Quant AI Integration Project Outline

1. Project Overview

The Quant web app is a Next.js + Firebase + OpenAI-based estimating software for steel fabrication. This outline describes the complete structure, AI integration plan, and development roadmap to be implemented in Cursor. The app supports voice input for estimates, AI-based specification compliance review, and automatic proposal generation.

Core Features:

1   Voice transcription for estimate input (OpenAI Whisper API).

2   AI-driven spec compliance review (GPT-4).

3   Automated proposal generation from project summaries (GPT-4).

4   Dynamic estimating grid with editable materials, plates, labor, and coatings.

5   Firestore backend with AI cost tracking and project management.

2. Tech Stack

1   Frontend: Next.js (React, TypeScript, TailwindCSS).

2   Backend: Firebase Firestore + Cloud Functions.

3   AI Integration: OpenAI GPT-4, Whisper.

4   Storage: Firebase Storage for project files.

5   Hosting: Vercel or Firebase Hosting.

3. Core App Sections

1   Settings – Company defaults, rates, coatings, proposal templates.

2   Project Defaults – Stock rounding, default grades, coating options.

3   Project Details – Name, GC, estimator, bid date, specs.

4   Estimating Screen – Voice HUD, entry form, editable data grid, KPI summary.

5   Spec Review – Automated AI compliance verification.

6   Proposal – AI-generated Markdown to PDF proposal.

7   Reports – CSV/PDF exports, paint SF, galv weight.

8   Audit Trail – Tracks all AI and user activity.

4. AI Integration Details

Each AI module interacts with OpenAI APIs through secure Firebase Functions:

1   Voice Transcription – Whisper API ($0.006/min).

2   Spec Review – GPT-4o-mini or GPT-4.1 for JSON compliance results.

3   Proposal Generation – GPT-4o-mini for professional Markdown proposals.

4   Usage Logging – Firestore tracks minutes, tokens, and cost per project.

5   Monthly AI Cost Dashboard – Summarizes usage and spending.

5. Database Schema

Firestore Collections:

1   /companies/{companyId}/settings – Company configuration.

2   /companies/{companyId}/projects/{projectId} – Project-level data.

3   /companies/{companyId}/projects/{projectId}/lines – Estimating data.

4   /companies/{companyId}/projects/{projectId}/aiLogs – AI call history and costs.

6. Development Phases

1   Phase 0 – Core UI: Settings, Project Details, Grid, KPI Ribbon.

2   Phase 1 – Add AI: Whisper transcription, Spec Review, Proposal Generator.

3   Phase 2 – Add Reporting, Audit, and Advanced Filtering.

4   Phase 3 – Optimization, PWA offline caching, multi-user collaboration.

7. Security

1   API keys stored securely in server environment (not client).

2   Firestore access restricted by company membership.

3   Monthly AI spend caps enforced via Cloud Functions.

8. Expected Costs

1   Whisper Transcription: ~$0.006/minute.

2   GPT-4 Calls: ~$0.15 per spec review or proposal.

3   Monthly usage for 20–50 projects: ~$10–$25 total.

9. Deliverables for Cursor Plan

1   Full Next.js scaffold with routes and Firebase integration.

2   AI service layer with serverless functions for Whisper and GPT-4.

3   UI components: Voice HUD, Estimating Grid, KPI Ribbon, Proposal Editor.

4   Firestore schema setup with security rules.

5   Deployment configuration for Firebase Hosting or Vercel.