Operational Instruction

14.1

Scramble Pedestrian Crossings

Government of South Australia
Department of Planning, Transport and Infrastructure

Scramble Pedestrian Crossings - 14.1

AMENDMENT RECORD

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CONTENTS

1. Scope

The purpose of this Instruction is to provide a uniform approach for the installation and operation of Scramble pedestrian crossings. A Scramble pedestrian crossing is a specific type of exclusive pedestrian phase in which crossings on all legs of the intersection operate simultaneously including diagonal crossings. The requirements of this document are intended to enhance pedestrian safety while allowing a reasonable degree of operating flexibility for efficient operation. This guideline applies to all such traffic signal operations on public roads under the responsibility of DPTI or Council.

2. General Requirements

2.1 Traffic Constraints

Scramble pedestrian crossings should only be used where high pedestrian and vehicle flows are experienced such that turning vehicles have insufficient gaps to filter through the pedestrian movements or where pedestrian safety is compromised.

Scramble pedestrian crossings may be considered for Priority Pedestrian Areas and Local Pedestrian Areas (as detailed in DPTI's *Functional Hierarchy*), roads with significant place aspect (according to Austroads *Guide to Traffic Management Part 4: Network Management*) or destinations of Regional or Metropolitan Place significance (according to the *Streets for People Compendium*).

Scramble pedestrian crossings shall not be used on roads identified as Major Traffic Routes or Freight Routes in DPTI's *Functional Hierarchy*.

As a guide, the following requirements are recommended as a minimum before a scramble pedestrian crossing should be considered:

- Pedestrian flows should be high. For example, if pedestrians are uniformly distributed and the cycle time is 120 seconds, the minimum pedestrian flow would need to be in the order of 300 per hour.

- There should be a minimum of 10% of the pedestrian demand for the diagonal crossing, for at least four one-hour periods in an average day. This can be predicted by conducting an origin and destination survey of pedestrian movements through the intersection.

The following must also be considered:

- Both vehicle and pedestrian delays usually increase with a scramble pedestrian crossing operation compared to phasing which allows pedestrian movements to flow within the vehicle phases. This is likely to lead to greater frustration and a stronger tendency for pedestrians to cross illegally against a red pedestrian light. Therefore, the vehicle flows should be high enough to discourage pedestrians from undertaking the unsafe practice of crossing on the red pedestrian light and leaving a call demand for the scramble phase unnecessarily.

- Additional delays to vehicles should be minimised. Due to the potential impact of additional delays, DPTI's Public Transport Operations and Planning section should be notified of any planned installations.

Scramble crossings can be confusing and difficult for people with a disability to use, especially people who are blind or have a vision impairment. To minimise the impact, consultation with disability organisations is required and DPTI's Access and Inclusion Team, Technical Services maintains the Disability Access and Inclusion Committee (DAIC) which can provide advice, guidance and consultation on DPTI projects. Individual councils may have their own committees which can facilitate consultation for scramble crossing proposals on council roads.

2.2 Geometric Constraints

Generally scramble pedestrian crossings must only be provided within "standard" cross road or T-intersections with simple and minimal phasing arrangements. Sufficient footpath space is required to store waiting pedestrians. They should ***not*** be installed at sites with:

- corner islands
- seagull/butterfly type islands
- more than four intersection approaches
- severely angled approaches
- diagonal crossings greater than 36 metres
- special phasing for emergency vehicles, bus or tram priority, railway signals etc.
- staggered or paired intersection/junctions
- signals with overlap phasing or early/late cut-offs (see Section 4)
- freeway/expressway intersections
- intersections with multiple turn lanes

2.3 Operational Constraints

Prior to seeking approval for a scramble crossing, DPTI's Network Management Services shall be consulted in relation to signalling, multi-modal impact assessments and network operations aspects of the proposal.

Consideration must be given to any potential interference with the coordination of major traffic routes and the ability to manage network operation and performance

Scramble pedestrian crossings at new signalised intersections are generally not recommended if the practical degree of saturation that would result would be greater than 0.9.

3. Installation Requirements

If a site satisfies the constraints in Section 2 and a scramble pedestrian crossing is proposed:

- the outer line of a standard pedestrian cross-walk shall be marked across each leg of the intersection, with the line closest to the centre of the intersection omitted on each approach;

- diagonal cross-walks must not be marked;
- the area bounded by the cross-walks must be free of traffic control devices, such as islands, raised pavement markers or other physical devices or obstructions which could be hazardous to pedestrians, particularly those with physical impairments;
- the pedestrian clearance times must cater for the additional diagonal crossing distance;
- pedestrian lanterns must be provided on a post on each corner such that the best line of sight is provided to pedestrians on the diagonally opposite corner;
- installation of a pedestrian countdown timer should be considered.
- diagonally facing push buttons should not be provided;
- pedestrian audio-tactile units should respond only to the corresponding parallel cross-walk;
- push button controls should be located in the same location on each crossing corner for consistency.
- the "Pedestrians may cross diagonally" (R3-5) sign advising pedestrians of the scramble crossing operation must be installed on the same traffic signal posts as the pedestrian signal faces at each corner of the intersection. Signs shall be positioned to be viewed by pedestrians waiting at the directly opposite kerb, and shall not face the diagonally opposite corner;
- gully pits and drainage inlets should not be installed on any of the corners within the pedestrian cross-walk areas;
- kerb ramps shall incorporate a vertical plinth orientated perpendicular to the road and warning tactile ground surface indicators to assist people with vision impairment to position themselves a safe distance back from the kerb and orientate them towards the opposite kerb ramp (refer DPTI Standard Drawing S-4074 Sheet 7). Tactile Ground Surface Indicators shall be installed in accordance with Australian Standard *AS 1428.4.1 Design for access and mobility – Means to assist the orientation of people with vision impairment*.
- When changes are made to crossings, vision impairment organisations such as Guide Dogs SA/NT and Royal Society for the Blind must be informed to ensure that their clients can be retrained (DPTI's Access and Inclusion Team can assist with this).

4. Operation

Scramble pedestrian crossings shall only operate on a full-time basis.

Part-time operation is not permitted as pedestrians could mistakenly cross diagonally when the signal operation has reverted to normal parallel use, creating a significant safety risk, particularly for vulnerable users.

When the scramble phase is introduced, all pedestrian signal groups must operate at the same time, ie the green display shall be introduced concurrently on every pedestrian lantern and the duration of the walk and clearance intervals must be identical and be timed to cater for movements across the longest pedestrian (diagonal) cross-walk distance.

Vehicle and pedestrian movements should not be allowed in the same phases. There shall be no vehicle-pedestrian conflicts. Also there must be no walk or clearance overlap from the scramble phase to any other phase. Under this operation pedestrian confusion is minimised and there is no unnecessary extension of vehicle phases to suit pedestrian requirements when vehicle flows are low, hence minimising delays.

However, it must be realised that pedestrian and vehicle delays are longer when vehicle flows are heavy and pedestrians are much more likely to disobey the red display during the vehicle phases when vehicle flows are light.

5. Approval

Scramble pedestrian crossings on Council roads require approval of DPTI's Manager, Traffic Services as the R3-5 "Pedestrians may cross diagonally" sign is listed in the *Code of Technical Requirements* as requiring separate approval from the Commissioner of Highways or his / her authorised delegate.

Scramble crossings may be installed by DPTI on roads under the care, control and management of the Commissioner of Highways under the *Instruments of Authorisation from the Commissioner of Highways* dated 10 March 2017.

6. Reference Documents

- Australian / New Zealand Standard (2009) *AS/NZS 1428.4.1 Design for Access and Mobility – Means to Assist the Orientation of People with Vision Impairment*
- Australian Standard (2014) *AS 1742.14 Manual of Uniform Traffic Control Devices, Part 14: Traffic Signals*
- Austroads (2016) *Guide to Traffic Management Part 10: Traffic Control and Communication Devices*
- Austroads (2016) *Guide to Traffic Management Part 4: Network Management*
- DPTI (2013) *A Functional Hierarchy for South Australia's Land Transport Network* https://www.sa.gov.au/__data/assets/pdf_file/0016/10609/A_Functional_Hierarchy_for_SAs_Land_Transport_Network.pdf
- Government of South Australia (2012) *Street for people: compendium for South Australian practice*
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- Vicroads (2016) *TEM Vol 3 Part 217 Guidance on treating pedestrian and turning vehicle conflicts at signalised intersections December 2016* https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/traffic-engineering
- RMS (2008-2016) *Traffic Signal Design* http://www.rms.nsw.gov.au/business-industry/partners-suppliers/document-types/guides-manuals/traffic-signal-design.html
- RMS (2010) *Delineation: Section 7 – Transverse lines pedestrian facilities* http://www.rms.nsw.gov.au/business-industry/partners-suppliers/document-types/guides-manuals/delineation.html