# Berkeley Hills Traffic Simulation

The Berkeley Hills area demands careful attention due to its vulnerability to wildfires. Traffic analysis serves as a valuable tool for identifying areas of improvement and weaknesses within the network.

The research started with some base scenarios, two daily scenarios with fewer vehicles and two-night scenarios with more people evacuating. Both day and night scenarios have two options, the first with three available exits and the second with two.
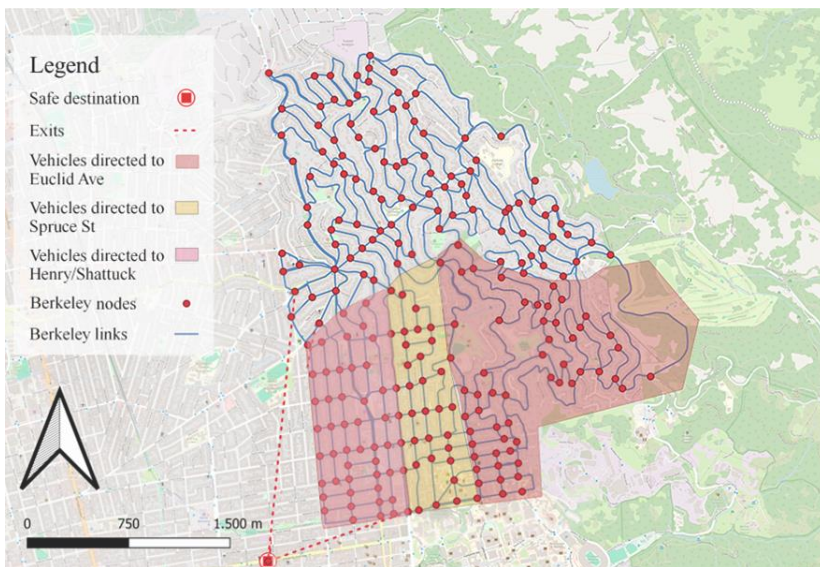
Following scenario analysis, the effects of specific road closures were assessed, alongside the patterns of road congestion. Observations revealed that road closures prompted evacuees to seek alternative routes, resulting in a more even distribution of traffic.

Subsequently, various traffic management strategies were tested. The first strategy, Marin Circle Control, involved optimizing traffic flow timing on different roads to prioritize specific routes, allowing more cars to enter Marin Circle from Marin Avenue. The second strategy, rerouting, entailed redirecting traffic to enhance efficiency and adapt to changing conditions, thereby spreading congestion to other local roads. The third strategy involved dividing the area to distribute traffic across minor axes rather than concentrating it on a single road. This included assigning non-shortest paths to avoid using Marin Ave, promoting planned evacuation routes. Additionally, contraflow scenarios were defined, focusing on Marin Avenue, Grizzly Peak Boulevard, and Euclid Ave.

After individually experimenting with these strategies and understanding their contributions to each scenario, they were combined to assess potential reductions in evacuation time. All scenarios showed improvements using one or more combined strategies, sometimes nearly halving the total evacuation time.

The simulations are continuously improved, thanks to comparisons made with representatives from the city of Berkeley. Future work includes expanding the evacuation area and developing new scenarios.

The figure illustrates the traffic travel time for day scenario/two exits, showing the application of various strategies.