

3D Modeling with CARLA and RoadRunner

This guide contains links and documentation updates for 3D modeling with CARLA and RoadRunner. Although it is possible to [import custom maps using a packaged installation of CARLA](#), you must use Docker to do so and it will require 600-700 GB of space to initially build the image. The documentation for importing custom maps using the CARLA source build is [here](#), and this guide is intended for the source build version of CARLA.

There is additional documentation [here](#) and [here](#) for exporting from RoadRunner and importing with the CARLA source build, but some of the instructions are incorrect or unclear. As such, the following guide provides more accurate instructions.

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Start Modeling with RoadRunner

It is recommended to create the road structure in RoadRunner before importing your map into CARLA. CARLA provides better tools for traffic lights, props, foliage, etc. than RoadRunner, so you might want to model the road structure and road markings in RoadRunner and then add additional things once the model is imported into CARLA. Note that you will need a license to use the RoadRunner application, but [WashU should be able to provide it](#).

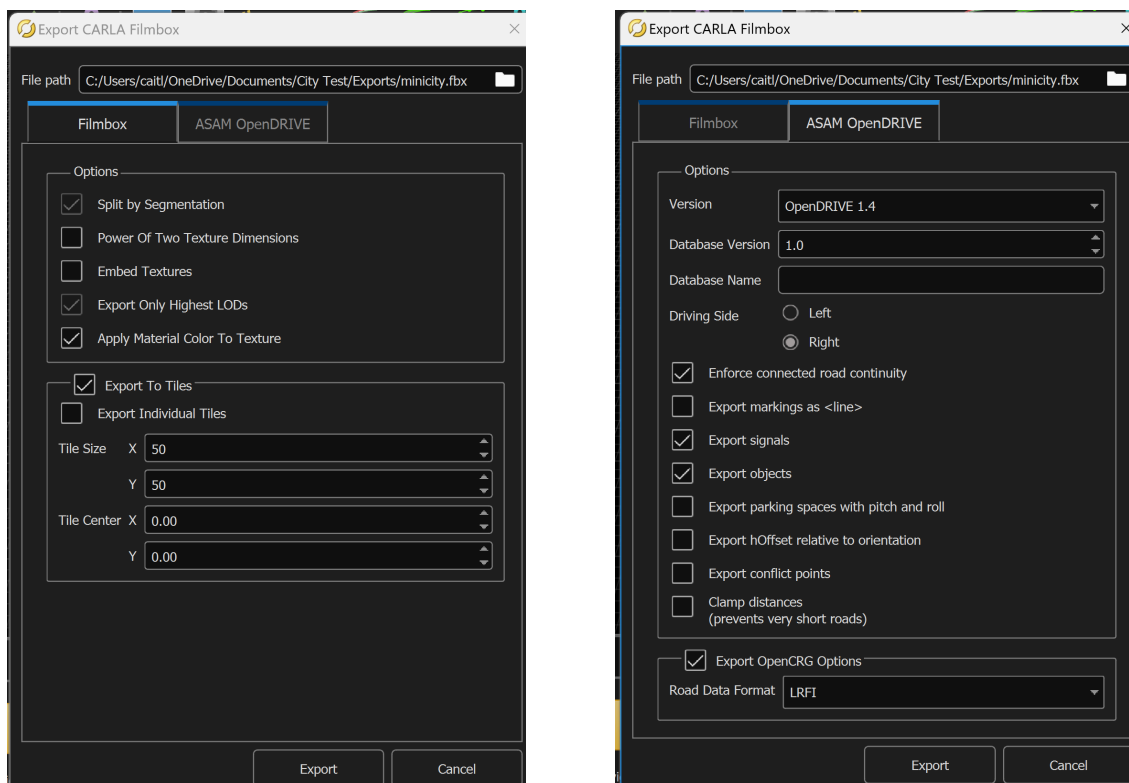
RoadRunner Tips

The documentation is [here](#) for modeling in RoadRunner. [This guide](#) also contains quick information about how to use the modeling tools. Please note that RoadRunner crashes quite often. This usually happens if you drag or move something too fast or if you connect roads in an unexpected way. It is recommended to save often. Additionally, if you have added road markings (crosswalks, stencils, etc.) on a road section and then connect another road to it, your markings can disappear. After connecting roads, verify that the road markings are as you intend, or go to a previous save file if needed.

Exporting a Custom Map in RoadRunner

Once you have completed your model in RoadRunner, you can export your model files. Keep in mind that all exported files should be placed in the same folder during the import step.

In RoadRunner, select “File”, then “Export”.
Select “CARLA Filmbox”, and a menu will pop up:



Ensure that “Export to Individual Tiles” is not selected. Tile Size may need adjustments, but you will need to check that after importing to Unreal.

Select “Export” to export the files into your desired location. This may take several minutes depending on the 3D model’s complexity.

In the folder with the exported files, ensure that the textures/materials used in the 3D model are also in the folder, as well as the .xodr and .fbx files. The .xodr file contains information about how the road network functions, such as road geometries and lane information. The .fbx file contains the actual 3D meshes. Ensure that the .xodr and .fbx files have the same name before importing into CARLA.

Importing a Custom Map to CARLA Unreal Engine

Once you have exported your files from RoadRunner, place the .xodr, .fbx, and materials files in the “Import” folder located in the carla root folder on your machine. The .geojson and .xml files should not be needed. Ensure that the .xodr and .fbx files have the same name and that no map files in the Unreal content browser already have this name.

Run **make import ARGS="--no-carla-materials"** in the carla root folder so that your textures will show up as they do in RoadRunner. This may take several minutes.

Run **make launch** in the carla root folder to launch the CARLA version of Unreal Engine.

Open the “map packages” folder in the content folder at the bottom of the screen of Unreal Engine. Go to Content/map_package/maps and open the folder with the name of your map.

Double click on your map file. It should be an icon with gray map geometries on it and an orange bar at the bottom. If you hover over it, it should be labeled yourmapname (level) to indicate that it is a map file.

After double clicking, the map should be generated on the map with its textures. This may take several minutes.

Once you have imported your map into CARLA, you can add additional elements to it using the Unreal Engine interface. Make sure to save as you make changes, and keep multiple versions.