Wrong-way driving (WWD) is a hazardous behavior on interstates, toll roads, and other high-speed limited access facilities. Since WWD crashes are rare, recent researchers have studied WWD events such as WWD 911 calls and WWD citations to understand the overall nature and trend of WWD. It is very difficult to build credible statistical models based solely on crashes due to the small sample size since these are only 3% of all crashes. Modeling of WWD non-crash events can result in more accurate models. A model was developed for Florida limited access facilities to identify roadway factors and traffic characteristics of exit ramp terminals that influence WWD entries. This model indicated that interchange type, intersection angle of exit ramp terminals, presence of tolling at the entrance ramp, presence of channelizing island between the exit ramp lanes, number of lanes on the exit ramp, area (rural or urban), and traffic volumes significantly affect the likelihood of WWD entries at exit ramps. Conventional "Wrong Way" signs can reduce WWD incidents but can be insufficient in some cases. In areas with many WWD crash and non-crash events, transportation agencies can be proactive by considering the use of countermeasures with advanced technologies to actively warn motorists of WWD violations. To help agencies select the most effective countermeasure, two innovative evaluation of performance approaches were developed so they can be used to evaluate and compare among different advanced WWD countermeasures. These approaches consist of before-after analysis of WWD non-crash events (WWD 911 calls and citations) and turn around rates of wrong way vehicles to self-correct their WWD acts. With this research, transportation agencies can better predict WWD entries at exit ramps; identify suitable locations for possible countermeasures deployment; and improve their current design, signing, and pavement marking practices while still following national and state standards.