

TowWarn

<https://simmons.ai/towwarn/>

What is the idea:

TowWarn is our proposed digital platform to send a friendly SMS reminder to drivers parked in a clearway during or just before operating hours that they need to move their vehicle before it gets towed. Unlike the current situation in which Transport Management Centre waits for government agencies and other service providers to phone in to report clearway violations, TowWarn digitally crowd-sources the task of detecting vehicles in clearways out to pedestrians and local businesses in a way that builds community spirit through friendly reminders rather than creating antagonism as a result of phoning to tow without further warning. For customers that chose not to opt-in to receiving tow notifications and have their vehicle towed, TowWarn allows them to check recent tows from an area by entering a customised signpost URL into a web-browser enabled smartphone without the need to install an app or turn on their GPS.

Who are the target customers and how does it improve the customer experience:

TowWarn is designed to satisfy the needs of multiple stakeholders (vehicle owners parked in a clearway, bystanders reporting a vehicle, and Transport Management Centre), including satisfaction of customer emotional needs:

1. For vehicle owners who park in a clearway, it provides an **opportunity to be notified** to move their vehicle before it gets towed, thus resulting in a cost savings for the vehicle owner. More importantly, keeping the customer informed throughout the process prevents the emotional anxiety they may experience when they realise their vehicle is missing. This is also in the public interest, as it reduces the chance of public backlash against the Clearways program.
2. For customers who drive long distances to find a legal parking spot, it provides a **positive outlet** for the injustice they feel when they notice someone else who has ignored the signs and parked in a closer spot on a clearway. For customers who are altruistically motivated to see the clearway congestion relieved, but don't want the violator to face towing fines, it provides a mechanism to trigger a friendly reminder rather than immediately escalating the situation. There is evidence on social media of individuals who publicly post details of offending vehicles rather than calling Transport Management Centre. By providing an approved alternative for digitally reporting clearway violations, we can reduce the risk of privacy violations.
3. For Transport Management Centre, it **reduces the number of phone calls** to be handled, as the system can directly notify the vehicle owner to move their own vehicle without requiring manual intervention from Transport Management Centre unless it becomes apparent that a tow truck is necessary. The crowd-sourcing system will allow greater coverage and more immediate identification of clearway violations, including partial violations in which the vehicle owner is asked to move their vehicle before a tow truck is called out. All incidents, including friendly reminders, will be logged, thus allowing Transport Management Centre and university research collaborators to use the data to identify problematic areas that need better signage, precisely quantify the impact of minor clearway violations on traffic flow, as well as opening up the

possibility to use the violation data in conjunction with traffic flow data to train a classification algorithm to automatically recognise roads with traffic patterns indicative of a clearway violation in real-time.

How is your idea innovative or unique for Transport for NSW and/or customers?

Our system is unique in its consideration of not just functionality, but in meeting the social and emotional goals of each stakeholder. In an increasingly connected world, customers expect to be directly and immediately informed. Our proposal goes beyond Transport for NSW's existing phone based reporting system by providing a digital means to report clearway violations, and by notifying customers with an SMS reminder to move their vehicle. Furthermore, our proposed use of customised URL stickers on the back of sign posts to view tow notifications for an area is socially innovative in providing a physical entry point to the digital platform for people who aren't signed up and doesn't require installing any apps or waiting for GPS signal (while QR codes with URLs are not a new idea, the use of them in this manner on a large scale would be innovative).

How would your idea be implemented and how would you make it commercially sustainable?

Please see the supporting documentation for application mockups: <https://simmons.ai/towwarn/>

For the initial implementation, signing-up to receive SMS tow notifications for a vehicle would be via a web form where a vehicle owner provides their vehicle registration plate number and mobile number. A limit will be placed on the number of vehicles a single mobile number can subscribe to in order to prevent abuse of the system as a tool for surveillance of other's vehicles. Long term, we would like to collect this information at the time of vehicle registration by providing an opt-in checkbox for tow notifications on the vehicle registration form. A benefit of our system over alternative solutions is that it supports all mobile devices as it utilises SMS for notifications rather than requiring customers to install an app.

Pedestrians (e.g. passers by, or occupants of local businesses who notice a customer's vehicle parked in a clearway near their shop but are unsure who owns it) will be able to report a vehicle in a clearway by entering the vehicle location and plate number in a web form. The user experience for reporting a vehicle can be optimised by through use of the mobile browser geolocation API or clearway sign URL (explained below) to infer the vehicle location, and use of image recognition libraries to automatically extract the vehicle plate number from a photo. The "NSW Clearways" Open Data shapefile released by Transport for NSW will be used to automatically verify the crowd-sourced reports refer to valid clearways that are in operation. If the clearway is a few minutes from coming into operation, the option to report the vehicle to Transport Management Centre will be removed, however an option to send the vehicle owner a friendly reminder (auto-moderated via the platform) will be provided instead.

For vehicle owners who haven't signed up to tow notifications and realise their vehicle is missing, we intend to place weather-proof stickers on the back of clearway signs containing a customised URL for the sign embedded in a QR code. Visiting the URL will provide the customer with a map of active clearways in the area, as well as messages pertaining to vehicles recently towed from the area. This includes friendly reminder messages from the community, as well as official messages tagged with that location by Transport Management Centre and tow truck operators. Map pins will show both the location of where vehicles were towed from as well as where they were towed to. This information will be extracted from location tags in official messages left by Transport Management Centre and tow truck operators.

Avenues for commercial sustainability would arise through growth of the platform to provide other forms of notifications and messages. For example, we could charge private parking operators for use of the platform to notify drivers that they are blocking a vehicle in or have left valuables in their vehicle. This would be limited to circumstances where it is in the driver's interest to be notified and the driver has consented to receiving all types of notifications.

We also intend to partner with universities and seek research grant funding to find ways to unlock the value of the data collected from the platform, such as using the crowd-sourced vehicle reports in conjunction with traffic flow data to train a classification algorithm to automatically recognise roads with traffic patterns indicative of a clearway violation in real-time.

How is your idea technically feasible? Are there examples of the same idea? Do you have examples of your work available?

Please see the supporting documentation for preliminary work towards the technical design of the TowWarn system: <https://simmons.ai/towwarn/>

The idea can be implemented by utilising existing mature technologies. The notifications themselves will be performed via SMS which can be automated via use of an API such as AWS Simple Notification Service (at up to \$0.09 per SMS message, sending notifications for all 250 known clearway violations per week would cost approximately \$22.50 per week). Use of web forms for subscribing to vehicle notification, reporting violations, and viewing recent tows ensures that the system can be used by all web-browser enabled mobile phones without the need to install an app. Custom weatherproof stickers (e.g. vinyl prints) can be printed and used to display QR codes / URLs for a tow area (we would work with Subject Matter Experts to initially trial these on roads that are frequently towed).

Publicly available examples of my past transport related work include <https://AusTrafficWatch.com> (an early research internship project to investigate use of social media to scrape traffic warnings and classify them as crash, breakdown, clear, etc. based on keywords), the paper A. Simmons et al. "Hub Map: A new approach for visualizing traffic data sets with multi-attribute link data" doi:10.1109/VLHCC.2015.7357220 (a visualisation approach for showing all SCATS traffic sensor attributes), and <http://easybuzzparking.org/> (investigating parking sensor data for GovHack 2018).

How would you use any seed funding to develop your concept?

The success of the system hinges on meeting the emotional goals of customers, thus we intend to use a portion of the seed funding to systematically recruit participants for research surveys. We intend to publicly publish the results of these studies to leave a legacy that other solutions can build upon. The majority of seed funding would be used for development and testing of the web application and back-end infrastructure proposed in our solution. Finally, we would like to use some of the funding to consider ways to make the system more findable by users, such as by placing QR code stickers on the back of clearway signs (starting with high priority sections of road in which towing is most frequent) so that customers can readily obtain the URL to view tow notifications in the area even if not previously aware of the system.

What dependencies (if any) would your idea have? Do you need access to additional data or systems or organisations?

While the system can theoretically operate independently of TfNSW's systems, the full benefits can only be realised if a substantial proportion of vehicle owners are signed-up to receive notifications for their vehicle. Thus we need TfNSW's help to promote signing-up to notifications as widely as possible. Long term, we would like to see an opt-in option for tow notifications on vehicle registration forms (an informal pilot survey we targeted at NSW residents and distributed via Facebook and Twitter shows that respondents were overwhelmingly in favour of their contact information being used to provide tow notifications – see <https://simmons.ai/towwarn/> for the survey responses)

In cases where the vehicle owner is not registered for notifications, or if the vehicle owner does not respond to the notification within a reasonable time frame, the system will expose this information to Transport Management Centre so that they can call out a tow truck. We would like to work with Transport Management Centre to ensure this processes is as seamless as possible so that this integrates with their workflow. For violations that are reported through the existing phone channels rather than crowd-sourced through our proposed solution, we would like to gain access to the violation database so that we can send out a notification to the customer that their vehicle is about to be towed and keep the customer informed throughout the process. Alternatively, Transport Management Centre could enter messages directly into our platform on behalf of the caller when they receive a clearway violation report via phone.

Project Link: <https://simmons.ai/towwarn/>