



■ COMMERCIAL PROPERTY MAPPING · CASE STUDY

# ASSET INTELLIGENCE REPORT

High-resolution drone mapping of a 137.76-acre commercial property — orthomosaic, terrain model, and asset-condition intelligence captured in a single flight.

● PLATFORM · DJI Matrice 4E

● RTK FIXED

● GSD · 1.3 CMPX

● COVERAGE · 137.76 AC



DRONE MAPPING & GEOSPATIAL ANALYSIS · SOUTHERN CALIFORNIA

FILE / AA-CS-001

For planning and due diligence purposes only. Does not substitute for a licensed land survey, engineering assessment, or professional certification.

## ■ EXECUTIVE SUMMARY

# SITE INTELLIGENCE OVERVIEW

Prepared from mission data, quality metrics, and site observations.

## EXECUTIVE SUMMARY

Aerial Atomics LLC conducted an aerial mapping project for the City of Escondido, focusing on a commercial property spanning 137.76 acres. The mission aimed to capture high-resolution imagery and detailed data to inform asset management and maintenance planning. Utilizing the DJI Matrice 4E, the project employed RTK Fixed positioning to ensure precise measurements and comprehensive site analysis.

The data quality achieved during this mission is exceptional, with a ground sampling distance (GSD) of 1.3 cm/px and a point cloud comprising 120 million points. The centimeter-grade accuracy of the RTK Fixed positioning method provides reliable metrics for evaluating site conditions, enhancing the decision-making process for future maintenance and capital budgeting. The GPS root mean square (RMS) error of 0.013 m further supports the integrity of the collected data.

Aerial imagery reveals indicators of widespread coating deterioration on roofs, suggesting potential maintenance needs. Visual analysis suggests that pavement conditions exhibit cracking and sealcoat wear, which may require attention. Surface patterns indicate possible drainage issues, with low spots and ponding areas identified that could impact stormwater management. Additionally, the assessment highlights the need for improved ADA pathways and site accessibility for compliance and user safety.

## KEY FINDINGS

1

120M-point dense point cloud generated

2

1.3 cm/pixel resolution — full site captured

3

36.8 m elevation relief documented across the site

4

137.76-acre site captured in a single coordinated flight

5

RTK Fixed positioning — 0.013 m RMS absolute accuracy

## MISSION AT A GLANCE

**137.76 ac**

SITE AREA

**1.3 cm/px**

RESOLUTION

**2,053**

IMAGES

**RTK Fixed**

POSITIONING

**120M**

POINT CLOUD

## SECTION 01 · MISSION BRIEF

# PROJECT BRIEF

A single coordinated UAV mission documented the full property — roofs, pavement, drainage, and site terrain — as a measurable, georeferenced record for owners, asset managers, and facility teams.

PREPARED BY

## AERIAL ATOMICS

Curtis Emmanuel

Director of Aerial Intelligence

● RTK FIXED

● CENTIMETER RESOLUTION

## MISSION SCOPE

LOCATION

**Escondido**

DATE

**2026-05-27**

COVERAGE

**137.76 acres**

CLIENT

**City of Escondido**

## EQUIPMENT · HW

- DJI Matrice 4E
- RTK Fixed
- Mechanical-shutter camera

## FLIGHT PARAMETERS · OPS

- Front overlap 80%
- Side overlap 80%
- Fixed altitude
- Altitude 183.0 ft AGL

## DELIVERABLES PRODUCED · OUT

- 1.3 cm/px orthomosaic
- Digital Surface Model (DSM)
- Dense point cloud (120M pts)
- Site condition layer
- Condition analysis report
- Drainage analysis layer
- Interactive GIS web map
- PDF assessment report

■ FIG. 01 · ORTHOMOSAIC

# SURVEY FOOTPRINT

The full property was reconstructed from 2,053 images into a seamless 1.3 cm/pixel orthomosaic — one georeferenced base layer for every measurement and condition call.

TOTAL AREA

**137.76** ac

IMAGES

**2,053** shots

AVG GSD

**1.3** cm/px

ELEV. RELIEF

**36.8** m

REPROJ. ERR

**1.08** px

POINT CLOUD

**120M** pts

SECTION 02 · QUALITY ASSURANCE

# DATA QUALITY & ACCURACY

The photogrammetric report confirms centimeter-grade RTK Fixed positional control and reliable image alignment — the basis for confident measurement and condition interpretation.

RECONSTRUCTION READOUT

QA / GEOREF

GPS RMS ERROR

✓ WITHIN TOLERANCE

1.3 cm

ABSOLUTE HORIZONTAL · CE90

✓ WITHIN TOLERANCE

1.7 cm

ABSOLUTE VERTICAL · LE90

✓ WITHIN TOLERANCE

1.5 cm

REPROJECTION ERROR

✓ WITHIN TOLERANCE

1.08 px

SPARSE RECONSTRUCTION RATE

✓ WITHIN TOLERANCE

97.5 %

INTERPRETATION

- Centimeter-grade RTK Fixed accuracy
- Excellent image alignment
- Reliable orthomosaic generation
- High confidence in observations

RTK FIXED CLASS

Sub-5 cm horizontal/vertical confidence

POSITIONAL ACCURACY REFERENCE · PLAIN LANGUAGE

METRIC	WHAT IT MEASURES	THIS PROJECT	INTERPRETATION
GPS RMS Error	Overall 3D position accuracy	1.3 cm	Absolute position of each pixel
CE90 Horizontal	90% of points within X cm horiz.	1.7 cm	Horizontal measurement confidence
LE90 Vertical	90% of points within X cm vert.	1.5 cm	Elevation surface reliability
Reprojection Err	Image-to-model alignment quality	1.08 px	Lower is sharper orthomosaic

■ FIG. 02 · ELEVATION

# DIGITAL SURFACE MODEL

The DSM records the elevation of every feature — structures, vegetation, and terrain — across the 137.76-acre footprint.

## RELATIVE ELEVATION

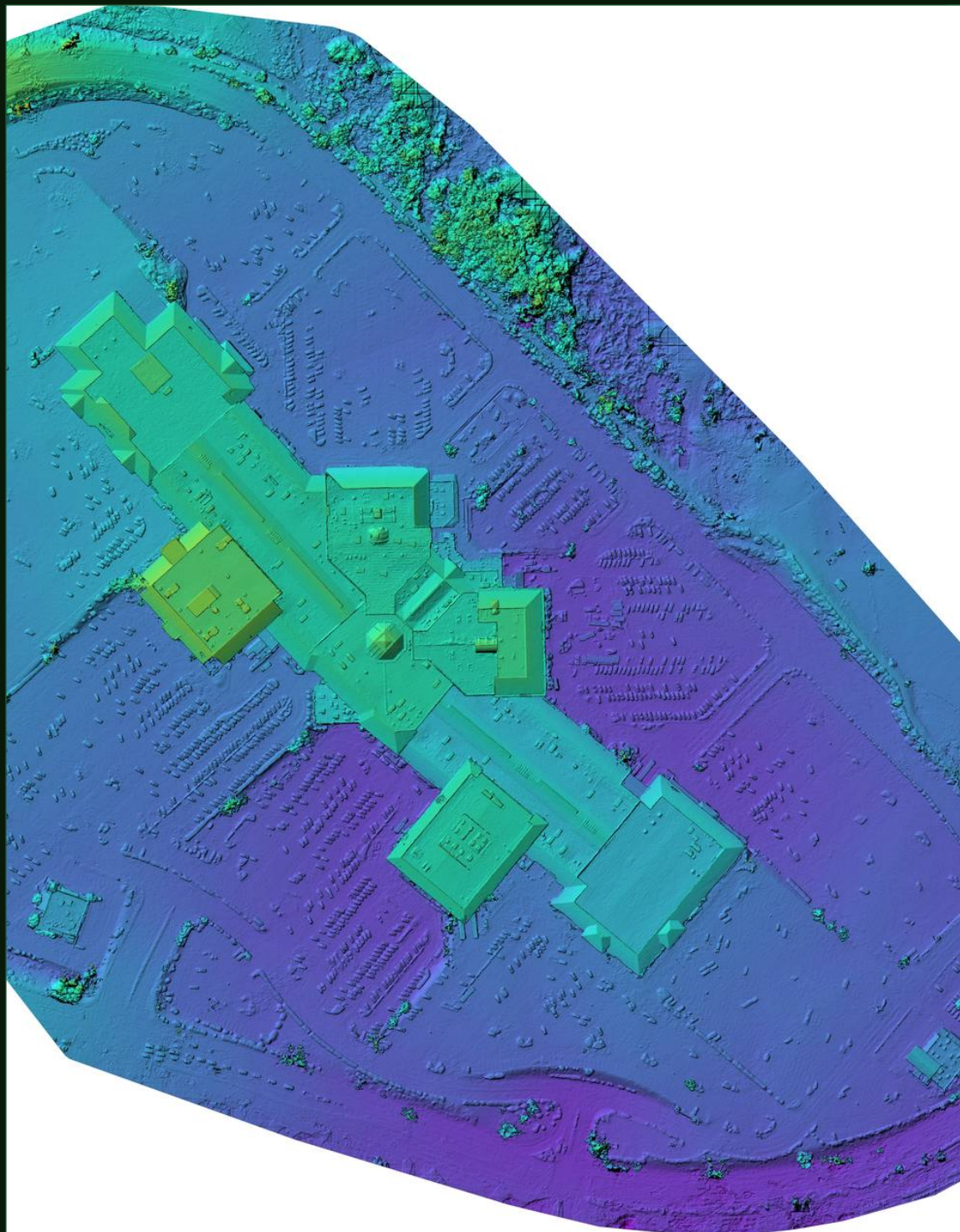


LOW · 62.62 m

99.38 m · HIGH

## KEY INSIGHTS

- Identifies high and low points across the property
- Highlights drainage patterns and ponding-prone areas
- Visualizes structure and vegetation height
- Supports grading and stormwater analysis



## SECTION 03 · ASSET CONDITION

# ASSET CONDITION ANALYSIS

At 1.3 cm/pixel, surface conditions, wear patterns, and drainage indicators are clearly resolved across the entire site footprint.

## OBSERVED INDICATORS

- Widespread coating deterioration
- Numerous patch repairs
- Weathering & debris discoloration
- Potential ponding spots
- Extensive HVAC penetrations

## OWNER VALUE

- Prioritize areas needing attention
- Quantify area for contractor bids
- Track condition over time
- Document for insurance / records

## STAKEHOLDER VALUE

- Build accurate proposals remotely
- Reduce on-site time & risk
- Support capital planning
- Improve documentation quality



WEATHERING & DEBRIS DISCOLORATION



PONDING / LOW SPOTS

SCOPE NOTE — All observations are derived from aerial imagery and constitute visual indicators only. This report does not constitute a structural inspection, engineering assessment, or certified condition report.

## ■ SECTION 04 · SITE SURFACES

# SITE SURFACES & DRAINAGE

The DSM converts surface form into actionable drainage and condition analysis — pairing what the orthomosaic shows with where water actually moves.



PARKING FIELD — SURFACE WEAR

## SURFACE CONDITIONS

- Cracking
- Sealcoat wear
- Faded striping
- Surface staining

## DRAINAGE VALUE

- Plan grading & swales
- Locate ponding areas
- Reduce flood risk
- Support permitting

## ADDITIONAL FINDINGS

- Low spots / ponding areas
- Grading performance
- Drainage improvements needed
- Runoff pathways

## BENEFICIARIES

- Property owners
- Engineers & planners
- Maintenance teams
- Insurance / legal

## ■ SECTION 05 · OUTPUT PACKAGE

# DELIVERABLES & APPLICATIONS

Every engagement produces a GIS-ready dataset that drops directly into maintenance systems, engineering workflows, and budgeting models — no specialized software required to view it.

## CORE DELIVERABLES

- Orthomosaic (GeoTIFF)
- Digital Surface Model (DSM)
- Condition assessment report
- Site surface documentation
- Interactive GIS web map
- Area & distance measurements

## DELIVERY FORMATS

- Cloud-optimized GeoTIFF
- DSM raster (GeoTIFF)
- Point cloud LAS / LAZ
- Hosted ArcGIS Online map
- PDF condition report

## COMMON APPLICATIONS

- Condition inspections
- Capital planning & budgeting
- Drainage & grading evaluation
- Insurance condition records
- Monitoring & change detection

## STAKEHOLDER BENEFITS

- Detect missing or damaged surface areas
- Document pre-existing conditions
- Support capital planning & budgeting
- Reduce manual inspection exposure
- Identify standing water / poor drainage
- Reduce risky manual site access
- Enable repeatable change detection
- Deliver reports within 48–72 hours
- Measure area for contractor bids
- Integrate into existing GIS & CMMS
- Build accurate proposals without site visit
- Establish measurable condition baseline

## PROFESSIONAL DISCLOSURE

This report is produced from aerial photogrammetric data and is intended for planning, due diligence, and asset management purposes only. It does not constitute or substitute for a licensed land survey, boundary determination, structural engineering assessment, environmental report, or any professional certification required by law. All measurements, elevations, and visual observations are derived from aerial imagery and are subject to the accuracy specifications stated in the Quality Assurance section of this report. Aerial Atomics LLC is not a licensed land surveyor or professional engineer. Consult a licensed professional for any regulatory, legal, or engineering application.

SECTION 06 · WHY IT WORKS

# OPERATIONAL ADVANTAGES

01

## CENTIMETER PRECISION

Centimeter-resolution data for confident condition calls.

02

## REPEATABLE MISSIONS

Future flights compare against the same baseline.

03

## FULL-SITE COVERAGE

One mission documents large sites efficiently.

04

## SIMPLE DELIVERY

PDF reports and web maps — no special software needed.

### TRADITIONAL INSPECTION VS AERIAL INTELLIGENCE

METHOD

DIMENSION	TRADITIONAL MANUAL INSPECTION	AERIAL ATOMICS MAPPING
FIELD TIME	Multi-day, crew on site	<b>Single coordinated flight</b>
COVERAGE	Sampled / spot checks	<b>Continuous 137.76-acre dataset</b>
RECORD	Notes & loose photos	<b>Georeferenced, measurable layers</b>
SAFETY	Ladder & roof exposure	<b>No manual access required</b>
RE-SURVEY	Restart from scratch	<b>Repeat against same baseline</b>
DELIVERABLES	Written report, loose photos	<b>GIS dataset + interactive web map</b>
TURNAROUND	Days to weeks for report	<b>48–72 hour standard delivery</b>



## AERIAL ATOMICS

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● FAA PART 107 CERTIFIED

● INSURED