



CASE STUDY

**BRASFIELD
& GORRIE**
GENERAL CONTRACTORS

Using Drone Mapping to Verify Construction Earthwork

Construction Company Brasfield & Gorrie Uses Drone-Generated 3D Model to Compare Actual Earthwork to Site Plan

Introduction

Commercial and prosumer drones can quickly and easily fly the area of a typical construction site, providing high-resolution maps and 3D models of site progress – offering significant efficiency gains compared to traditional methods.

DroneDeploy is excited to share the story of our collaboration with Brasfield & Gorrie, one of the largest privately held construction firms in the United States. The following is just one of the many ways they're using drones – to generate an elevation map of a hospital construction site and compare it to design elevations in order to confirm earthwork activities.

Drones at Brasfield & Gorrie

Brasfield & Gorrie has been using drones for several years, save a brief pause while awaiting their commercial section 333 exemption. Today, drone operations at Brasfield & Gorrie are housed in the Virtual Design and Construction (VDC) group, a 24-person team dedicated to improving construction processes through the use of Building Information Modeling.

Hunter Cole, Virtual Design Coordinator, summarizes what the team does another way; *“We assist in almost anything that the company does that’s 3D-model related.”*

Each regional office is equipped with the DJI Inspire series. Whether capturing aerial photos or videos, or generating detailed 3D models through the use of photogrammetry, drones enable the team to rapidly gather information during all phases of construction in a safe, economical, and practical way.

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Earthwork at a Hospital Construction Site

While conducting work on a 61-acre hospital construction site in Florida, the VDC group received a request from field operations. A subcontractor finished the initial earthwork, but the site manager was concerned that it did not match what had been designed. He enlisted the help of the VDC to verify the work done.

“We were tasked to figure out the difference between the current overall site grade and the proposed finish grade,” said Charles Curtis, a field engineer on the site.

The size of the site made it a great candidate for drone mapping. Measuring the elevations of the earthworks using traditional methods would have been a very expensive and time-consuming process.

“We were tasked to figure out the difference between the current overall site grade and the proposed finish grade”

Charles Curtis, Field Engineer



Flying the Site

The VDC group contracted Dronebase, a local drone services provider, to fly the site with a Phantom 3 and a licensed pilot. They utilized DroneDeploy's mobile app to plan and automate the flight. Due to the site's considerable size, multiple flights were necessary. Total flight setup and execution took only an hour.

Because the map would be used for comparative analysis, it was important that the map overlay properly with the design drawings. To ensure a high degree of accuracy, Brasfield & Gorrie incorporated ground control points, or GCPs.

After flying the site, Brasfield & Gorrie uploaded the captured imagery to DroneDeploy. Later that same day, DroneDeploy's cloud platform finished processing the imagery into an orthomosaic map, an elevation map, and a 3D model.

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Analyzing the Data

Jesse Creech, Brasfield & Gorrie's VDC, was charged with getting site elevation from the drone flight into a formation that could be compared with the pre-existing site plans. The model had to accurately be projected in the same local coordinate system that the design file used. Entering the ground-based measurements of the ground control points made sure that the map was aligned with a high degree of accuracy, a feature currently offered with DroneDeploy's software.

Once the two models were properly aligned, Jesse could then compare the model of the existing site with the design file. The final output was a heat map that made it clear to see the progress the grading contractor had completed to date.

“The comparison concluded that the site contractor needed to export more soils in order to reach the desired elevations.”

Jesse Creech, VDC at Brasfield & Gorrie

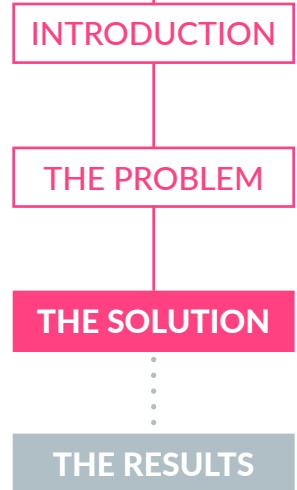




Fig 1.



Fig 2.



Fig 3.

The Results

Traditional Site Survey



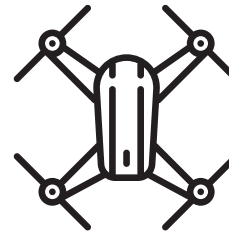
Accept Survey
1-2 days

Data Collection & Post-processing
1-2 weeks

Delivery of PDF, CAD File,
Contour Map
1-2 weeks

Total Time
2-3 weeks

With DroneDeploy

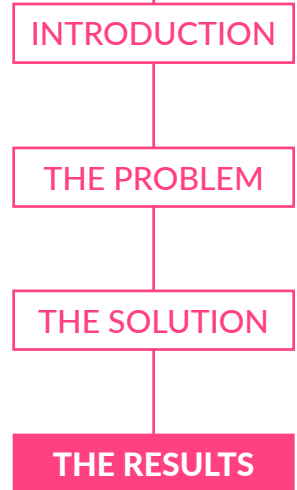


Mobilize to Site
1 day

Fly Drone & Collect Data
1-2 days

Delivery of PDF, CAD File,
Maps & Point Cloud
1-2 days

Total Time
1-4 days



Faster Data Collection Leads to Higher ROI

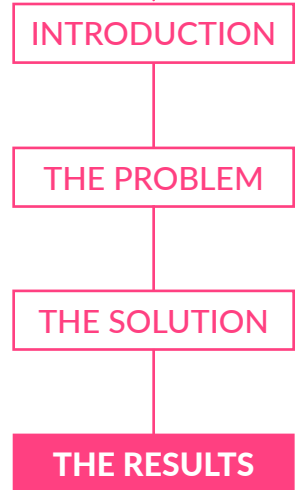
Using a drone to map the area allowed the VDC team to assess earthwork on the site much faster and with more detail than they could have done using traditional methods. According to Charles, the field engineer, completing the same project with traditional methods would have required over 1,000 survey shots.

Overall, the project demonstrated the massive time and cost savings that drone mapping is bringing to Brasfield & Gorrie, as illustrated by Charles: “The speed with which a drone flyover can capture highly detailed imagery is the time saver. Overall, I feel that utilizing the drone, we spent a third or less of what it would have taken to do the job manually.”

“Normally, we would use the robotic total station to shoot a grid of elevation correct points. I would have to use, at a minimum, a 50' x 50' grid for a site such as this one. With approximately 61 acres, that would have required over 1,000 individual shots with multiple setups. Trying to fit it in with our normal work would likely have taken many weeks or serious overtime.” – Charles Curtis, Field Engineer

“Overall, I feel that utilizing the drone, we spent a third or less of what it would have taken to do the job manually.”

Charles Curtis, Field Engineer



Advice & Best Practices for Drone Use in Construction from Brasfield & Gorrie

- **Research before buying a UAS.** Be alert and agile, as technology is changing rapidly. Start simply. Take full advantage of the low cost of entry drone mapping allows.
- **Plan your mission first.** No two construction sites are the same and neither are the hazards involved. The worst thing you can do is arrive on-site without a predetermined flight plan.
- **Establish your goals.** Know what you want to do with the data before you collect it since this will determine the level of detail necessary for a successful mission.
- **Ensure FAA compliance.** Be willing to deny services if an unsafe or noncompliant operation is being asked of your organization.
- **Enlist the help of real, certified pilots.** UAS flight overlaps with actual aviation. Brasfield & Gorrie enlisted the support of a licensed pilot to establish the operational use of drones.

“With a relatively small investment in time and money we were able to verify field conditions and complete an analysis that would have otherwise taken much longer and been much more expensive. We received a very high ROI in this instance.”

Jesse Creech, VDC at Brasfield & Gorrie

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Try DroneDeploy on Your Construction Site

With DroneDeploy, it's easy to automatically fly your DJI drone to make a map and 3D model. You can then make volume calculations instantly from any device simply by selecting the perimeter of the pile or pit you want to measure.

To get started, just download the free DroneDeploy app for iOS or Android or signup to start your free trial.

[Try DroneDeploy for Free](#)

Interested in learning more about how DroneDeploy can help your business?
Request a consultation here www.dronedeploy.com