# The Safe System Approach

There are very few areas of public discussion and sentiment which generate as much consensus as road safety. Everyone wants safer roads for all users, and road safety is a key priority for governments, road authorities and communities everywhere.

**Improving safety on the road network is based on the four core pillars — safer roads, safer speeds, safer vehicles and safer road users.** Alongside technological improvements in the cars we drive and the roads we drive on, we have seen significant behavioural campaigns such as those around drink-driving, speeding, wearing seat belts and phone usage amongst many others.

More recently, there has been considerable work done on the development of a Safe System approach to road design. The Safe System approach recognises that people, as road users, will make mistakes when driving, walking or riding, and that, through careful design, we should be able to both minimise those mistakes and their impact. In a Safe System, roads are designed, for instance, to reduce the severity of crashes where speed is a major factor in a collision with another vehicle, pedestrian, cyclist or road side feature.

The Safe System approach is gaining traction across Australia. The Federal Government's National Road Safety Strategy calls for the advancement of the Safe System approach. In Victoria, VicRoads is adopting the approach as part of their Towards Zero strategy. This strategy aims to achieve the road safety goal of reducing lives lost on Victoria's roads annually to fewer than 200 by 2020; reducing serious injuries by 15%; and beyond 2020 working towards zero deaths and serious injuries on our roads.

GTA is working with VicRoads and prepared a guide to train practitioners on the Safe System Approach.

# Safe System Assessment (SSA)

A Safe System Approach can take many different forms depending on the type and severity of crashes being mitigated. Factors which need to be considered in the development of a Safe System include potential crash types, risks associated with these crashes (exposure, likelihood and severity), traffic conditions, construction costs and benefits realised through implementation.

Typically, the form and extent of any treatment, or Safety Solution, is evaluated using a Safe System Assessment which:

- Considers how well a proposed project aligns with Safe System principles
- Compares project design options to identify the option most aligned with Safe System principles
- Considers any trade-offs between safety and road efficiency, i.e. capacity/traffic flow
- Identifies the most effective treatments that might be used to minimise death and serious injury

Safe System Assessment (SSA) is most valuable when conducted during the early stages of a road project i.e. preliminary business case and options assessment stage of project planning, as adjustments to the design and/or scope can be more readily accommodated.

The current SSA process requires planners and designers to consider some key questions:

- **What is the reason for the project?** Examine project specific risks and traffic considerations and identify why we need the SSA.
- **What is the function of the road?** Consider location, land use, parking, public transport, etc.
- **What is the speed environment?** What is the current speed limit, what would be the impacts of changing the speed? etc.
- **Which road users are present?** Consider the presence of elderly pedestrians, school children and cyclists. Also, note what facilities are, or will be available to vulnerable road users e.g. signalised crossings, bicycle lanes, school speed limits, etc.
- **What is the composition of the traffic stream?** Consider the presence of heavy vehicles, motorcyclists and other vehicles using the roadway.

# What are the treatments?

There are scores of possible treatments which come under a Safe System approach, including;

- **Roundabouts instead of traffic signals at some intersections**
  - Roundabouts can physically reduce vehicle speeds down to less than 50km/hr
- **Safety Barriers (alongside the road)**
  - Physical barriers typically installed within central medians to contain errant vehicles from running onto opposing traffic lanes and causing head-on collisions
  - These types of treatments are also installed within road verges to contain errant vehicles from running off the road and/or offering protection to roadside hazards
  - Experience has shown a reduction of up to 85% of head-on crashes and run-off roads can be achieved
- **Separated lanes for cyclists (along the road)**
  - Provides segregation within road space for cyclists and drivers
- **Raised Safety Platforms**
  - Raised safety platforms reduce vehicle speeds within, and on approach to intersections which can reduce the number and severity of any accidents

The important thing to note is that a combination of treatments (consisting of primary and supporting treatments) is typically considered across the project holistically rather than as isolated treatments. This approach will maximise alignment with Safe System principles and ensure that no gaps are introduced within the project scope.

> “A Safe System can take many different forms...”

# case study

## Raised Signalised Intersection
Footscray, Melbourne

GTA Consultants worked with VicRoads Metropolitan North West Region to undertake the functional and detailed design of a raised signalised intersection on Irving Street, Footscray in Melbourne's inner-west. VicRoads, through its Safe System Road Improvement Projects team, is currently rolling out raised safety platforms across signalised intersections on the arterial road network.

With funding from the TAC, this site was identified by VicRoads as being potentially dangerous given it is a complex intersection with the existing tram terminus on Leeds Street, Footscray railway station, bus stops and a busy pedestrian area set within an established retail precinct.

One characteristic of this site was the provision of a scramble crossing at the intersection, meaning pedestrians could cross at any point on the raised safety platform. This presented several challenges in determining how to protect pedestrians from errant vehicles, as well balancing the various competing requirements for all road users.

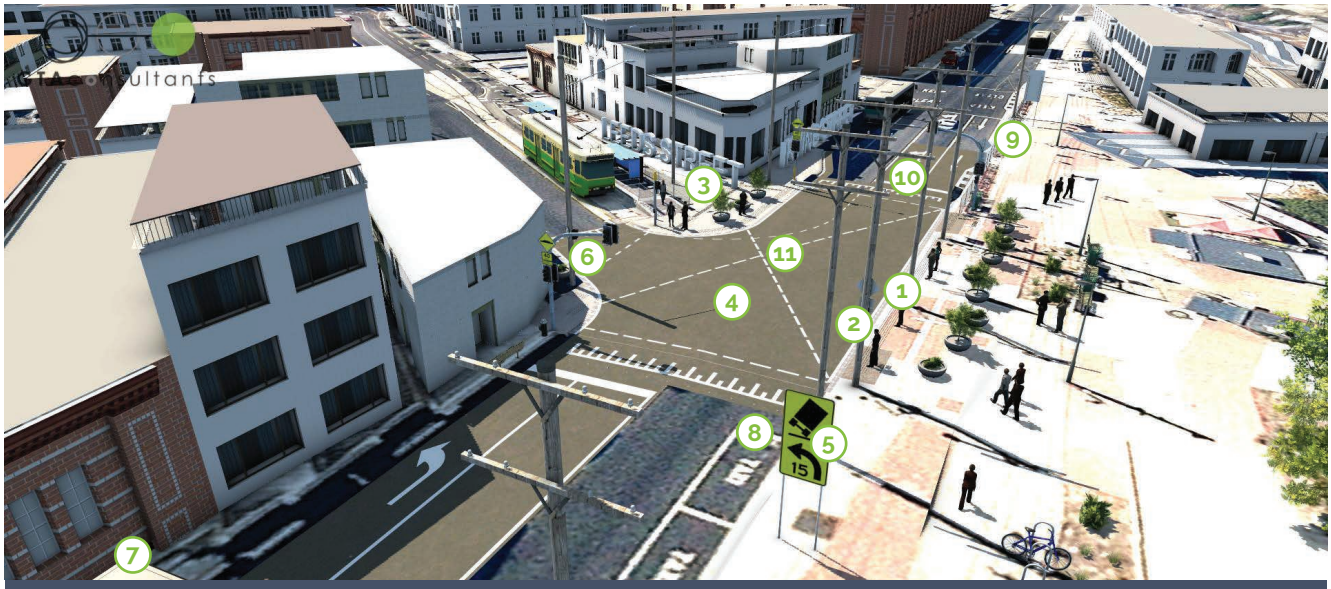
GTA facilitated a solution in conjunction with feedback from VicRoads and Road Safety Auditors with the specific aim of achieving DDA compliance. This solution involved simplifying the number and placement of tactiles across the intersection, which improved guidance and safety.

In addition, further challenges were faced, with push back from PTV on the proposed treatment. PTV's concerns were three-fold and focused on:

- Passenger comfort and safety of bus passengers as the bus went across the raised safety platform
- Concerns around the safety of buses crossing the platform, i.e. tilting and stability issues, and
- Potential delays and timetable impacts.

GTA were able to troubleshoot a solution with PTV and VicRoads and achieve a design acceptable to all.

It is also worth noting that the introduction of a raised safety platform can have considerable knock-on effects with respect to what needs to be considered during its creation. The following table is based on typical considerations that relate to the provision of raised safety platforms and identifies project outcomes in response to those considerations specifically relating to this case study.




| PROJECT ATTRIBUTES | PROJECT OUTCOME |
|---|---|
| 1. **Stormwater Drainage** | Grated trench drains were adopted mainly to avoid clashes with existing underground services. |
| 2. **Existing Services** | An investigation into the layout of underground services was completed, and a design was developed to avoid relocating existing services. This was critical, as the costs for relocation works were significant in such a highly constrained and urbanised environment. |
| 3. **DDA** | Tactical Ground Surface Indicators (TGSI) tactiles rationalised at each of the pedestrian crossing points. Painted edge lines and landscape planter boxes were also introduced to provide clearer delineation of traffic lanes and offer protection to pedestrians. |
| 4. **Surface Treatments** | No coloured pavements. Standard intersection line marking provided only. |
| 5. **Signage** | Custom, reduced size tilting trucks warning signs were implemented to better suit the local area environment. Sign clutter was kept to a minimum. |
| 6. **Traffic Signal Hardware** | All traffic signal pedestals were able to be retained in their existing locations. The mounting heights of some lanterns were altered to improve visibility around additional traffic signs introduced as part of the raised safety platform solution. |
| 7. **Vehicle Stability and Turning Movements** | The potential impact of the raised safety platform on turning trucks and buses were checked by performing swept path analysis using a 12.5m long truck as the design vehicle. The truck stability analysis completed for relevant turning movements through the intersection found no issues. |
| 8. **Cyclist Integration** | No formal on-road bicycle facility was included as part of this project as there is currently no connecting cycling infrastructure in this precinct generally. |
| 9. **Sight Distance** | Horizontal and vertical sight distance checked and confirmed as adequate. |
| 10. **Intersection Capacity** | Reduction of turning lane lengths due to introduction of raised safety platform. Impact on intersection capacity was assessed as being marginal. Phasing and clearance times modified, and the controller reprogrammed as applicable. |
| 11. **Pavements** | Existing road pavement retained generally, and asphalt surfacing applied on top to achieve raised safety platform profile. |

# Conclusion

The introduction of raised safety platforms as part of the Safe System philosophy shows how the thinking behind road network improvement has evolved to encapsulate a greater focus on enhancing road safety for all users — not just motorists. However, it is not the whole answer and does not replace the need to carry out road safety audits which focus on the likelihood of a crash, regardless of severity, to ensure that no hazards are built into the road environment. The Safe System Approach looks at ways to improve the road environment with the aim of minimising fatal and serious injuries by considering the inherent risk of the infrastructure and the exposure of all road users.

Through its work on the Safe System Approach, GTA advocates a 'wider lens' perspective of the Safe System process. This means considering, the transport impacts and road safety goals of a project alongside the risks in cost and construction in the early stages in a project. We also believe it is critical to 'stress test' projects early and apply a holistic focus based on a thorough appreciation of the site context, risks, opportunities and the impact that this has on costs, time and road safety goals to be achieved.

Roads are getting more congested by the day with greater diversity of modes. Applying smart solutions as part of a Safe System Approach is critical in reducing accidents and ultimately death and injuries.

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