

AR/VR/XR, DIGITAL TWINS + MORE:

WGI's Visualization Practice Embraces Complete Service Suite

A WGI Innovation Case Study



WGI's visualization team's extensive abilities to produce high-quality renderings and videos helps convey design ideas and evaluate alternatives for our clients. Established in 2019, the visualization division's original mission was streamlining marketing efforts within the transportation division by enhancing our in-house capabilities — and eliminating the need for third-party graphic designers. Working totally within the department, we focused on specific engineering issues and avoided multiple iterations with outside firms. Results were noticed throughout the company, resulting in various assignments and opportunities to further develop the team's modeling skills.

Since then, the team's abilities rapidly developed from simple 3D roadway segments to recreating entire city blocks and regional corridors with custom features and traffic, assisting various departments. The WGI visualization practice now provides a full suite of visualization and rendering services, including advanced capabilities in AR/VR/XR and digital twin technologies in conjunction with partners such as Akular.

CHALLENGE

Traditional plan sets are developed in 2D, and usually consist of dozens to hundreds of sheets with little color or variation. To the layperson (public or client), sifting through them is overwhelming, often causing more confusion than resolve. Even for professionals, this barrage of information can increase the chance of design conflicts. Our challenge came in several parts:

- Convey projects in a clear, concise manner
- Portray alternatives to clients
- Eliminate design conflicts
- Support leading-edge AR/VR and digital twins

Another barrier entailed selecting the proper rendering platform(s) and training associates to become proficient with the software. However, once integrated, these resources assisted companywide with a diverse range of projects and requests.



SOLUTION

We began investing in the equipment required to handle the demands of rendering software, then ramping up our graphic design through training and exploring the abilities of multiple rendering platforms. Visualization development consisted of creating the environment in CAD and bringing the environment to life in the rendering software. The visualization team selected a diversity of projects to expand their knowledge outside the transportation division, including planning, landscape architecture, structures, and site development.

With this foundation, the team completed projects of varying size and scale, including seawall options along a neighborhood coastline to modeling 10 miles of highway along a developing Florida corridor. The team took advantage as more opportunities arose to tackle complex graphics, including bridge construction sequencing and traffic simulations. The team's services and vast arsenal of abilities can be used in a project's lifecycle at virtually any point.

Banyan Boulevard | West Palm Beach, FL





BANYAN BOULEVARD

The project stretches close to a mile in an active downtown area, and the team created idealized models for nearly half of the corridor along various spots. Renderings helped to show the City of West Palm Beach future improvements such as landscaping, rain gardens for drainage, and potential private developments. The team also created a video stretching along several blocks. One of our first tasks was tying all aspects of the design process together and recreating an actual setting. Buildings are a mix of those premade in Sketchup and freehand drawing.

Renderings are of Banyan Boulevard |
West Palm Beach, Florida.





OCEAN REEF CLUB

The project involved expanding the existing bridge and improving the golf cart, cyclist, and pedestrian pathways along the bridge.

The team needed a variety of viewpoints for this project, since the roadway wasn't a significant factor in the overall design.

Renderings are from the Ocean Reef Club | Key Largo, Florida.



COLONIAL PARKWAY

The team used a combination of stills and videos for a public involvement meeting. Creating them showed impacts on local homeowners and how the nearby school systems would be affected. The team made multiple flyover videos totaling close to 10 minutes while spanning the project's entire nine miles.

Renderings are from Colonial Drive | Orlando, Florida.





HILLSBORO BOULEVARD

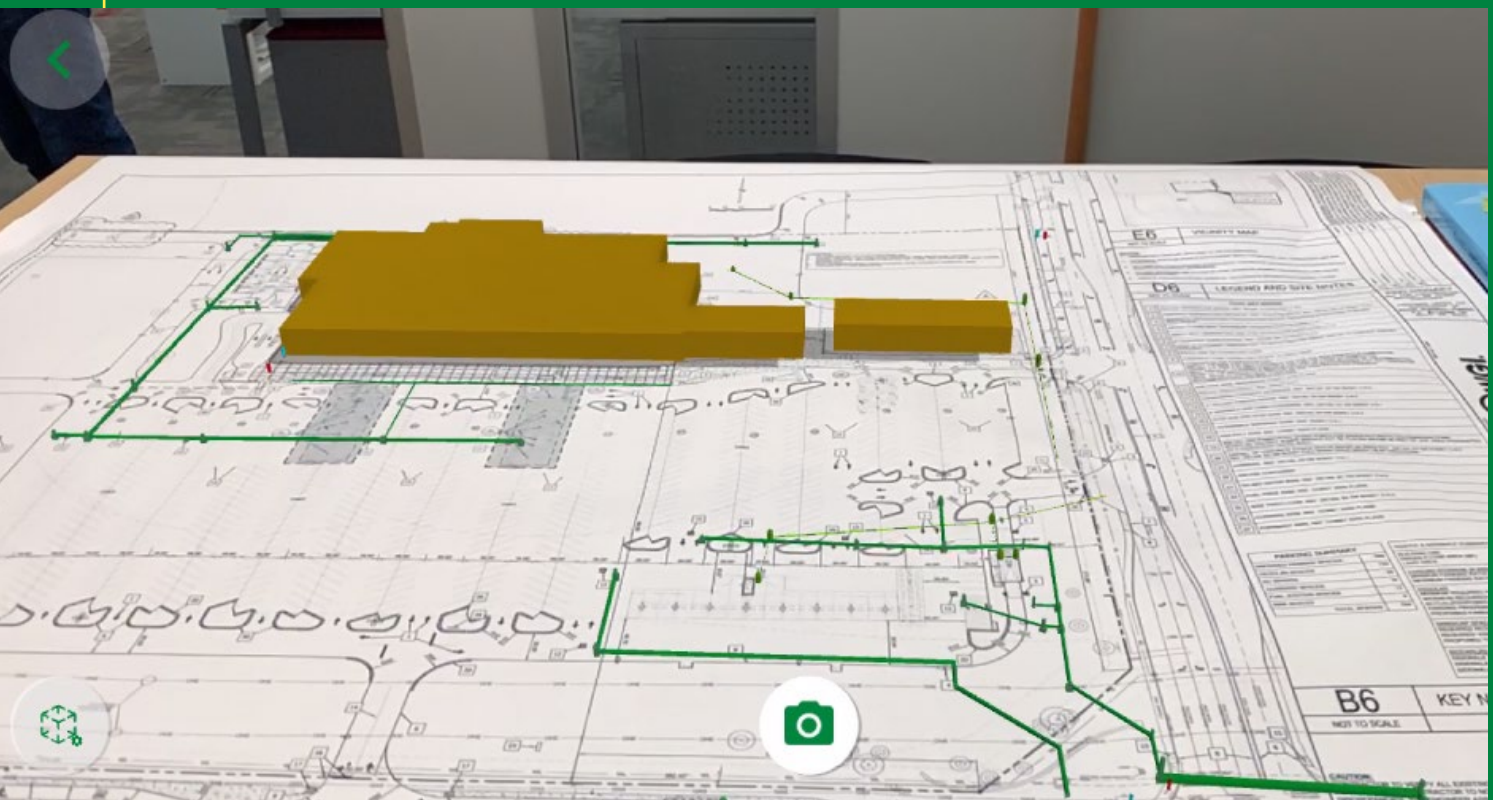
The visualization team added bike lanes along collector and enhanced pedestrian access in addition to the original project services. The model, along with another typical section of the project, took about three days to create. No survey or other data required collection.

Renderings are from a recent project pursuit at Hillsboro Boulevard | Deerfield Beach, Florida.

1603 BROADWAY HOTEL AND OFFICE

This project is a 22-story, mixed-use building with hotel, office, and structured parking along a primary corridor in Downtown. The Augmented Reality (AR) models assisted in coordinating with the adjacent neighborhoods, envisioning both pedestrian and traffic interconnections outside the building, and potential conflict resolution within the building. Using AR technology to visualize complicated scenarios assisted in clearly communicating with adjacent stakeholders, resulting in the project's overwhelming support.

The AR model, a visualization of the full Revit model, includes the building's structure, MEP systems, and furniture finish-out | San Antonio, Texas.



BENEFITS

The ability to bring client projects to life in a 3D environment is invaluable, giving WGI an edge against the competition. Aside from static images, the team's capabilities have grown to include animations through neighborhood or city blocks, construction sequencing, point of view, motorist/pedestrian perspectives, and traffic simulations. These features increased clarity and understanding of project issues, and led to selecting the best option that satisfies all parties involved.

Public involvement meetings are praised for enhanced visuals that ameliorate the public's grasp of a project. Additionally, driver-perspective videos contributed to creating new design standards enhancing motorist safety along rail corridors.

Continuing to adopt new technologies, the visualization team is investing in the use of AR/VR/XR for public involvement and demonstrating project alternatives in the field. Understanding how various unknowns will be represented in the existing environment is integral to success, and our tools are essential for this process.

Digital rapid prototyping reduces wasted time and construction costs by defining the end results before teams begin. It is an explanation tool for those who don't share the spatial awareness to create a 3D map of the 2D plans in their mind. By creating prototypes that are extremely close to the real-life scenarios, the public and municipal leaders can make a decision without the need to live them.

As part of the WGI visualization and digital twin strategy, the team is also expanding its services and partner system, supporting a wide range of use cases for static and live digital twins. Static digital twins can be used in construction to provide a full system of records. Live digital twins support a variety of use cases from operations and maintenance to sustainability, resilience, and adaptability.

Ocean Reef Club | Key Largo, FL



RESULTS

Implementing the visualization department has greatly complemented various other WGI departments, and expanded our scope of services to clients. Our renderings and videos provided clients with a greater understanding of their projects and reduced design errors and revisions, saving time and money.

On the public involvement side, our services increase customer satisfaction and enhance decision-making for public officials.

For WGI, the ability to convert these 3D models and renders into long-term digital twins is both their evolution and true perennial value. The best result for the end-user and our firm is creating models so expertly perfected that our visualization department then turns them into living digital renditions, tracking and engaging our municipal team to proactively use them.



Visualization & Digital Twin Services Provided by WGI

Use Cases

- Bridges
- Buildings
- Construction
- Design Alternatives
- Driver/Pedestrian Perspectives
- Land Development
- Parking Facilities
- Public Involvement Facilitation
- Traffic Simulations
- Transportation
- Utilities

Techniques

- Renderings
- Illustrations
- Hand Sketches
- Animations
- 3D Models
- Presentation Graphics
- Enhanced Presentation Styles
- Embedded 3D Models
- Virtual Reality
- Augmented Reality
- Digital Twins

LET'S TALK.

For more information about this case study and WGI's Visualization Services, please contact us today:



John Thomas, PE

Project Engineer - Transportation

John.Thomas@WGInc.com



TOMORROW'S INFRASTRUCTURE SOLUTIONS, TODAY

Offices Nationwide | 800.394.7275 | WGInc.com