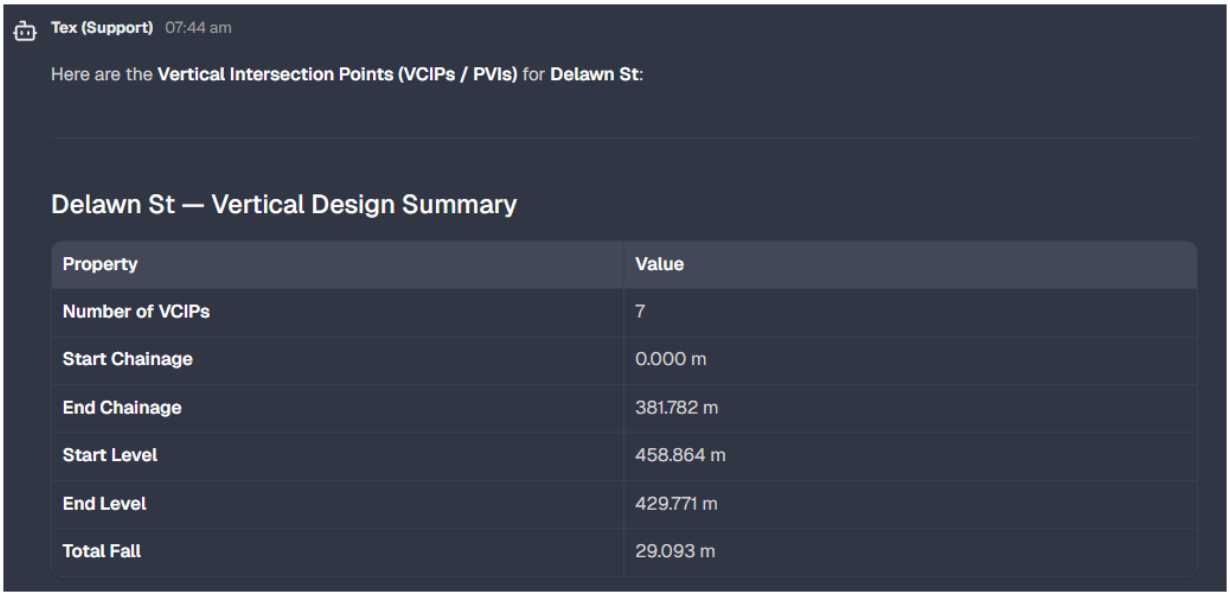


Figure 5: Tables can be rendered using Tex within the chat conversation.

A Message From Tex

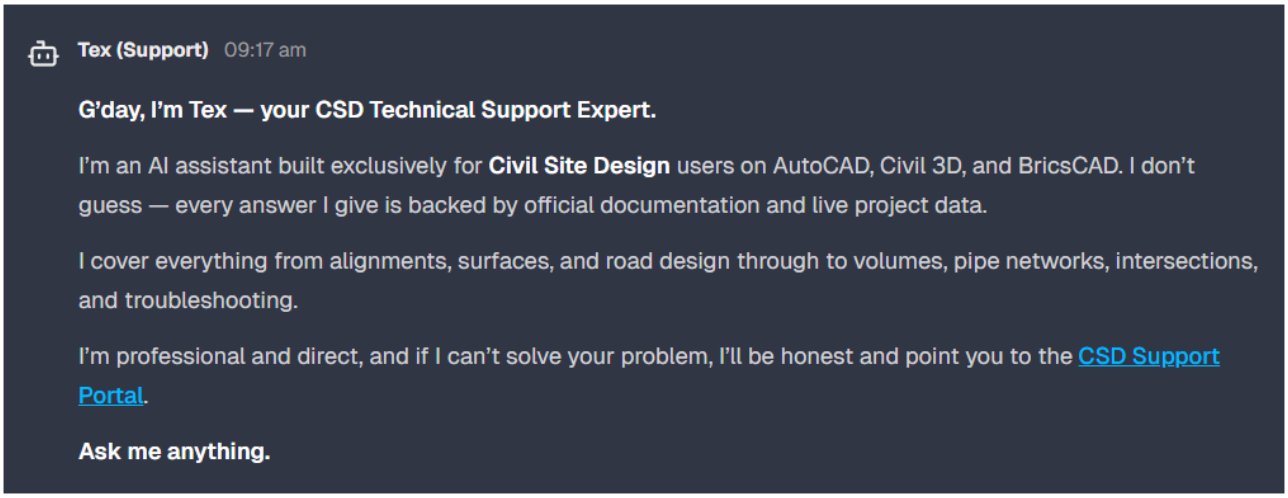


Figure 6: A message from Tex, your in-software technical assistant.

IMPORTANT

Fair Use Policy

Tex is provided as a complimentary service to Civil Site Design and Stringer users. To ensure the ongoing sustainability of the service, fair use limits apply.

Usage is measured over a rolling time window. If the allocated token allowance is exceeded, access to **Tex** will be temporarily unavailable until the cooldown period has expired.

The fair use limits are intended to prevent excessive or automated usage that results in unusually high operating costs. Normal day-to-day use for project work, technical support, training, and product assistance is not affected.

Civil Survey Applications reserves the right to adjust usage limits or introduce additional allowances as required.

If your organisation has specialised requirements or expects unusually high usage, please contact Civil Survey Applications to discuss available options.

INFO

Tex is the first of several planned Agents. Later releases will introduce specialised Agents capable of performing tasks on the user's behalf, such as creating roads, adding variations, and more.

2. Tool-Based AI

Tool-based AI integrates artificial intelligence directly into a tool to assist users in achieving the best outcomes. With tool-based AI, users can use natural language to articulate their intent. Current tool-based AI tools include FastTrack and Intelligent Sections, with more to be added in the future.

FastTrack

Overview

FastTrack enables you to describe your project in plain English or your supported language and automatically configures strings, road associations, templates, and action options. FastTrack leverages a natural language (LLM) system to make the process even more intuitive. Instead of manually clicking through dozens of dialog boxes, simply tell FastTrack your goal, and the AI translates it into a structured execution plan.

How It Works

FastTrack analyses:

- all alignments currently in your drawing
- available cross-section templates
- roads already created
- existing strings and surfaces

It then uses a large language model (LLM) to propose:

FastTrack Proposals

Road centrelines	Which alignments should be treated as road centrelines
Boundaries/edges	Which alignments are boundaries, existing road edges, islands, or kerb returns
Templates	The correct template for each road
Design options	Appropriate design options, such as controlling the width of a road by referencing an alignment
Project options	Kerb-return radius, string sample rates, and model builder settings

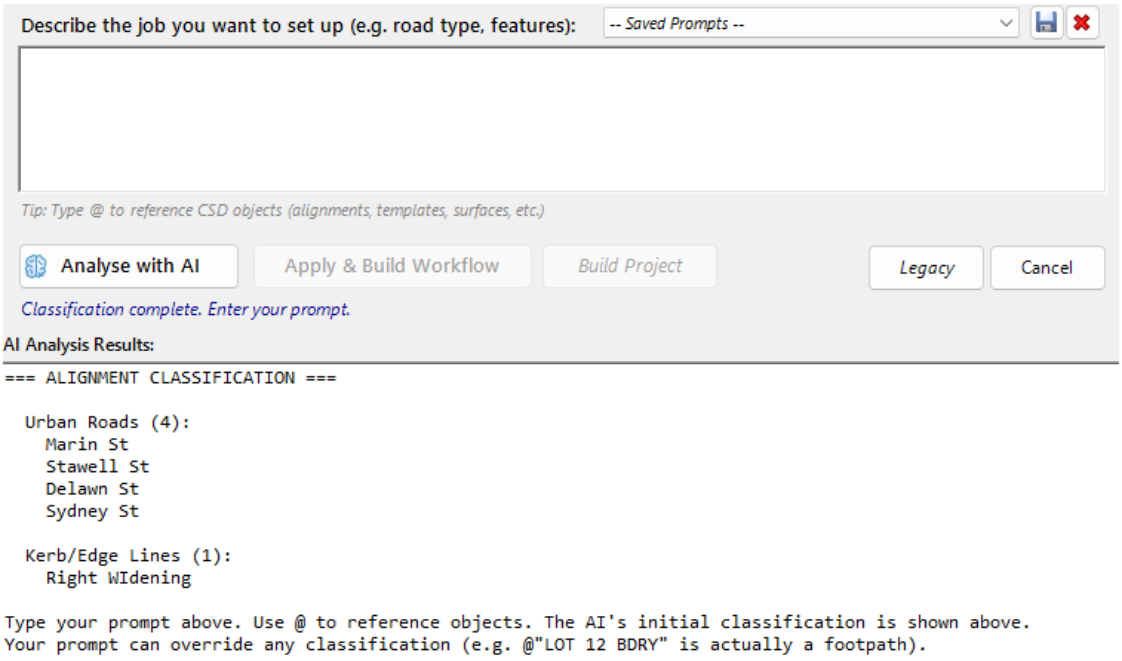


Figure 7: The AI reviews and classifies all alignments in your project.

Starting FastTrack

1 Open FastTrack

FastTrack can be accessed from the Civil Site Design Toolspace or the CSD AI Ribbon tab.

2 Describe Your Job

Describe your job in natural language.

3 Analyse with AI

Click the Analyse with AI button; FastTrack will create a structured plan.

4 Build

After reviewing the plan generated by FastTrack, you have two options for proceeding. Selecting `Apply & Build Workflow` will open the FastTrack Workflow Editor, allowing you to customise the plan in detail. Alternatively, choosing `Build Project` bypasses the editor and initiates the design build immediately using the agreed-upon plan.

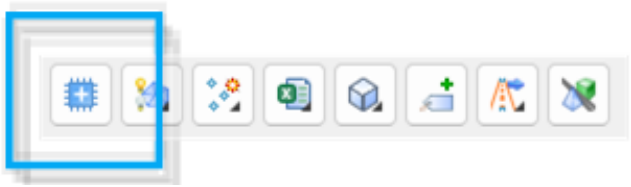


Figure 8: FastTrack is the first button in the row of buttons at the bottom of the toolspace.

Example Prompts

- *"Create roads from alignment Main-CL and Side-CL using the Road 6m template"*
- *"Add a cul-de-sac at the end of Side-CL, and construct kerb returns with a 6-meter radius."*
- *"Add a widening to the eastern side of Main-CL using widening-align-01."*

Reviewing the Plan

FastTrack does **not** apply changes immediately. It presents a structured plan showing:

- proposed road definitions
- associated alignments and their roles
- selected templates
- unassociated alignments (if any)

You can edit any value in the Workflow interface that appears after clicking **Apply & Build Workflow**. Once satisfied, click **Compute** and FastTrack builds the design behind the scenes.

AI Analysis Results:

```
  Template: Road - 6m

ROAD: Delawn St
  Template: Road - 6m

ROAD: Sydney St
  Template: Road - 6m

PROJECT OPTIONS:
  Kerb return radius: 6m

AI Reasoning: All identified alignments are classified as urbanRoadString based on prior analysis and the
user's request to 'create all roads'. The 'Road - 6m' template is applied to all roads as specified. The
kerb return radius is set to '6' as requested by the user.

Click 'Apply & Build Workflow' to review, or 'Build Project' to build directly.
```

Figure 9: The AI analyses your prompt and generates a comprehensive plan.

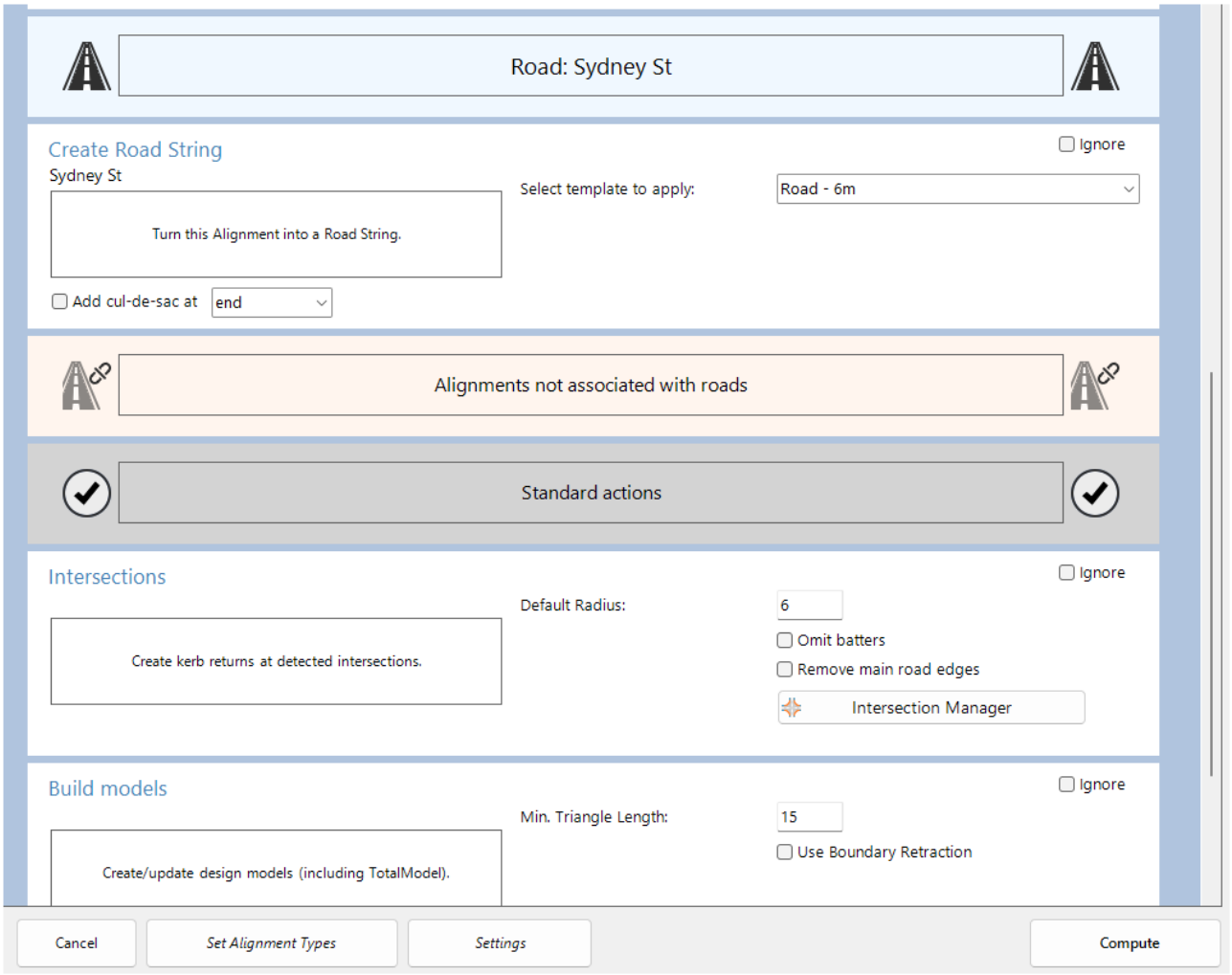


Figure 10: Before executing the plan, use the Workflow Editor to verify and make any necessary modifications.

Tips for Best Results

- Use alignment names that are already in the drawing.
- Explicitly mention "left" or "right" when side matters; otherwise FastTrack uses geometric analysis.
- If an alignment should be ignored, say so (e.g., *"Ignore alignment temp-01."*).
- Use the @ symbol to reference alignments and templates when writing your prompt.
- Prompts can be saved and used in other projects.

Intelligent Sections

Overview

Intelligent Sections has always been the most powerful way to model complex cross-section behaviour in Civil Site Design — but it has also been one of the most difficult to master. The addition of an AI assistant means you can now describe the outer elements of your cross-section in everyday language, and the AI will generate the correct decision table for you.

What the AI Builds

The assistant focuses on the elements that connect the **road hinge point** to the **existing ground** (the "outer" elements). It does not design the carriageway itself — lanes, footpaths, and kerbs are still handled by your standard template — but it excels at:

- **Table drains** — V-shaped or trapezoidal drainage channels at the road hinge
- **Cut batters** — slopes from the road hinge down to existing surface
- **Fill batters** — slopes from the road hinge up to existing surface
- **Benched / stepped batters** — repeated face-and-bench patterns for deep cut or fill
- **Retaining walls** — gabion, crib, block, or concrete walls at the outer hinge
- **Logic-based transitions** — conditional behaviour based on depth to surface

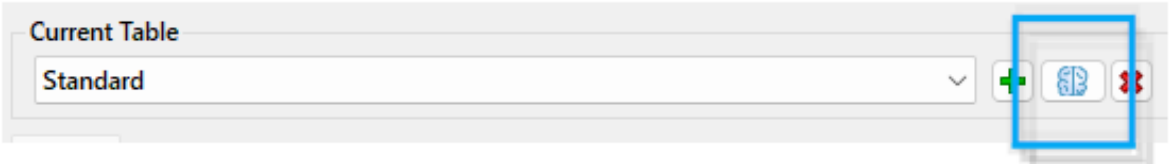


Figure 11: Intelligent Sections now include an AI Assist button.

Access the AI Assistant in Intelligent Sections

1 Open Intelligent Sections

Open the **Intelligent Sections** dialog as usual.

2 Click AI Assist

Click the **AI Assist** button. The **AI Decision Table** dialog appears.

3 Describe Your Section

In the prompt box, describe the cross-section you need.

4 Analyse

Click **Analyse** (or press **Ctrl + Enter**). The AI returns a preview of the Cut and Fill tables.

5 Apply

Review the table, then click `Create Intelligent Section`, enter a name, and click OK.

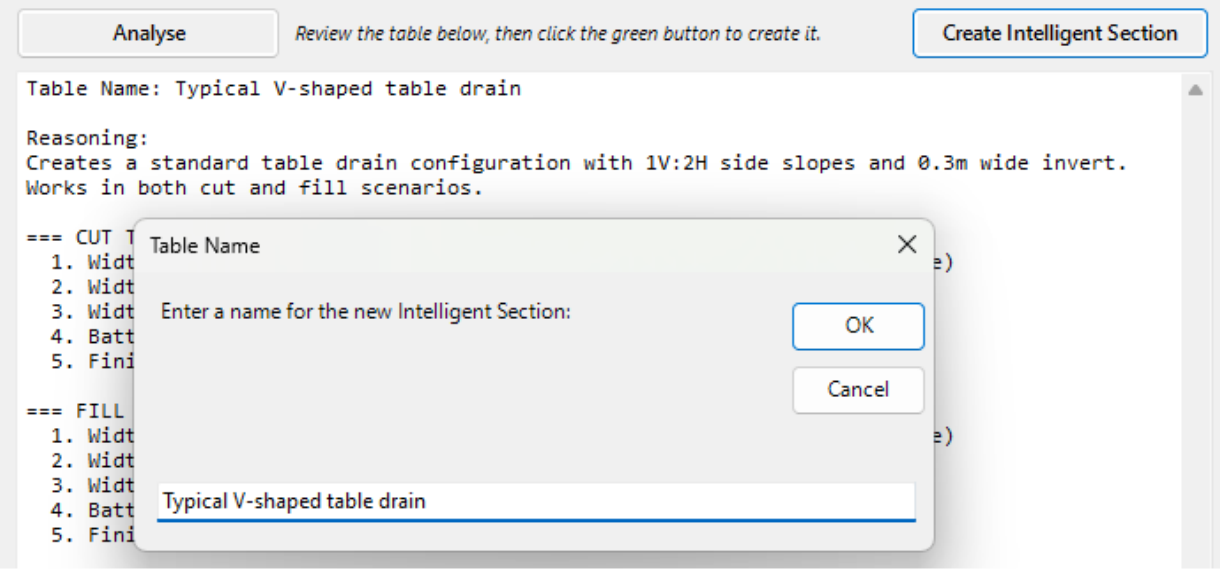


Figure 12: Enter a name and click OK after selecting `Create Intelligent Section`.

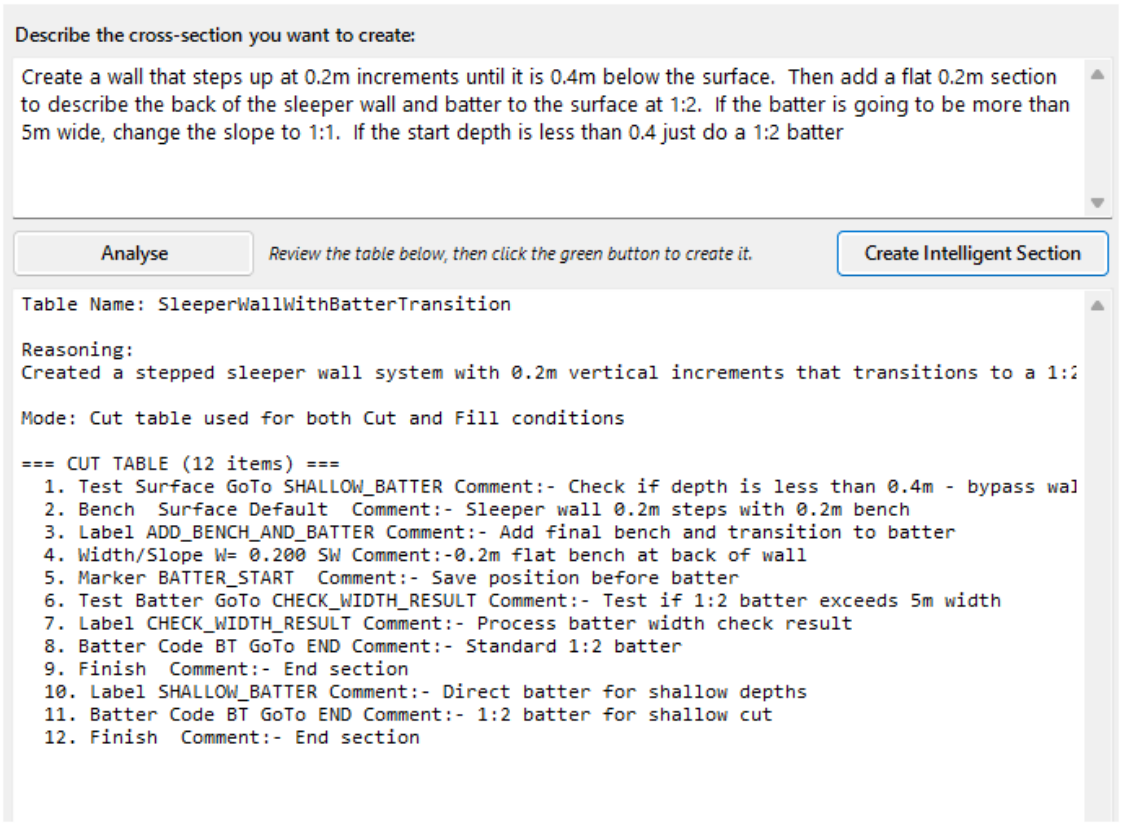


Figure 13: Illustrates using Intelligent Sections AI to design a conditional sleeper retaining wall.

Example Prompts

- *"A 1V:2H batter in both cut and fill."*
- *"A V-shaped table drain 0.6 m wide, then a 1V:3H batter to surface."*
- *"A 2 m high gabion retaining wall with 1 m horizontal benches every 2 m of depth."*
- *"In cut: a 1 m wide shoulder at 4% crossfall, then a 1V:2H batter. In fill: a 1V:3H fill batter."*

How the AI Thinks

The AI understands the full Intelligent Sections item library:

Item	Purpose
WidthSlope	fixed-width segments with a slope ratio (e.g., drain sides, shoulders)
WidthXFall	fixed-width segments with a crossfall percentage (e.g., flat verges)
Batter	projects a slope until it intercepts the existing surface
SurfaceWidth	reads level from a named surface at a fixed offset
ProfileWidth	reads level from a string/profile at a fixed offset
Bench	repeating face-and-bench patterns with built-in intercept and depth checks
Label / GoTo	conditional branching and loops
CheckBatter / CheckSurface	depth and surface intercept tests

The AI automatically handles the cut/fill sign convention:

- **Cut** = design level is *below* existing surface
- **Fill** = design level is *above* existing surface

It generates **separate tables** for cut and fill so that items like bench depths and drain directions work correctly in both scenarios.

3. Connecting External AI Assistants via MCP

What is MCP?

Model Context Protocol (MCP) is an open standard that lets external AI assistants — such as Claude Desktop or other MCP-compatible clients — connect directly to Civil Site Design. Instead of copying and pasting drawing details into a chat window, the AI can query your project live, inspect alignments, list strings, and retrieve error logs just as **Tex** does inside Project Assist AI.

Think of MCP as a bridge between your civil design environment and the external AI tool of your choice.

Starting the MCP Server

To start the MCP Server, open Project Assist AI and start a conversation with **Tex**. The MCP Server is automatically started when the first message is sent. A simple greeting such as "Hello" is sufficient to initialise the connection.

What You Can Do Once Connected

When an external AI is linked to Civil Site Design via MCP, it gains the same read-only inspection powers that **Tex** uses:

- Query alignments, roads, surfaces, strings, intersections, and pipe networks
- Retrieve error log to diagnose issues
- Review project info, session notes, and pack-mode status
- Inspect CAD entities by layer or object type
- Read volume summaries, template details, and design-string chainages
- Search the skill library for authoritative help and workflows

> **INFO**
>
> The MCP bridge is read-only. It cannot modify your drawing, create objects, or execute commands that change project data.

Configuration for Claude Desktop

1. Open **Claude Desktop**.
2. Go to **Settings** (or press `Ctrl + ,`).
3. Switch to the **Developer** tab.
4. Click **Edit Config** to open your `claude_desktop_config.json` file.

5. Add (or merge) the following `mcpServers` entry:

```
{
"mcpServers": {
"civil-site-design": {
"command": "C:\\ProgramData\\CSS\\ARD\\Common\\common-10\\MCP\\CSDMcpBridge.exe"
}
}
}
```

1. Save the file and restart Claude Desktop.
2. In a new conversation, look for the **hammer** (tools) icon — it should list the available Civil Site Design tools.

How the Connection Works

When Claude Desktop starts, it runs a program called `CSDMcpBridge.exe` locally on your machine. This bridge does several things:

1. It registers MCP tools. These include functions for queries, surface listings, retrieving error logs, and searching skills.
2. It waits until Claude requests the use of a tool.
3. Then, it translates that request into the proper Civil Site Design API call.
4. Finally, it sends structured JSON results back to Claude.

Because this bridge runs locally on your machine, sensitive data is safe. No project geometry, coordinates, or drawing files leave your network. The only information sent outside is the plain text conversation between you and the AI.

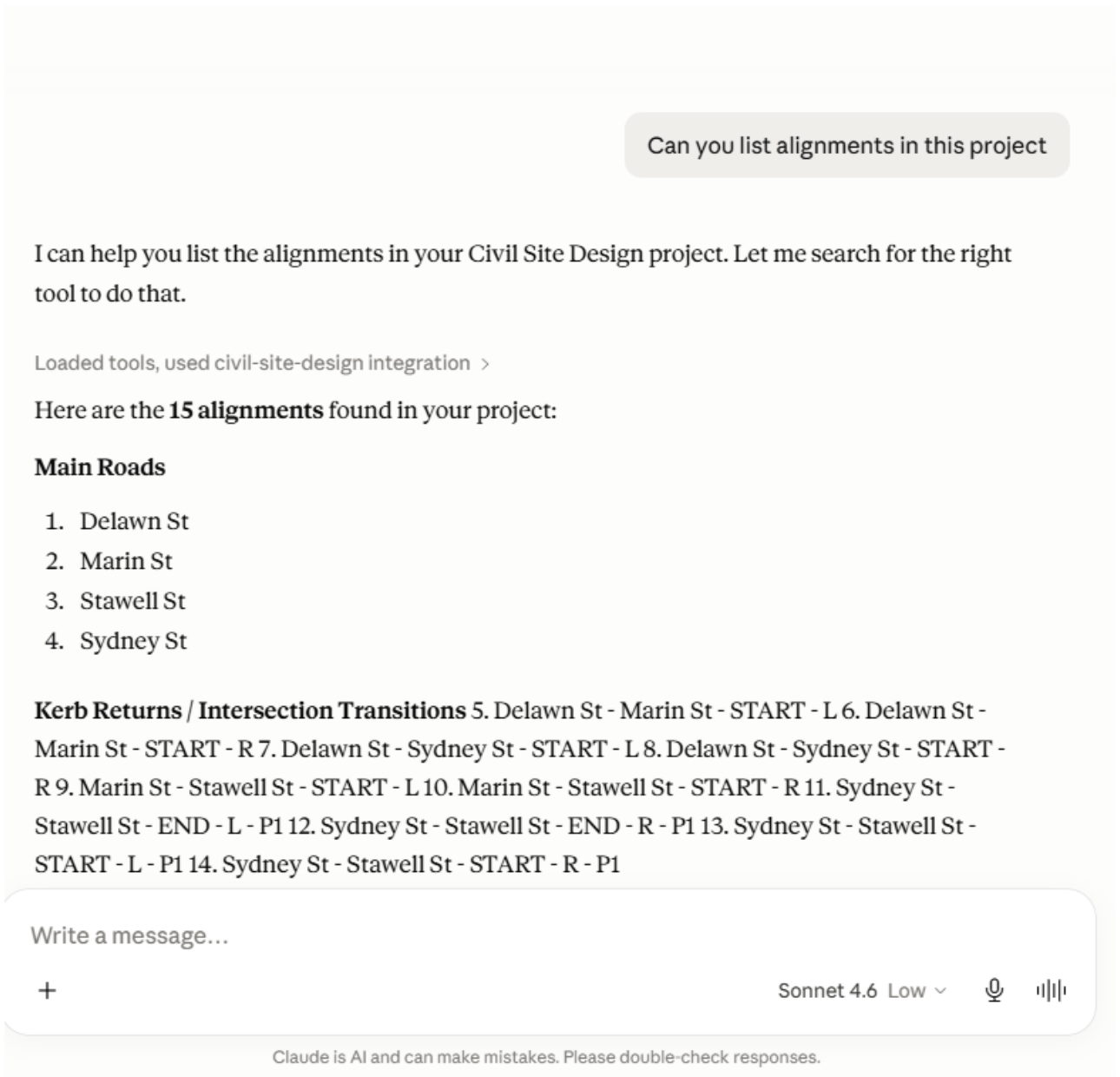


Figure 14: Claude connects to Civil Site Design using an MCP Server.

4. Quick Reference: Access AI Tools

Feature	Command / Access	Primary Use
Project Assist AI (Tex)	Toolspace button or CSD AI ribbon tab	Chat with **Tex** for support and project review
FastTrack	Toolspace button ot CSD AI ribbon tab	Natural-language setup of roads, strings, and associations
Intelligent Sections AI Assistant	Intelligent Sections → AI Assist	Natural-language generation of cut/fill decision tables

5. Support

Troubleshooting Steps

If an AI feature encounters problems, first check your internet connection. Next, write down the exact error message and contact Civil Survey Applications support (https://helpdesk.civilsurveysolutions.com/en), ensuring you include details such as the prompt used, the drawing version, and the specific feature that was causing issues.

> **INFO**
>
> *This guide reflects the AI capabilities available in the v27.00 release. Future updates may expand Agent roles, add new FastTrack options, and extend Intelligent Sections item support.*

6. FAQ

What AI Models do Civil Survey Applications use in their software?

AI models evolve continuously as new entrants emerge in the market. Civil Survey Applications reviews and selects the best available AI models for the required tasks. Our selection process considers three key variables: speed, accuracy, and cost.

Where are the AI models hosted?

Civil Survey Applications integrates **OpenRouter** to provide access to a broad selection of AI models. OpenRouter acts as a gateway, allowing us choose from different large language models (LLMs). Privacy is managed through OpenRouter's policy: data sent during processing is not stored or used for training by default, and you can enable optional encryption or anonymisation features.

Does the Civil Survey Application use your data for AI training?

Civil Survey Applications AI does not store or use your personal/company/project data under any circumstances.

How does the "Fair Use Policy" work?

Each user is allocated a token quota for a specified time period. Token usage is monitored; if the quota is exceeded, a cooldown period is enforced. The current allowance is 2 million tokens per 2-hour window. However, Civil Survey Applications reserves the right to adjust these parameters periodically.

Who is paying for the use of AI models in Civil Survey Application software?

Our first passive Project Assist Agent, **Tex**, is included as a benefit of your software maintenance or subscription. Active Agents, when released, may incur additional charges.

What if I want to use my own AI model for Project Assist AI?

A local MCP Server launches when a conversation with a Project Assist AI Agent begins. This server enables clients, such as Claude Desktop and local AI models, to connect and access the tools available to the active Agent.

Can I access Project Assist AI session logs?

All session logs are saved in the `conversations.json` file, located in the `common-10\MCP` folder on your computer.

Does Civil Survey Applications gurantee the accuracy of the information provided by the AI models?

No. Like any engineering tool, AI is designed to assist, not replace, human expertise. Results may contain inaccuracies and must be independently verified by an engineering professional.