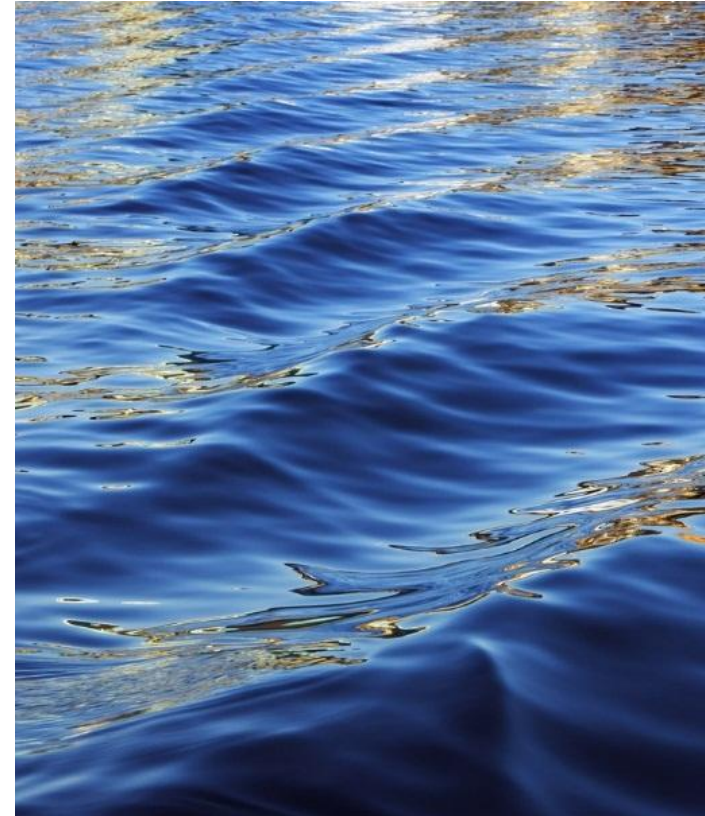




Creating a Drone Program to Help Support the City of Corinth's Public Works and Parks Departments

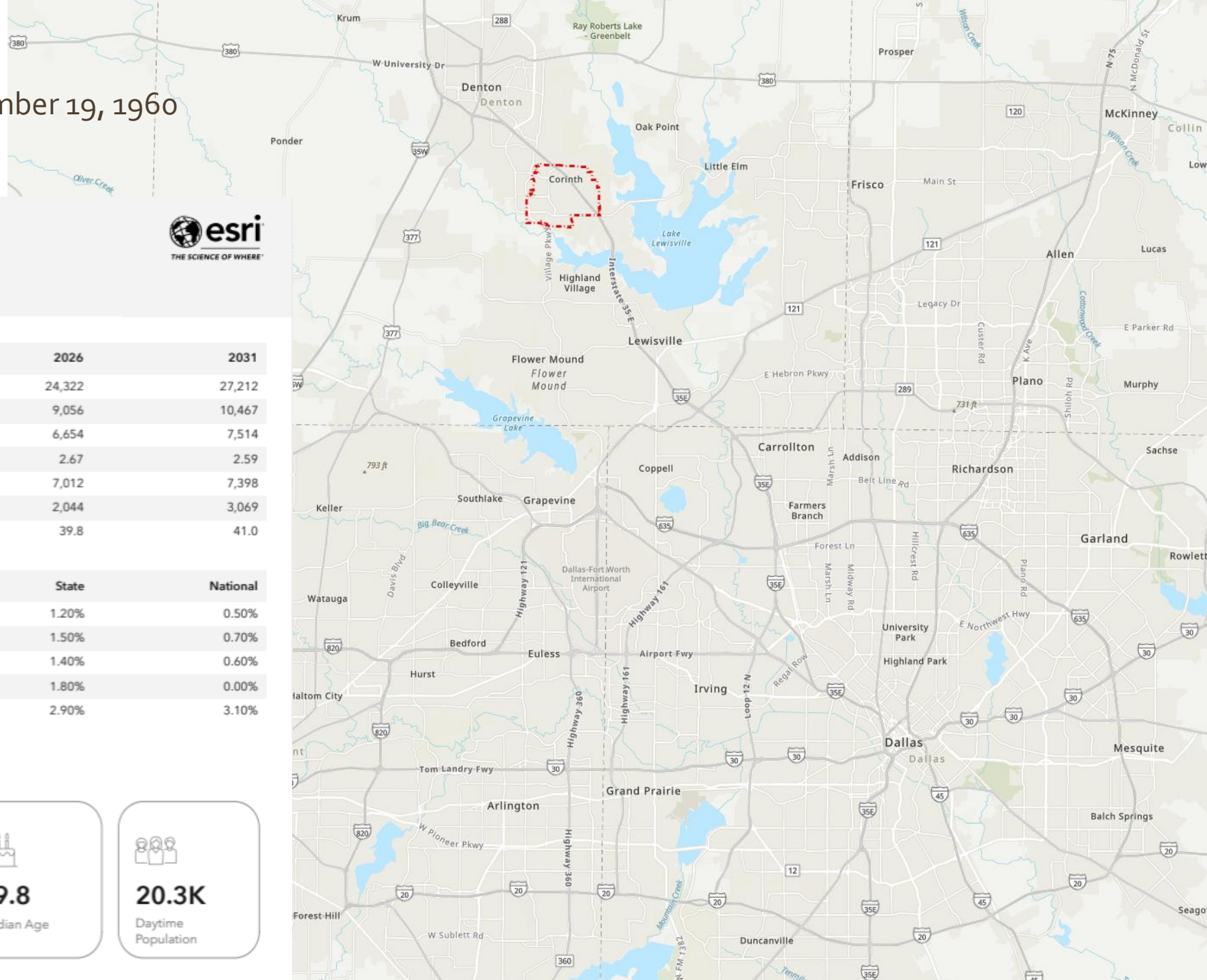
City of Corinth

Anna Lenkowsky - GIS Analyst II
Garrett Skrehart - Development and BI-GIS Manager





Incorporated September 19, 1960



Demographic and Income Profile

Corinth City, TX
Corinth City, TX (4816696)
Geography: Place



Summary	Census 2020	2026	2031
Total Population	22,634	24,322	27,212
Total Households	7,986	9,056	10,467
Family Households	6,217	6,654	7,514
Average Household Size	2.82	2.67	2.59
Owner Occupied Housing Units	6,131	7,012	7,398
Renter Occupied Housing Units	1,855	2,044	3,069
Median Age	38.5	39.8	41.0

Trends 2026 - 2031	Area	State	National
Population	2.30%	1.20%	0.50%
Households	2.90%	1.50%	0.70%
Family Population	2.50%	1.40%	0.60%
Owner Occupied Housing Units	1.10%	1.80%	0.00%
Median Household Income	2.00%	2.90%	3.10%

Key Indicators for 2026



24.3K

Total Population



9,056

Total Households



2.67

Average
Household Size



39.8

Median Age



20.3K

Daytime
Population

How We Got Started

- Public Works Director requested help
- Document construction progress with current aerial imagery
- Verify grading and drainage conditions at new retention ponds

Questions that we needed to answer before getting started:

- Is there a drone that can fit all our needs?
- What application to use
- Limited budget
- Staff limitations
- Purchase Window Limitations



Drone and Software Decisions

Drone: Matrice 4E

- Built for surveying, mapping and construction documentation
- 20 MP mechanical-shutter camera with integrated RTK
- Budget target: approximately \$6,000 for the aircraft package



Software

- SiteScan: Cloud processing and program management
- Drone2Map: Local desktop processing

Additional Safety Equipment

- Parachute system for drone to become FAA-accepted Category 2



VS



FAA 107 Unmanned Aircraft General

Exam format

- 60 scored questions
- 2 hours
- 70% passing score
- Approximately \$175
- No practical flight test

Topic Area	Approximate Weight	What to Expect
Regulations	15–25%	FAA rules, waivers, remote pilot responsibilities, certificate requirements
Airspace Classification & Operating Requirements	15–25%	Class B/C/D/E/G airspace, TFRs, NOTAMs, sectional charts
Weather	11–16%	METARs, TAFs, weather charts, wind, visibility, cloud ceilings
Loading & Performance	7–11%	Weight and balance, performance charts, drone limitations
Operations	35–45%	Emergency procedures, crew resource management, radio comms, aeronautical decision-making, airport ops, maintenance



We have all the equipment and are certified

What next?

- Complete pilot registration on FAA IACRA website
- Register Drone with FAA Drone Zone
- Multiple Test Flights
- Develop SOPs and equipment checklist
- Adjust configurations (Take off altitude, snapshot overlap, etc)
- Additional purchases – Ground Control Points, stakes, backpack
- Meet with City Attorney a couple of times

What projects are we being asked to support?

Public Works Drainage and Engineering Departments

Help identify/verify new construction grading issues

- The grading of new developments does not always match the final record drawings, which have led to flooding of nearby lawns or shallow detention ponds
- Help test out mitigation solutions for identified issues

Parks Department

Park and Sports Field Drainage

- Drainage analysis to understand and identify how heavy rain moves in parks near subdivisions and the flooding of their sports fields, due to concerns of pooling in nearby lawns and shallow spots in fields
- Check for localized depressions in their fields that have occurred from heavy use or rain to help speed up and track repairs after these events occur

Current Outputs We Utilize

Drone 2 Map: DTM, Ortho Images, Contours, DSM, Point Clouds and Shaded Reliefs

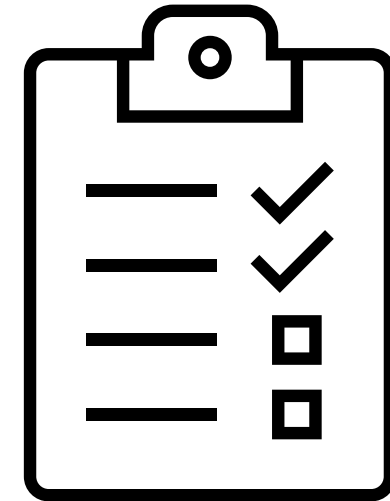
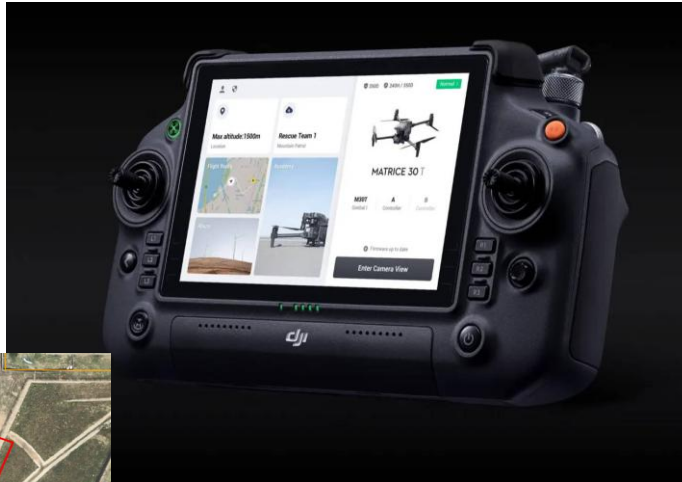
ArcGIS Pro: Flood Simulations and Raster Analysis

These outputs have been helpful in checking for real time accuracy, monitoring projects and creating solutions through different stages, in both a 2D and 3D environment

Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing

Plan drone
flight and
Prep



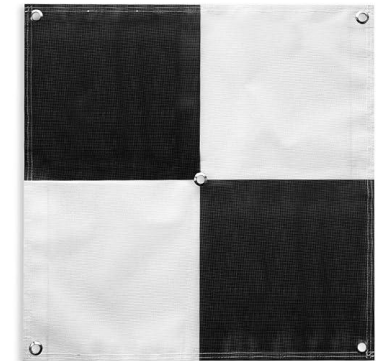
Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing

Plan drone
flight and
Prep



Fly Drone



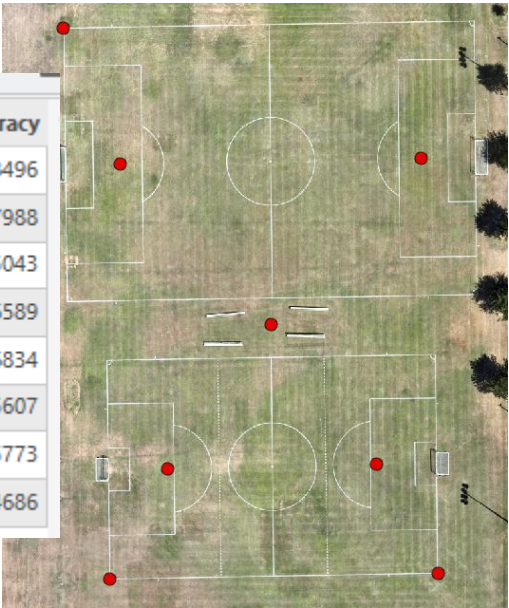
Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing



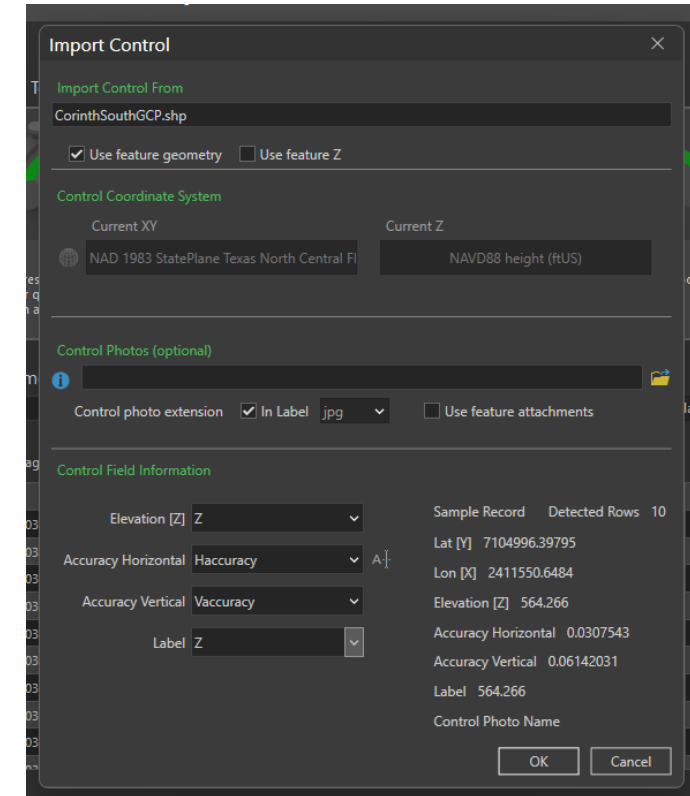
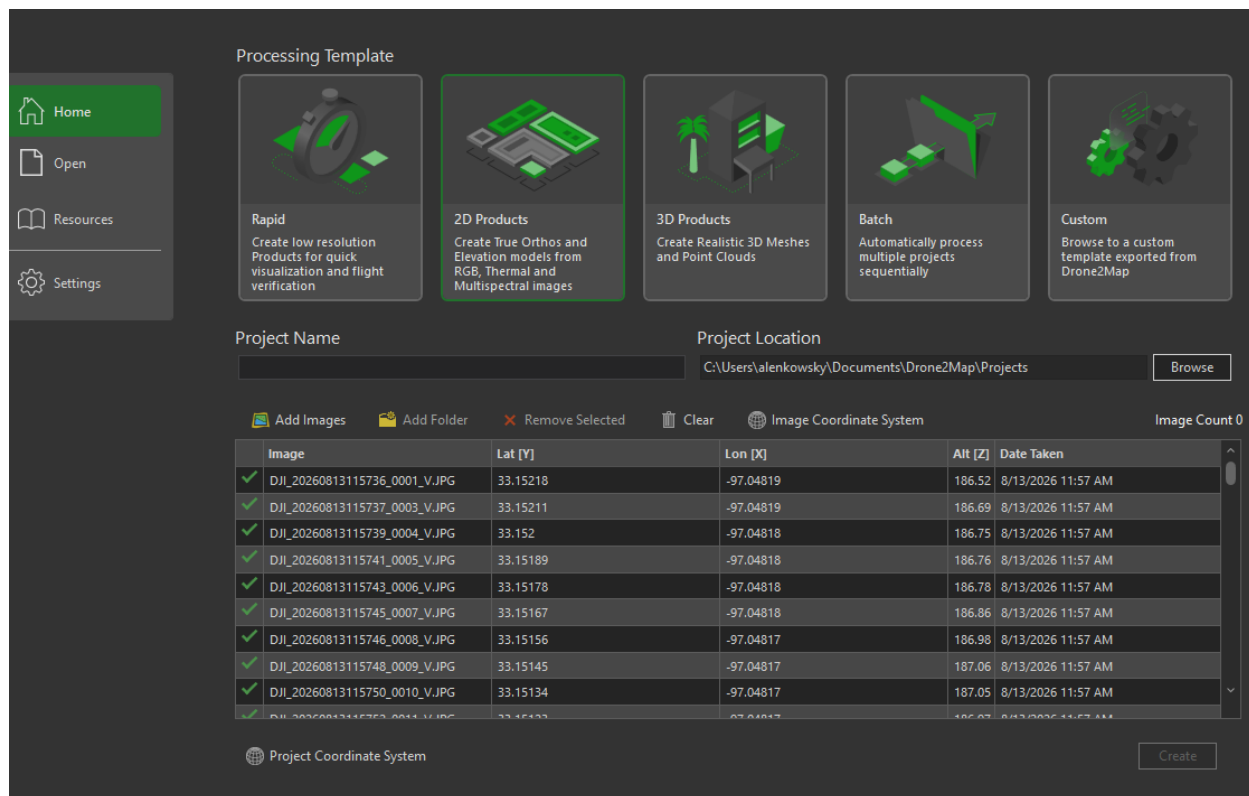
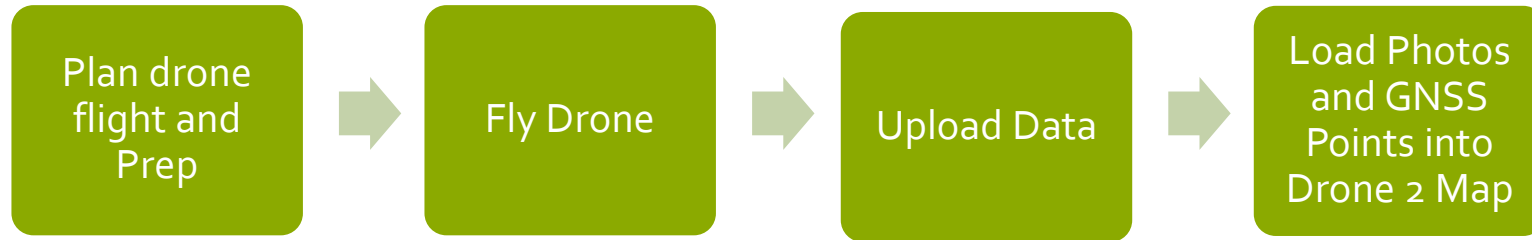
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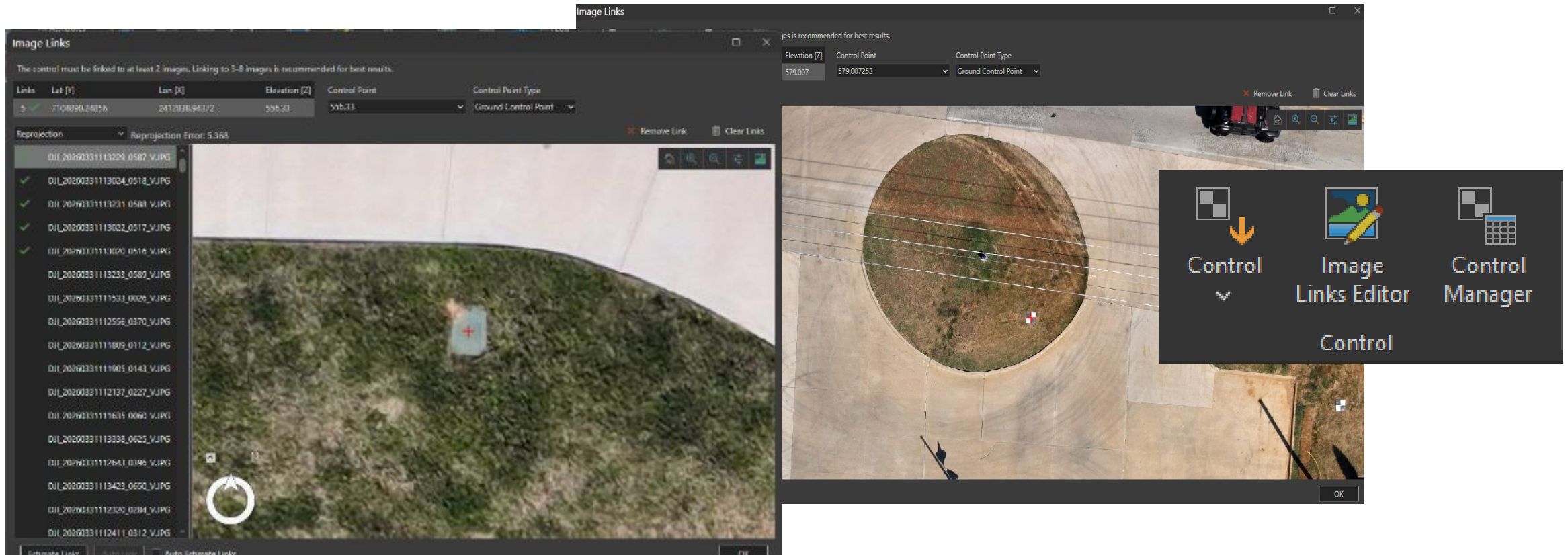
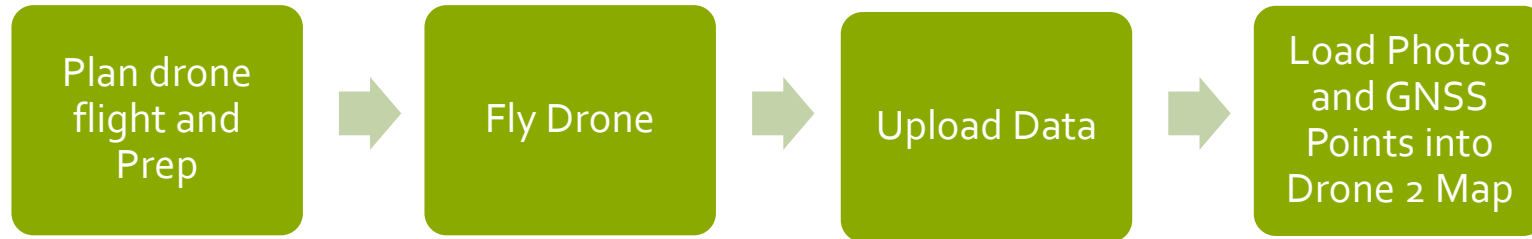
Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing



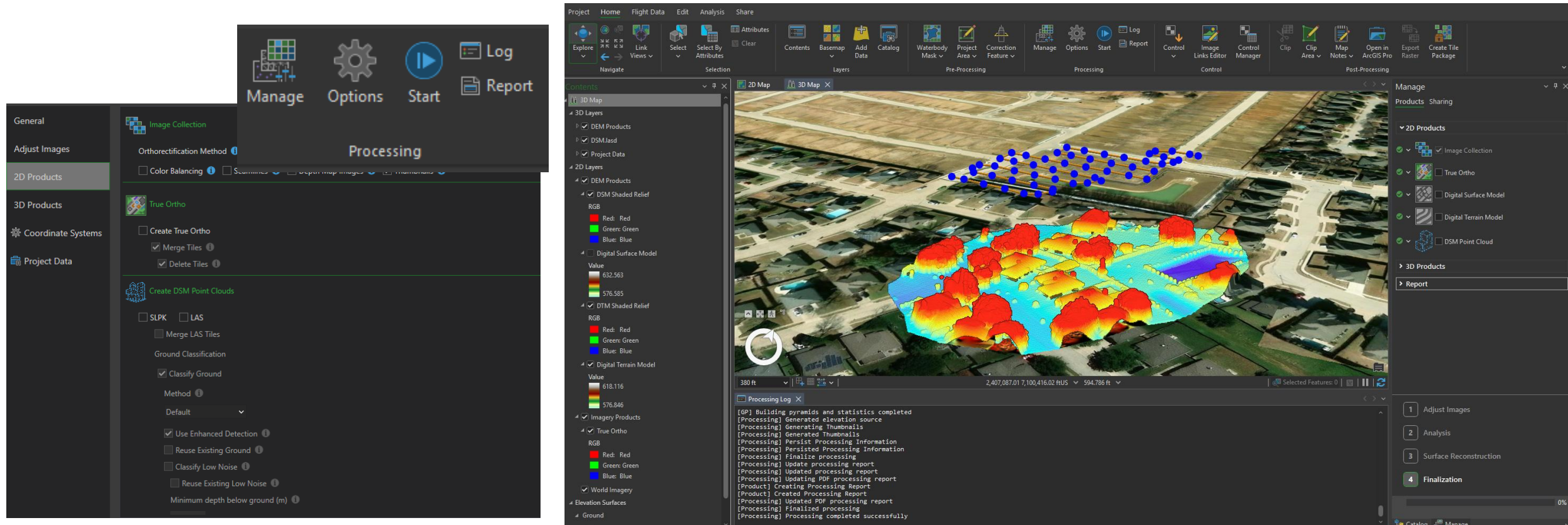
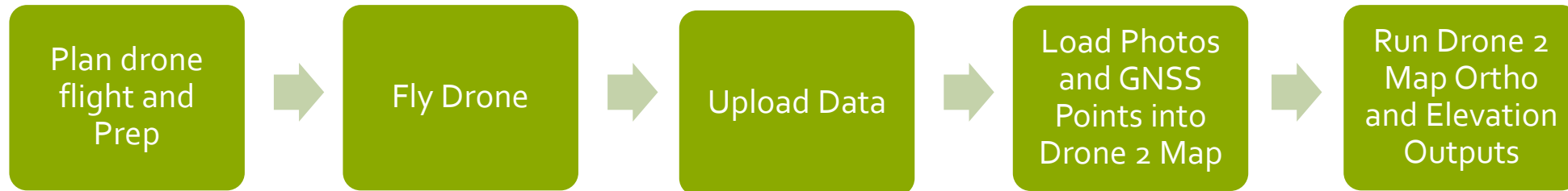
Drone Flight and Analysis Workflow Overview

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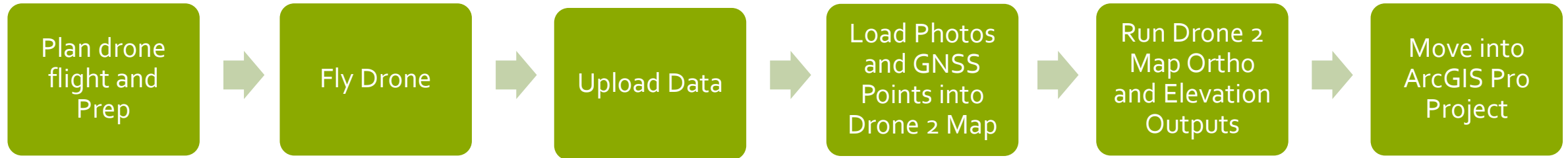
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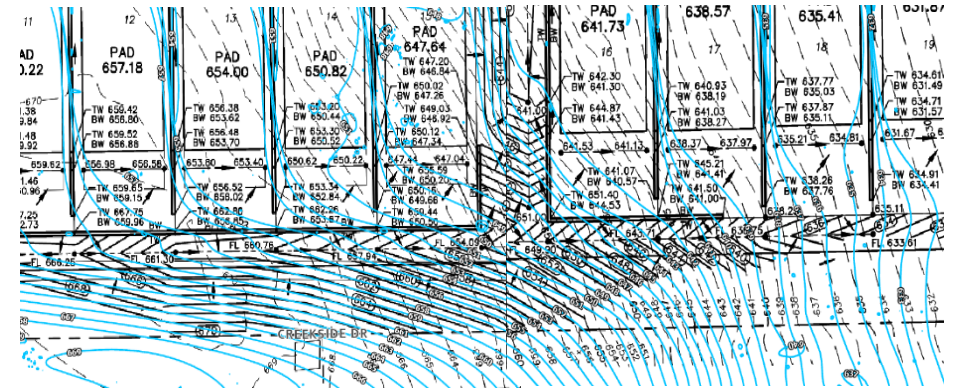
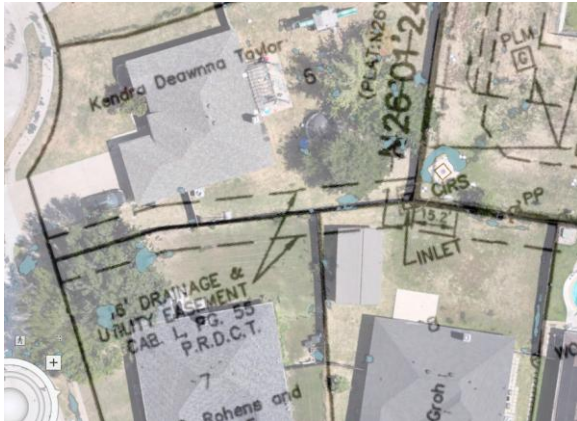


Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing



1. Use ortho image to georeference grading plans and plats ,
Compare contours to plans, or
Use 3d exploratory analysis tools to view detailed profiles of the slope and elevation of DTM or DSM

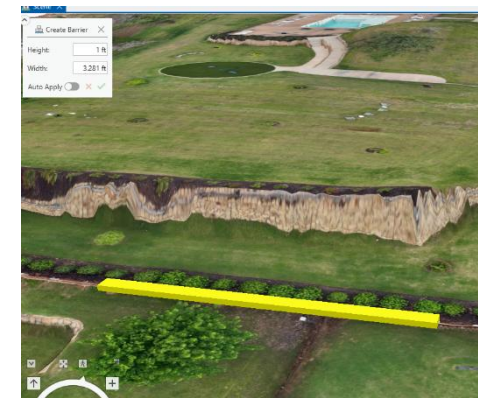
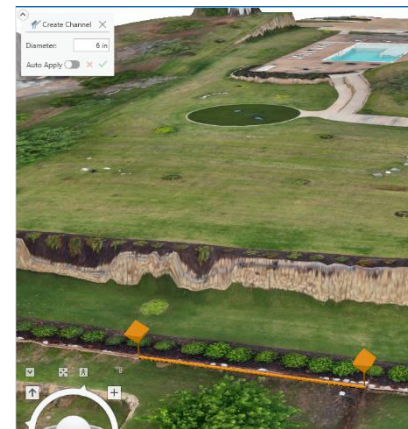
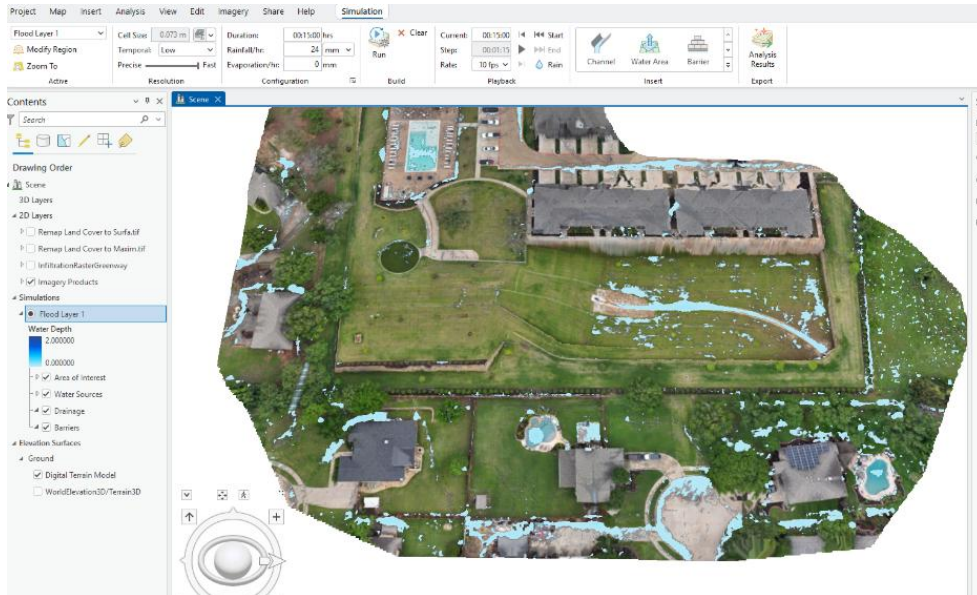


Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing

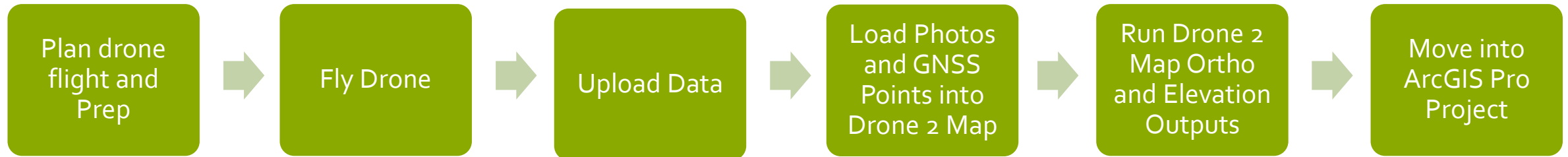


2. Run flood simulations using the DTM to get a look at where water would pool to predict, verify, or locate drainage issues with the ability to test out mitigation solutions.

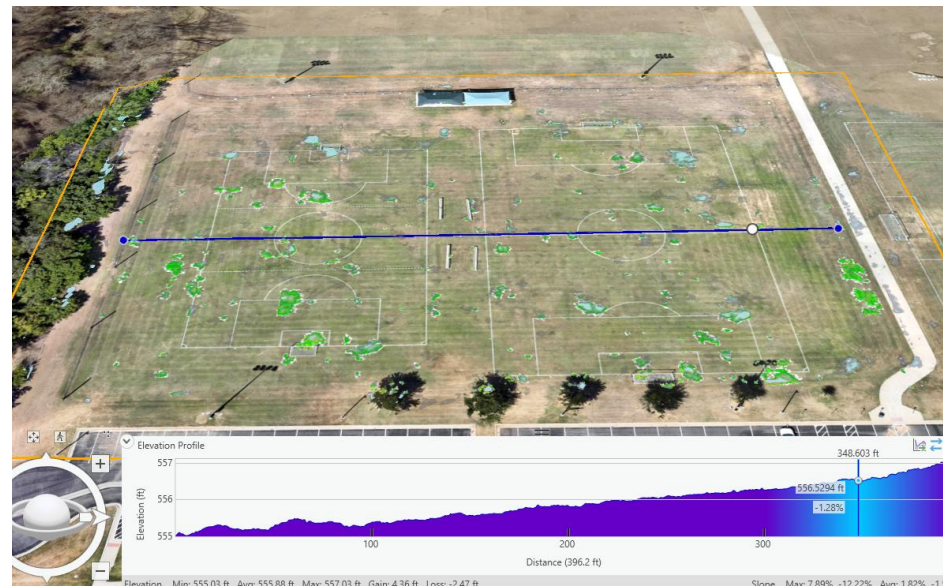


Drone Flight and Analysis Workflow Overview

Drone Flight and Drone 2 Map Post Processing



3. Use 3D Exploratory and Raster tools on the DTM to view detailed profiles of the slope and elevation of sport fields to identify where there are sinks



Examples: Brookman Apartments

Results from initial flight and
initial mitigation ideas



One wall, Extended French Drain



Two Walls



No Added Preventions



Examples: Brookmen Apartments

Results from flight after creation
of shallow channel/burm and Wall



After

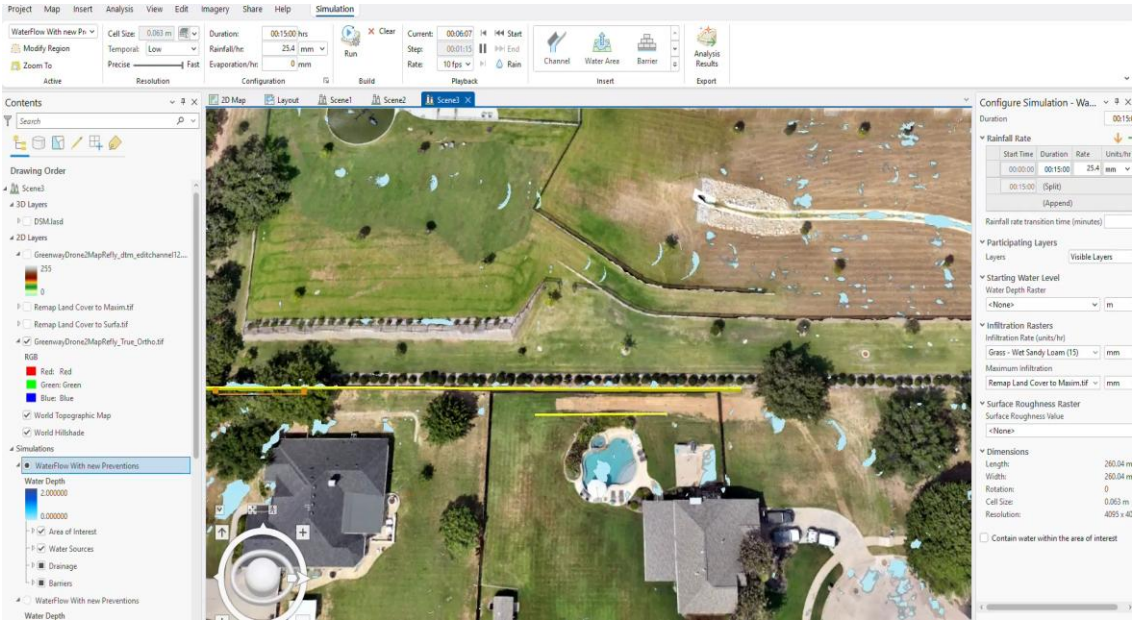


Before



Examples: Brookmen Apartments

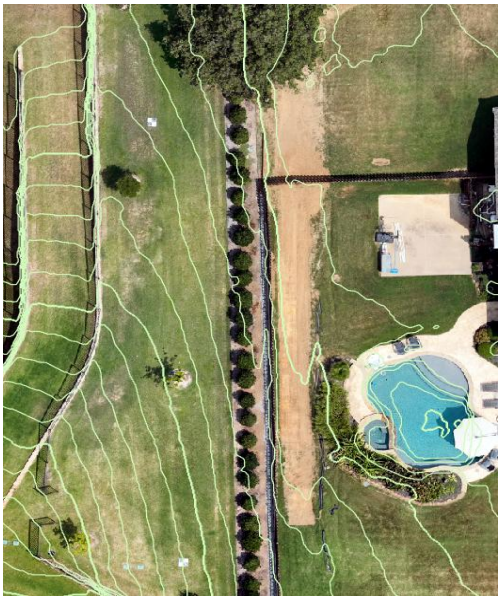
Results after construction of both wall and shallow ditch



Before

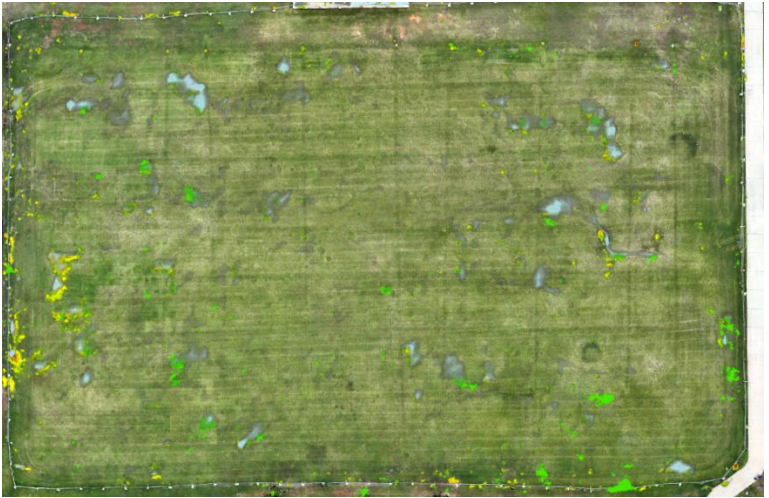
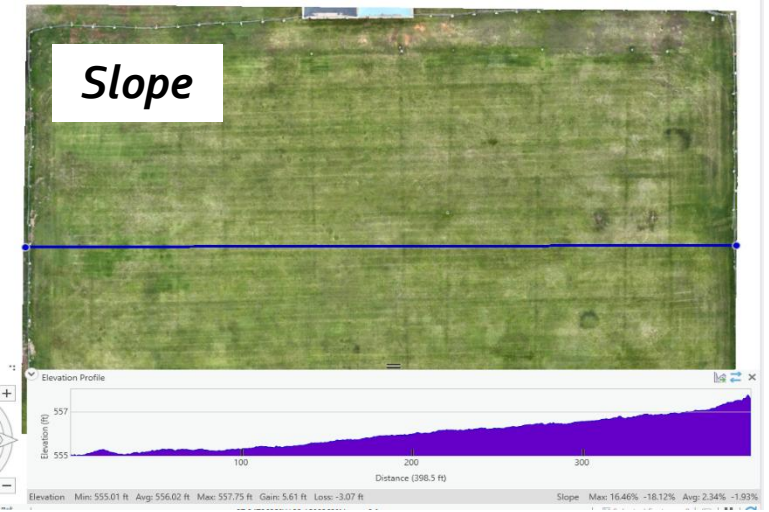


After

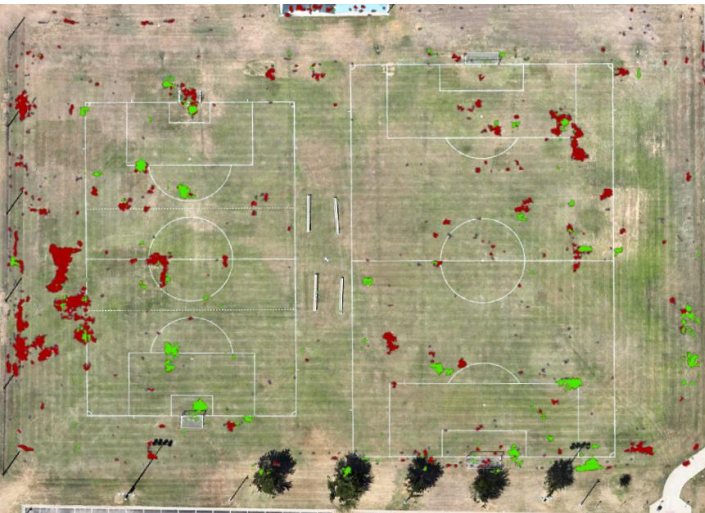


Examples: Corinth South Sport Fields

Before Grading and initial Sink Identification

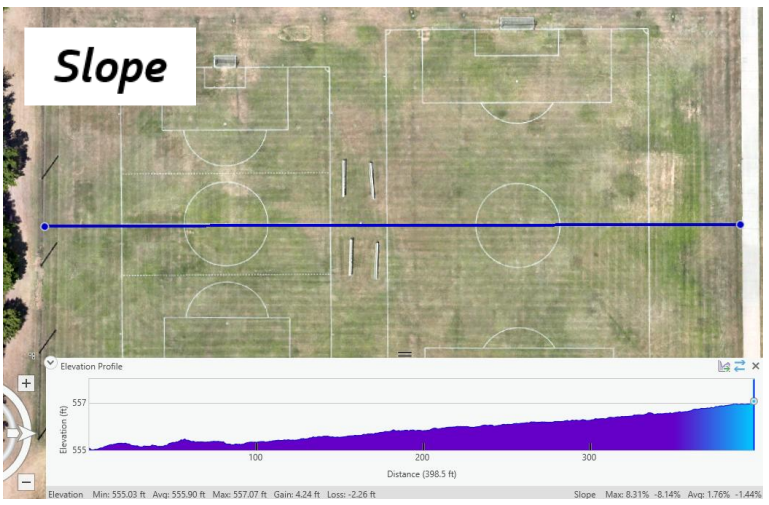


Flood Simulation pooling and Sinks



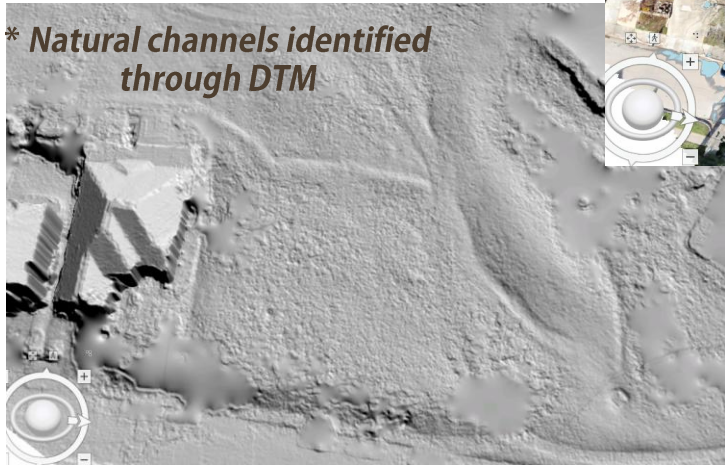
*Before = Red
After = Green*

After Grading and Sinks filled



Flood Simulation pooling and Sinks

Examples: Knoll Park



No Mitigation



With 2ft channel and wall



What we've Learned and Challenges

- Be careful of shadows and trees
- Have enough storage on your computer and processing power
- Always check drone SD Card
- Grass height makes a difference
- The edge of the DTMs could show elevated surfaces

Wrap Up

Thanks for Listening!

Our email:

gis@cityofcorinth.com

Helpful Links:

[ArcGIS Drone2Map system requirements](#) | [ArcGIS Drone2Map documentation](#)

[Set up a flood simulation](#) | [Documentation](#)

[Simulate a flood](#) | [Documentation](#)

[Create 2D products with ArcGIS Drone2Map](#) | [Documentation](#)

[Create 3D products with ArcGIS Drone2Map](#) | [Documentation](#)

[ArcGIS Drone2Map - Esri Community](#)

