Public Perception

• Only idiots drive into floodwaters, putting others at risk

• They are predominantly young males who think their 4WD is invincible

• It happens in daylight (that’s when the photos are taken)

• Increase fines for drivers
Reality

(advice from Queensland Fire & Emergency Services)

• A large percentage of Swift Water Rescues are at night

• Those rescued can include all age groups

• They are certainly not all male, many are couples and families
Inadvertent drive-ins, swift water rescues

1 May 2015 6:15pm Greenhill Road, Munruben

Andrea Relf age 42
Lily Jessiman age 67
Kaitlin Relf age 8
Tara-Belle Relf age 3

All survived, but 5 others died in South East Queensland that night.
Greenhill Road, Munruben (4:30pm 1 May 2015)
Greenhill Road, Munruben (5:26pm 1 May 2015)
Why does this keep happening?

• Are permanent standard warning signs effective?

• The mirror on the table experiment

• How do we prevent this happening?
Automatic Warning Sign Concept

• Project Scope

• Automated (only when road flooded)

• Flashing amber

• Not reliant on mains power

• Clear message (ROAD FLOODED)

• Live connection to Open Data, or at least to Council Officers and/or systems
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity</td>
<td>4</td>
</tr>
<tr>
<td>Topography</td>
<td>2</td>
</tr>
<tr>
<td>Frequency</td>
<td>3</td>
</tr>
<tr>
<td>Physical barriers</td>
<td>1</td>
</tr>
<tr>
<td>Road grade</td>
<td>2</td>
</tr>
<tr>
<td>Road hierarchy</td>
<td>2</td>
</tr>
<tr>
<td>Sight distance</td>
<td>3</td>
</tr>
<tr>
<td>Lighting</td>
<td>3</td>
</tr>
</tbody>
</table>
ROAD SUBJECT TO FLOODING
INDICATORS SHOW DEPTH

Sign Selection/mounting (height & lateral installation criteria), LED build (i.e. colour/luminous intensity)
Thursday 30 March 2017 – Greenhill Road
Thursday 30 March 2017 – Greenhill Road
Prioritising dangerous sites – risk analysis

1. Velocity at depth >300mm

2. Frequency – depth >300mm

3. Road grade at water entry

4. Sight distance (worst approach) divided by safe stopping distance for posted speed
Prioritising dangerous sites – risk analysis (cont’d)

5. Downstream topography – deep drop ‘v’ shallow flat (escape route for occupants)

6. Physical barriers to reduce risk of cars being washed off (depends on depth of water relevant to the barrier)

7. Road hierarchy (light vehicle traffic volume)

8. Street lighting (making the water more visible to the driver)
Night-time Prototype Testing
FRSWS Sensor-housing Designs
Substation 33: Staff and Volunteers of all backgrounds involved in manufacture
Social Enterprise – Substation 33

• Support and training for those who find themselves faced with long term unemployment, physical and/or intellectual disabilities, stress and/or mental illness

• The Substation 33 FRSWS Team ranges from avionics engineers to grade 8 school leavers and many in between

• Some people are working 38 hours per week and others are volunteering a few hours per week

• They are all there for a reason and contribute greatly to this project
Sustainability and affordability

- Recycling e-Waste
  - Recycled laptop batteries
  - Recycled 3D printing using recycled e-Waste
- Low cost solution
- Solar recharging
Electronics Design Prototyping

Simple-LED design (v1.5) – left/mid, “ROAD FLOODED” design (v2.0) - right
Innovation and continuous improvement

- Minimum viable product
- Continuing research and development
- Versions 2.0, 3.0 and 4.0 delivered – Dec 2016 to April 2017
- Version 5.0 is presently in design, with delivery in May/June 2017
- Version 6.0 in R&D phase
Advice & Other Councils

Logan City Council contributed $250,000 to the program and approved by Committee of the Whole under Service Enhancement.

Department of Infrastructure, Local Government and Planning funded $375,000 to the FRSWS program and approved under Community Resilience Fund (CRF).
Fast Facts

- 278 known flood prone road sites in Logan
- More than 50 high priority sites have been identified.
- First system was installed 22 December 2016
- First major event 30 March 2017 when 9 systems had been installed
- All 9 sites flooded, 8 systems worked as designed. One failed due to an ant infestation in the signs.
- Two sites were fully inundated by extreme regional river flooding two days after the flash flooding event
- Current funding will provide for the system to be installed at 25 sites by October 2017.
Impact

• Lives will be saved

• Trauma will be minimised

• Reduction in risks to emergency services personnel

• Reduction in risks to Council staff

• Reduced liability risk to Council
Transferability

• Collaboration with other road authorities
• Information package available to other Councils
• Procurement arrangements are in place and available for other Councils
• Satellite phone technology can be used in remote locations
• Same technology with different sensors could provide:
  1. Fog and smoke road safety warnings
  2. Bushfire early warning system
The Logan City Council Team
The Substation 33 Team
The combined team
Witness comment

“After commuting to the city for work this morning ... I decided to head home prior to them making a decision.

Just thought I’d share some photos which I am sure you will be aware of.

Today ... I am sure your signs will save lives!

Hope you and your staff stay safe”

Regards,
Andrea
"We also went for a drive along Chambers Flat Road that night. There was a P plater in front of us & I'm pleased to say they had slowed down & were driving to conditions. We knew we were looking for an additional sign that was most likely going to be lit. Sure enough ... off in the distance was this huge blinking yellow sign & the car in front slowed & turned around. We just followed them and never even see where the water had crossed.

I hope that’s reward enough after all your hard work. I’m sure of the eight sites up and running there would have been no rescues etc. Well done." - Andrea
Questions