Purpose

This Technical Note is being released to provide advice to industry of DoT (Roads) intention to adopt the use of Extra Low Voltage (ELV) at 42 volts AC for traffic signals as the standard arrangement for all new installations. A timeline for implementation has been included to provide industry with sufficient time to make any necessary hardware modifications to prepare for the change.

Background

Traffic signals have traditionally switched 240 volts AC or low voltage (LV) to traffic signal lanterns and other traffic signal hardware. As part of a long term field trial, a small number of traffic signal installations have been operating successfully using 42 volts for a number of years. The benefits of ELV include:

- Safer voltage for technicians and the public
- Improved lamp monitoring
- Reduced risk of induced voltage issues
- Suitable for sites where minimum depth of cover is not possible

DoT (Roads) is adopting ELV (at 42 volts AC) as the default standard for all new traffic signal installations. This will require changes to existing traffic signal hardware for operation on ELV.

With the parallel introduction of the new VC6 traffic signal controller, it is an ideal opportunity to also implement ELV with ‘dim by wire’ dimming functionality for all new VC6 installations at the same time.

There are currently more than 3,000 LV traffic signal sites installed throughout Victoria. For this reason, LV hardware will continue to be required and in some situations LV sites will continue to be installed.

Hardware changes

Standard traffic signal hardware is designed for LV operation. To enable ELV operation current hardware may require modification or new ELV hardware may be needed. The following traffic signal hardware will be required in an ELV version:

- Controller (VC5 and VC6)
- Traffic signal lanterns
- Pedestrian detectors
- Audio tactile drivers
- Puffin WALK detectors
• Internally illuminated signs (e.g. give way to peds, no right turn, ramp control/metering signs)

For some larger, existing sites with the early version of multicore traffic signal cable (6mm neutral conductor) a conversion to ELV may require the site cabling to be replaced with the new multicore traffic signal cable (10mm neutral conductor) for correct ELV operation. This will need to be determined on a case-by-case basis.

Referenced documents

This Technical Note should be read in conjunction with the following referenced DoT (Roads) specifications:

• TCS 038 – Traffic signal lanterns
• TCS 016 – Traffic signal controllers
• TCS 027 – PUFFIN Walk detectors
• TCS 032 – No right turn signs
• TCS 010 – Give way to peds signs
• TCS 003 – Ramp control/metering signs
• Standard Section 730 – Traffic signal installation

Note: At the time of release of this technical note the above specifications are being updated to include ELV requirements.

Implementation

The implementation of ELV will be staged depending on the type and extent of works being carried out. Some existing sites had ‘dual voltage’ lanterns installed as part of an LED upgrade program in preparation for possible conversion to ELV. These sites will require other installed LV hardware to be replaced with ELV hardware.

Details of the proposed implementation time line by works type are provided in Table 1 below. A guide recommending when to convert an existing site to ELV is provided in Table 2 below. It is recognised that conversion to ELV for existing LV sites may not be possible in every situation.

<table>
<thead>
<tr>
<th>Site Type</th>
<th>Controller Type</th>
<th>Dimming method</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>New traffic signal installation</td>
<td>VC6</td>
<td>Dim by wire ONLY</td>
<td>Immediately</td>
</tr>
<tr>
<td></td>
<td>VC5</td>
<td>Voltage dimming</td>
<td>July 2020</td>
</tr>
<tr>
<td>Major remodel (where a new controller and majority of lanterns being replaced)</td>
<td>VC6</td>
<td>Dim by wire ONLY</td>
<td>Immediately</td>
</tr>
<tr>
<td></td>
<td>VC5</td>
<td>Voltage dimming</td>
<td>July 2020</td>
</tr>
<tr>
<td>Minor remodel / Controller replacement</td>
<td>VC5 or VC6</td>
<td>Voltage dimming</td>
<td>July 2020</td>
</tr>
</tbody>
</table>

Table 1 – ELV implementation time line
### Table 2 – Recommendations when to convert existing sites to ELV

<table>
<thead>
<tr>
<th>Type of works</th>
<th>Extent of works</th>
<th>Existing lanterns</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remodel</td>
<td>Controller replacement Small number of lanterns being added or replaced</td>
<td>LV lanterns</td>
<td>Remain LV</td>
</tr>
<tr>
<td></td>
<td>Controller replacement Small number of lanterns being added or replaced</td>
<td>Dual voltage</td>
<td>Convert to ELV</td>
</tr>
<tr>
<td></td>
<td>Controller replacement Majority of lanterns being replaced</td>
<td>N/A</td>
<td>Convert to ELV</td>
</tr>
<tr>
<td>Controller Replacement</td>
<td>No additional works</td>
<td>LV lanterns</td>
<td>Remain LV</td>
</tr>
<tr>
<td></td>
<td>Dual voltage</td>
<td>Convert to ELV</td>
<td></td>
</tr>
</tbody>
</table>

**Additional information**

If you would like additional information regarding the implementation of ELV, please email your enquiry to [ITS_Improvements_and_Standards@roads.vic.gov.au](mailto:ITS_Improvements_and_Standards@roads.vic.gov.au)