



# AIM Innovation Showcase Application

## Sponsor

**Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation.** If selected, the sponsoring DOT will be asked to present the innovation at the Innovation Showcase during the AASHTO Spring Meeting.

**1. Sponsoring DOT (State):** California

**2. Name and Title:** Scott Eades, Caltrans District 5 Director

**Organization:** California Department of Transportation (Caltrans)

**Street Address:** 50 Higuera Street

**City:** San Luis Obispo

**State:** California

**Zip Code:** 93401

**Email:** scott.eades@dot.ca.gov

**Phone:** (805) 549-3101

## Innovation Description (30 points)

The term “innovation” may include processes, products, techniques, procedures, and practices.

**3. Name of the innovation:**

State Route 25/156 (SR 25/156) Turbo Roundabout in San Benito County, California.

**4. Please describe the innovation.**

The SR 25/156 Turbo Roundabout is an innovative, new facility that improves safety while maintaining intersection traffic flow and efficiency. A turbo roundabout’s operation appears like a regular roundabout but has additional features that reduce the potential for collisions. Some of these features include three-inch lane dividers, overhead signage, and pavement markings. Another design feature is a mountable truck apron - which accommodates the sweep of a tractor trailer rig wheels as it makes its way through the roundabout. The design of this turbo roundabout also addressed today’s traffic and truck volumes, as well as future projections.

**5. What is the existing baseline practice that the innovation intends to replace/improve?**



This project was developed to reduce the frequency and severity of collisions at the SR 25/156 junction. This intersection had historically been controlled via four-way traffic signals which this project replaced with a turbo roundabout. Despite the project's semi-rural location, SR 25 is a major commuter route between the City of Hollister, the surrounding communities, and jobs in Silicon Valley. SR 156 is a designated Interregional Strategic Corridor and provides a key east-west goods movement link between the Central Coast, Bay Area, and the Central Valley – ultimately moving California products throughout state and the nation. Due to the unique nature and volume of vehicles converging at this intersection, a new approach to improving safety needed to be considered. A turbo roundabout emphasizes safety and speed control. Design features control the speed that vehicles enter, navigate, and exit the roundabout. Lower vehicle speeds provide more time for drivers to judge, adjust speed and enter a gap in circulating traffic. It results in a reduction in the frequency and severity of collisions.

#### **6. What problems associated with the baseline practice does the innovation propose to solve?**

The intersection of two major state routes with a traditional signalized intersection proved problematic at this specific location. This location had a history of fatal collisions between vehicles and trucks, as well as frequent traffic delays, as traffic flow at this location slowed due to the number of vehicles and trucks converging. Construction of a turbo roundabout was an innovative approach to reduce the opportunity for broadside collisions and maintain efficient traffic flow at the intersection of two major state routes.

#### **7. Briefly describe the history of its development.**

Since 2011, Caltrans had implemented several small projects that modified the existing signals at this location. These modifications included adjusting signal timing, installing "signal ahead" signs, installing flashing beacons and upgrading the size of the signal heads. Although these countermeasures had some benefit, Caltrans had seen collisions greatly reduced at other intersections in California where roundabouts replaced signalized intersections. Additionally at this intersection, the roadways met at an acute angle and the standard roundabout geometry could not be used without major roadway modifications. The project team researched and found a European roundabout geometry which could accommodate the acute angles and the current traffic volumes. This was California's first time deploying a turbo roundabout, the first time a turbo roundabout was implementation on a highway system, and the second time a turbo roundabout was implemented in the Nation.

#### **8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation below (if electronic, please provide a separate file). Please list your attachments or weblinks here.**

One of the most effective public education tactics that Caltrans deployed was the development and distribution of a community friendly "how-to" video in English and Spanish. In early 2023, prior to the opening of the turbo roundabout, Caltrans, working closely with the Council of San Benito County Governments (SBCOG), developed a three-minute video which succinctly described the history of the intersection, outlined the purpose and need for



the turbo roundabout, and provided a step-by-step set of instructions for how to enter, navigate, and exit a turbo roundabout. The instructions showcased a highly visual model of the roundabout and provided the driver's view while traveling through the roundabout.

Once the video was complete in late 2023, Caltrans and SBCOG distributed the video widely around the community – distributing fact sheets, issuing press releases, posting to social media, making presentations to key community organizations, updating the SBCOG website and encouraging interagency partners to share via their regular communication channels. Please see important video links below:

Video in English: [The Turbo Roundabout Explained \(English\) \(youtube.com\)](#)

Video in Spanish: [La Turborrotonda Explicada - YouTube](#)

Council of San Benito County Governments Transportation Updates Page: <http://sanbenitocog.org/transportation-updates>

Fact Sheet (English): [Turbo-Roundabout-Project-Fact-Sheet-113023-FINAL.pdf \(sanbenitocog.org\)](#)

Aerial Images: See attached zipped file "Roundabout Images and Stills"

Still Images from Video: See attached zipped file "Roundabout Images and Stills"

Click or tap here to enter text. Link to CCTV Camera: <https://cwwp2.dot.ca.gov/vm/loc/d5/sr156sr25.htm>

## State of Development (10 points)

Innovations must be successfully deployed in at least one State DOT. The AIM selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

- Innovation is fully functional and yet to be piloted.
- Innovation has been piloted successfully in an operational environment.
- Innovation has been deployed multiple times in an operational environment.
- Innovation is ready for full-scale implementation.

The SR 25/156 Turbo Roundabout opened to traffic in February 2024, is fully functional and is being successfully used by travelers.

10. What additional development is necessary to enable implementation of the innovation for routine use?

The State Route 25/156 Turbo Roundabout was fully operational as of February 2024.

11. Do you have knowledge of other organizations using, currently developing, or showing interest in this innovation?  Yes  No

If so, please list organization names and contacts.

Organization	Name	Phone	Email
NYS Department of Transportation	Howard McCulloch, P.E., PTOE	(518) 485-7503 (desk) (518) 424-5933 (cell)	Howard.McCulloch@dot.ny.gov
Jacksonville Transportation Authority	Nathaniel Ford Executive Director	(904) 630-3181	nford@jtafla.com
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### Potential Payoff (30 points)

Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice.

**12. Identify the top three benefits your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.**

Benefit Types	Please describe:
Improved Safety	<p>Result is fewer severe collisions and incidents of injury. As expected after the initial opening of a roundabout minor collisions increased due to driver learning, but over time minor collisions have declined in addition to the reduction of severe collisions. Proven Safety Countermeasure statistic from FHWA states transitioning from a signalized intersection to a roundabout could reduce fatal and injury crashes by 78%.</p> <p>Researchers at Cal Poly San Luis Obispo are analyzing the</p>

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# INNOVATION

## MANAGEMENT

	<p>conflicts observed at the Turbo Roundabout using video analytics with support from Transoft Inc. They compared the conflicts at Turbo roundabout shortly after opening and compared them to the conflicts at the signalized intersection that existed prior to the roundabout installation. The findings show that dangerous high-speed conflicts that lead to severe broadside collisions have been reduced significantly. They will publish a complete document reflecting their findings by the end of 2024 in a report published by the Mineta Transportation Institute, which funded this research.</p>
<p>Improved Operation Performance</p>	<p>The project resulted in reduced speeds and safer movements within the roundabout. This intersection would have daily a.m. and p.m. delays caused by queuing at the existing signals of commuters traveling to and from San Jose/Silicon Valley along with the large quantity of trucks that traverse between the Central Coast and the Central Valley. The intersection operated at an acceptable level of service (LOS) with an average delay of 34.4 seconds per vehicle (sec/veh) during the AM peak and 24.2 sec/veh during the PM peak.</p> <p>Before construction, Traffic Operations conducted an Intersection Control Evaluation (ICE) to evaluate the intersection of SR 25 and SR 156. The control options evaluated included existing signal control (do nothing), modified signal control and yield control (roundabout). It was determined the roundabout would operate with an average delay of 12 sec/veh during the AM peak and 12.2 sec/veh during the PM peak.</p> <p>Since the roundabout opened there is negligible delay at this intersection. Which can be viewed using the CCTV camera link provided in Item #8.</p>
<p>Environmental Benefits</p>	<p>Travelers are not idling in their vehicles at this location as they would be with a traditional signalized intersection. Thus, there are less greenhouse gases being released at this location. This project was built within the existing right of way, saving impacts to adjacent farmland and wildlife.</p>

## Deployability (30 points)

The AIM selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

### **13. What challenges and/or lessons learned should other organizations be aware of before adopting this innovation?**

Due to the public's lack of experience with roundabouts, they did not believe the roundabout would function properly and improve traffic operations after implementation. Therefore, a project team must develop a community engagement plan that outlines the best approaches to both inform the public and take in their feedback during project development process. This engagement plan should include elected officials, the business community, travelers and residents. Additionally, the project team needed to keep the public informed while the project was being constructed. During construction, the outreach plans should include detailed staging plans if the intent is to keep the roadway open during the construction. In the early stages of construction for this project, the lack of consistent information sharing caused the public to get frustrated with the length of time it was taking to finish. Lastly, educating the public before opening for normal use was also a challenge. Utilizing innovative communication tools like simulations is essential. Also, post construction monitoring can yield enhancements that can benefit your community. Caltrans Traffic Safety closely monitored the turbo roundabout during the initial months after opening. Based on their observations, additional striping was added on the pavement to enhance the driver ability to correctly transverse the roundabout.

### **14. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.**

**Cost:** \$ 14.9 million.

**Level of Effort:** Several functional units within Caltrans contributed to the success of this project.

**Time:** April 2017 the Public Interest Findings document was signed, environmental work was completed in 2018, and the facility was opened to the public in February 2024.

### **15. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.**

The project team and department engaged with a consultant to develop the educational video, which included a custom model developed off CAD plan files. Additionally, this consultant also performed an extensive public outreach campaign which included website development for the project, providing social media content and writing news releases. This proved very helpful in disseminating information to elected officials, the public and the media.

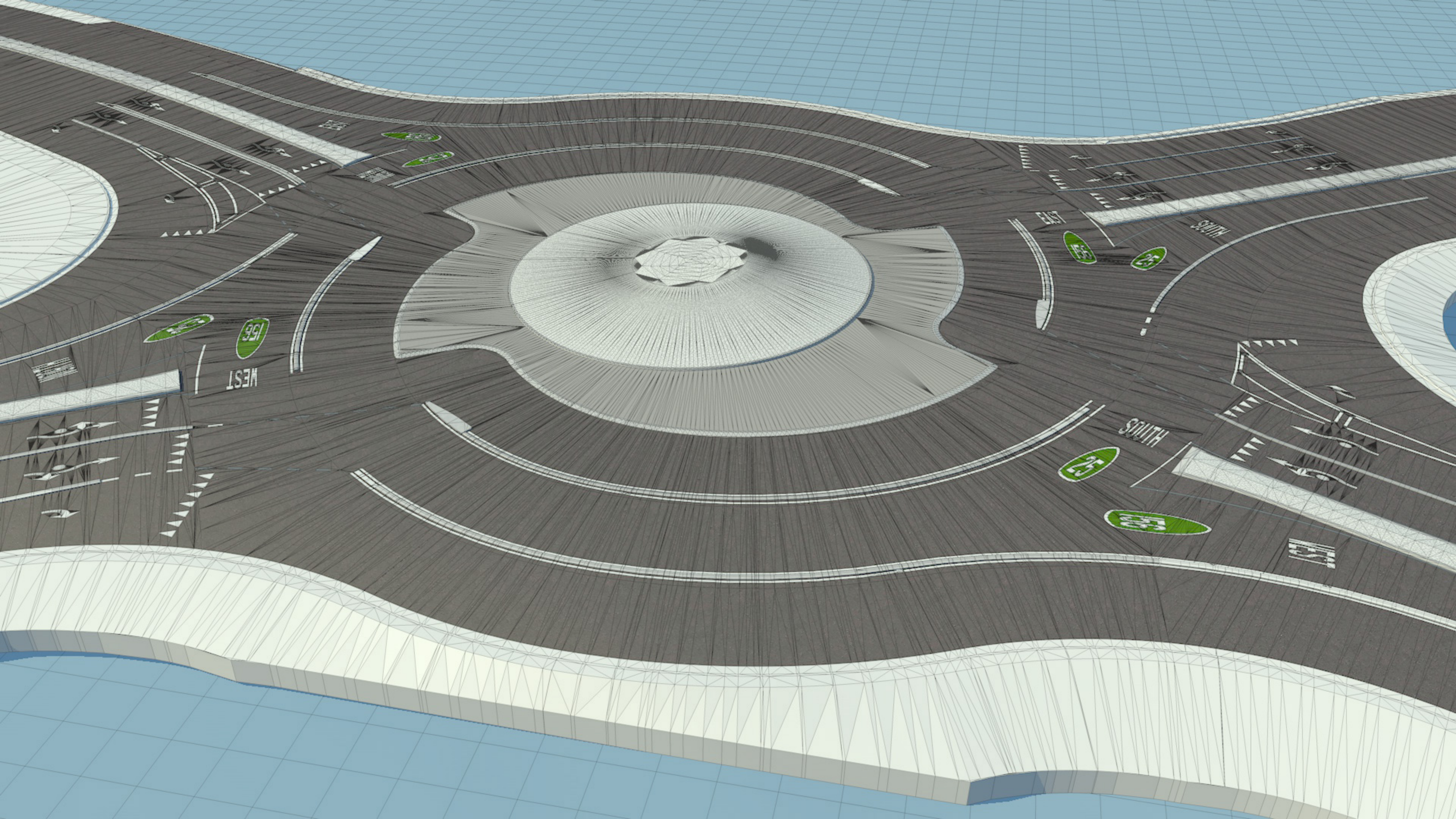












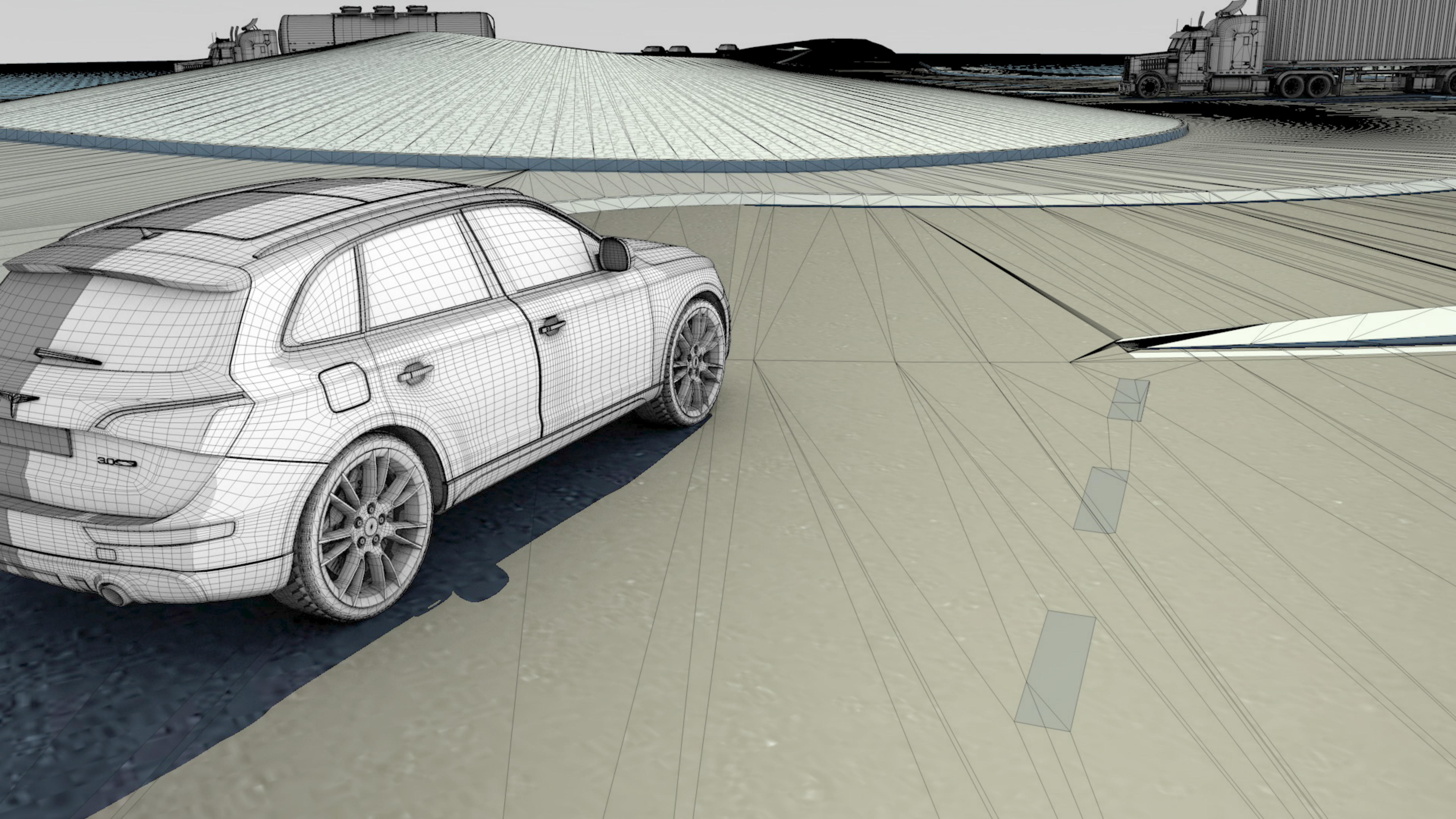
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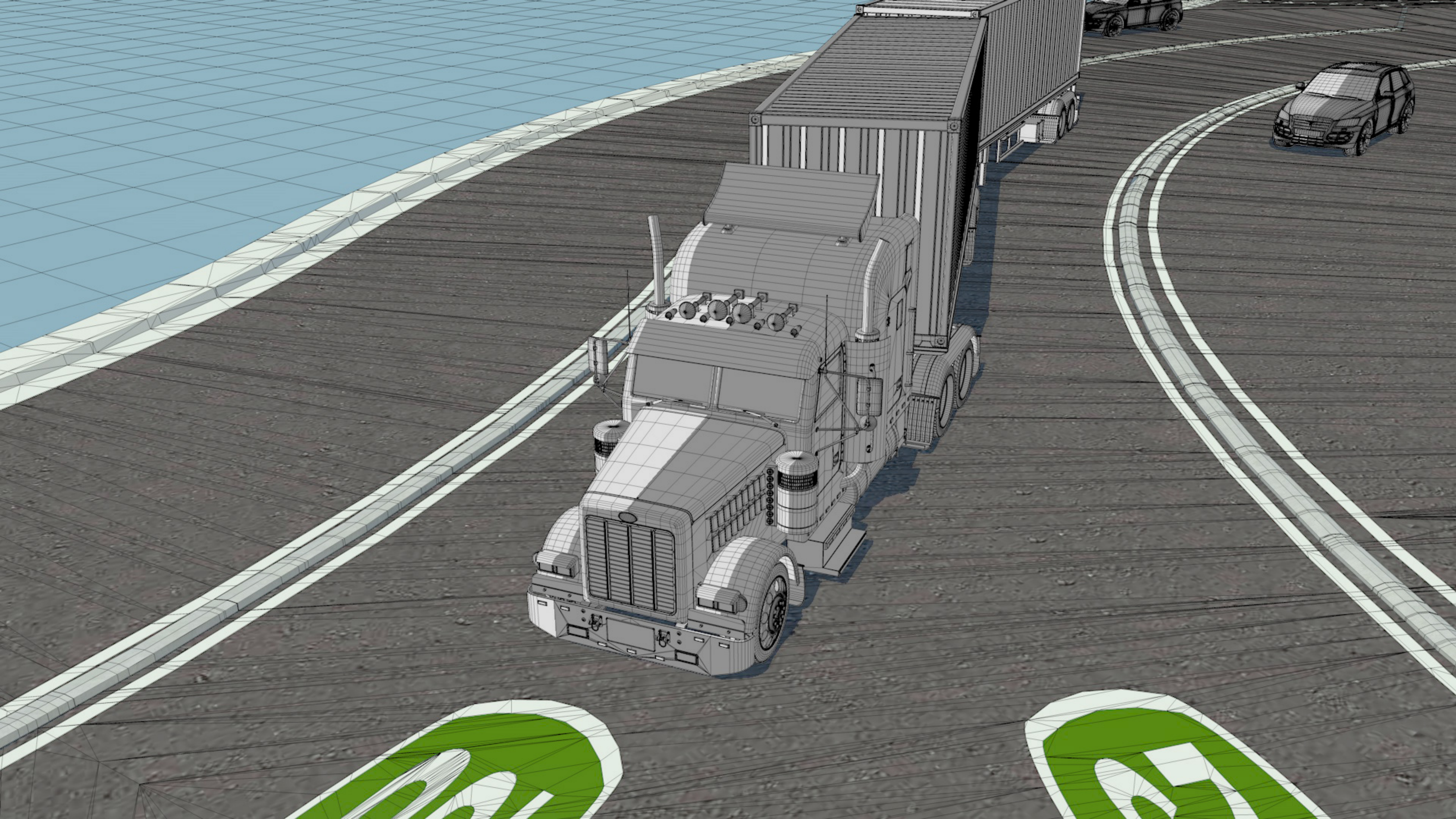
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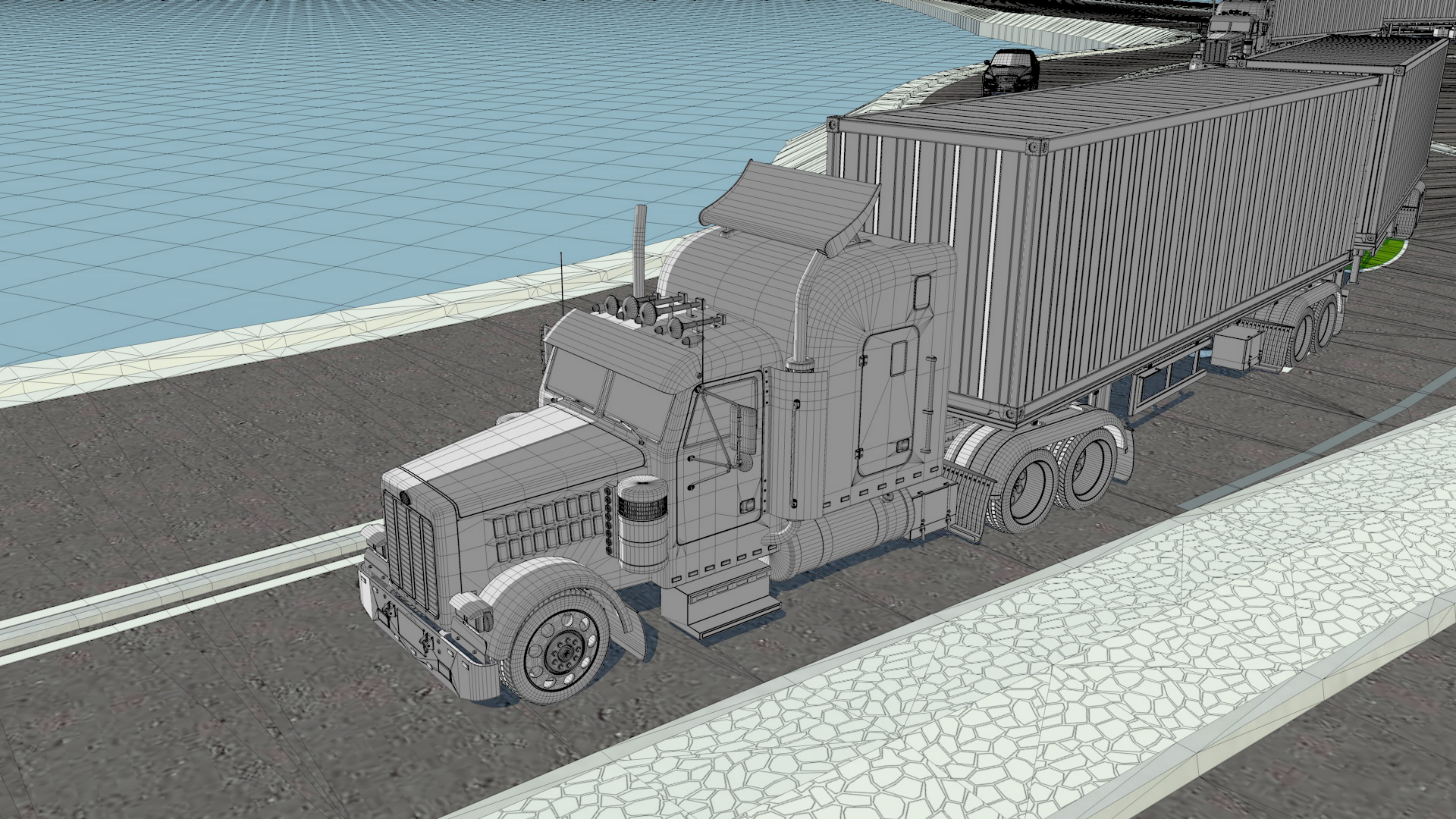
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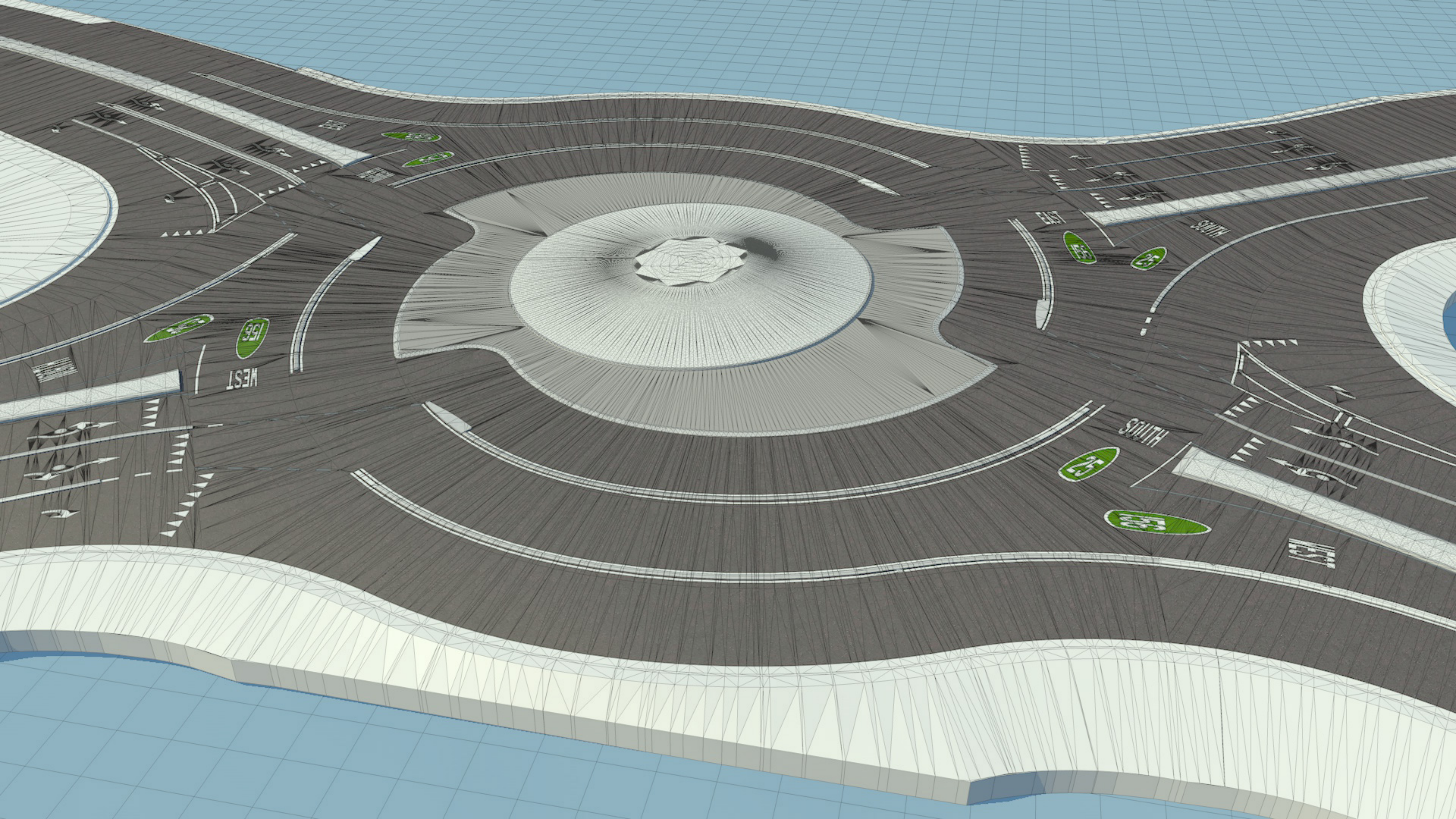












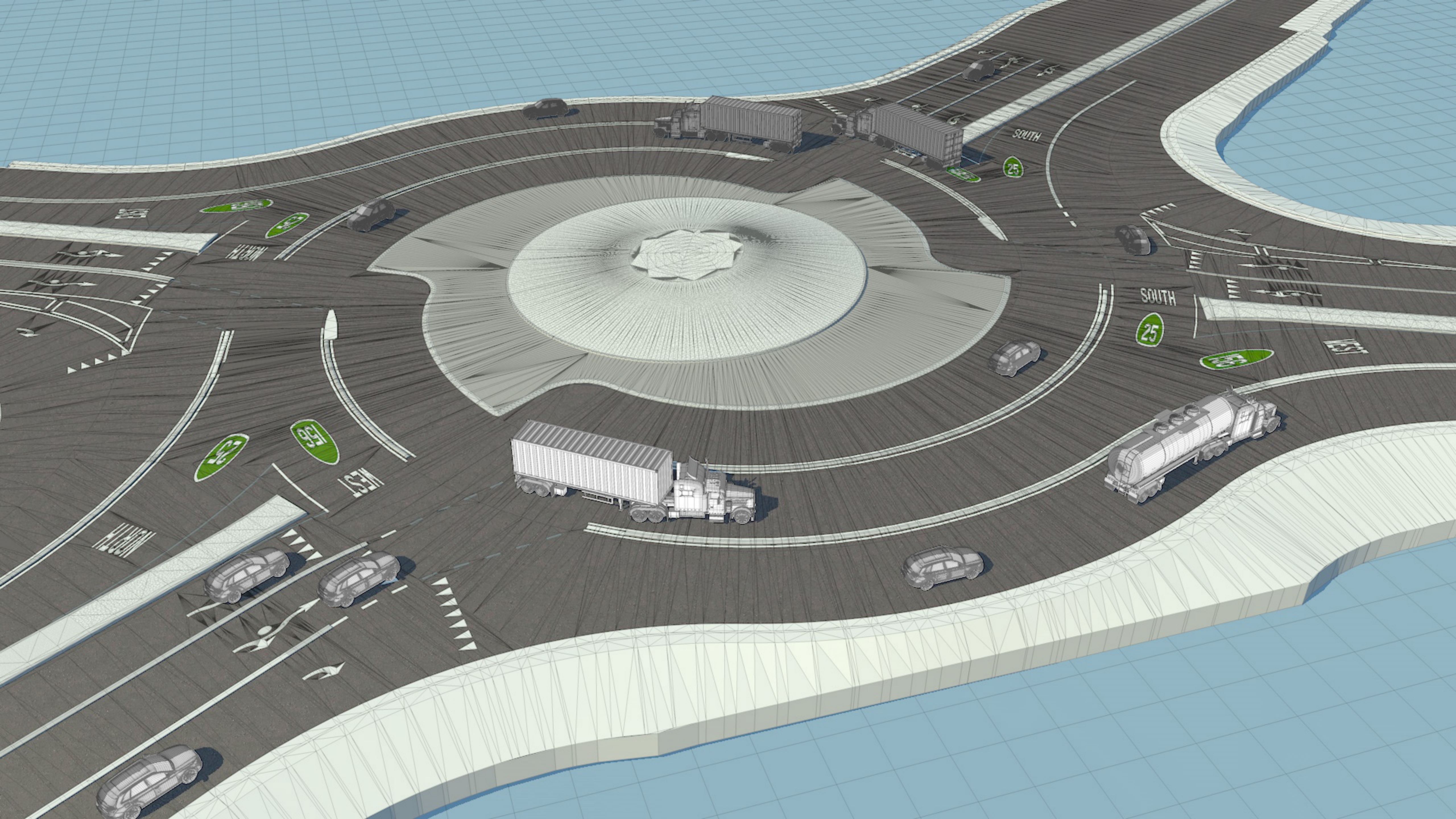
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