



M23 Appendix F

NZTA M23:2022

Appendix F: Temporary road safety hardware & devices

5 December 2022

Version 2 (Working Draft)

WORKING DRAFT

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Document references

- AS/NZS 3845 Part 1:2015 and Part 2:2017
- AS/NZS 4192:2006
- AS/NZS 1906.4
- AS 1906.1:2017
- AS 4191–1994
- AS 1428.1-2009
- Waka Kotahi Specification E06
- Waka Kotahi Specification M23, incl Appendix C
- Waka Kotahi ITS-02-001-202010-SPEC-VMS-FIXED
- Traffic Control Devices Manual
- Land Transport Rule: Vehicle lighting 2004
- Traffic Regulations 1976 and The Official New Zealand Road Code
- Austroads Guide to Traffic Management - Part 10: Traffic Control and Communications Devices
- EN12352:2006 Traffic control equipment – Warning and safety light devices for Class L8H warning lights



Waka Kotahi is part of, and contributes to, the Road to Zero safety strategy.

Road to Zero is the government's strategy to guide improvements in road safety over the period 2020–2030. The strategy's vision is to stop people being killed or seriously injured on our roads. This means that no death or serious injury while travelling on our roads is acceptable.

For more information visit www.nzta.govt.nz/road-to-zero.

Revision record

Date	Notes
September 2022	Initial Working Draft, transfer of information from CoPTTM to NZTA M23 in support of NZGTTM development
December 2022	2nd draft incorporating amendments identified during NZGTTM pilots and associated correspondence with industry, plus additional products

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Introduction

This hardware summary manual has been prepared to assist organisations and individuals who interact with temporary road safety hardware and devices. The technical details within this manual have been extracted from the respective product, installation, and technical manuals of each system/device and other relevant standards.

For more detailed information, refer to the individual manuals for each product or contact the System Supplier.

The information, commentary and details provided in this manual are collected from a variety of reliable sources however the System Owner/Supplier, and formally issued and endorsed material must still be used as reference material for products. Do not utilise a system/device listed in this manual without first consulting the System Owner/System Supplier and obtaining the correct and most recent documentation for the product.

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Glossary

(Refer also to AS/NZS 3845 Part 1 2015 and Part 2 2017)

Artificial lighting	Any light source that is produced by electrical means
Asphalt surface	A material that binds aggregate with bitumen to form a flexible hard surface for the construction of footpaths and pavements
Aggregate	Coarse to medium grained particulate material like sand, gravel, crushed stone, for example
AWVMS	Advance warning variable message sign
Beacon	Roof-mounted device consisting of a light encapsulated in an amber casing that may either flash (strobe) or appear to flash when circled by a rotating reflector
Bi-directional application	Two-way traffic e.g. device that can be hit by both adjacent and opposing traffic
Centreline	The line which defines the axis or alignment of the centre of a road or other work. <ul style="list-style-type: none"> • In relation to any portion of a roadway not marked with a flush median –a dotted or solid line or lines of paint or raised studs (or any combination of those lines or studs) intended to separate opposing traffic. • In relation to any portion of a roadway marked with a flush median –the longitudinal white line that forms the left side of the median as viewed by a driver facing forward. • In relation to an unmarked roadway – the inferred line down the longitudinal centre of the roadway
Channelling	The defining of traffic lanes by use of traffic control devices, separately or in combination
Chevron delineators	Retro-reflective chevron delineators attached to the top of temporary road safety barriers, safety fences or barricades
Concrete surface	A material that binds aggregate with cement that harden to form an impervious rock like mass. Concrete can be used for footpath, pavements and a wide range of other applications
Cone bars	Connect between two cones (for each cone bar) in order to better channel traffic through, past and around the work area
Contractor	A person engaged by any person (otherwise than as an employee) to do any work for gain or reward.
Date of Issue of Technical Note	Date that a technical note has been approved and added to this document
Delineation	One, or a combination of devices (excluding guide signs), that regulate, warn, or provide tracking information and guidance to the driver
Edge line	Used to outline and separate the outside edge of the pavement from the shoulder.
Fire Service	Fire and Emergency New Zealand (FENZ) is a crown entity that is charged with protecting lives and property from fire
High visibility garments	Any clothing worn that is highly luminescent in its natural matt property or a colour that is easily discernible from any background
LAS	Light arrow system
Luminance	A measure of the luminous intensity per unit area of light travelling in a given direction
Manually operated signal	Manually operated signal is where a portable traffic signal is activated via a remote from a safe distance from traffic in high-risk environments
Multi-lane road	A road environment where there are two or more lanes in the same direction (excluding passing lanes)
MTC	Manual traffic controller - a person controlling the flow of traffic in a single lane past a closure with the use of stop/go paddles

Passing lane	A passing lane is length of road where there are two lanes in the same direction that have been permanently sign posted with passing lane signage
Photometric performance	Capacity of visible light based on the response of the average human observer
Portable traffic signal systems	An approved portable traffic signal device allowing traffic controllers to perform their roles at a safe distance from traffic in high-risk environments.
Proprietary	A device that is the subject of patent or other intellectual property rights
Public domain	A device or system that is not the subject of patent or other intellectual property rights within Australia and New Zealand. Note: These are also referred to as non-proprietary devices
Retro-reflective	A surface or material that reflects light back to a light source making them easier to see during heavily overcast days and at dawn, dusk or night
RCA	Road Controlling Authority that has control of the road, sometimes referred to as Road Authority
Road category	A – any road with a permanent speed limit less than or equal to 60km/hr (including multi-lane roads) B – any road with a permanent speed limit of 70km/hr or more with only a single lane in each direction, and including passing lanes C – any multi-lane road with a permanent speed limit of 70km/hr or more
Road level	The level of TTM pertaining to that road environment as defined in the Code of Practice for Temporary Traffic Management (CoPTTM). The RCA is responsible for defining the actual road level of each individual road in its network
Safety fence	A device to physically prevent people from gaining access into a hazardous area
Shadow vehicle	A shadow vehicle is used to provide additional guidance for road users approaching from the rear and close protection for personnel on foot and/or work vehicles in the working space
Site specific risk assessment	An assessment which is specific to the site that considers risk based on parameters such as road user exposure, crash likelihood and crash severity
Supplier	The entity that supplies the system or device
TCD Rule	Traffic Control Devices 2004 - -rule that covers requirements for the design, construction, installation, operation and maintenance of traffic control devices, and functions and responsibilities of road controlling authorities
Temporary speed humps	Road humps or undulations are used for 10–15 kph speed zones. The temporary speed hump must only be used at attended worksites with positive traffic management in place.
Three-point seat belt	Have three anchor points: across the lap and diagonally across the wearer's chest.
TSL	Temporary speed limit - a speed limit that is in force for a period of less than 12 months and is set under the Land Transport Rule: Setting of Speed Limits 2017 by the RCA
TMD	Traffic management diagram - a traffic management diagram within, and forms part of, the TMP. A TMP may have more than one TMD included as part of it
TMP	Traffic management plan - a document describing the design, implementation, maintenance, and removal of temporary traffic management (TTM) while the associated activity is being carried out within the road reserve or adjacent to, and affecting the road reserve
TTM	Temporary traffic management - the process or method of managing road users, including vehicles and pedestrians through, around or past an activity on a road reserve safely and with a minimum level of inconvenience
Traffic Incident Manager (TIM)	One who detects, monitors, and responds to various traffic management data sources and incidents to maintain safety and efficiency on local roadway systems
Traffic management vehicle	Vehicle optimised for the install, removal and maintenance of temporary traffic management devices. This definition includes the different vehicles of a mobile operation
Truck mounted attenuator	A safety device designed to reduce the severity of collision that may be fitted to slow moving or stationary work vehicles which are exposed to potential impact from behind by approaching traffic
Uni-directional application	Hardware or device that only functions for a single approach direction
VMS	Variable message sign - this is a device that can be used to highlight specific hazardous situations. The message displayed on the sign can vary depending on the specific need of the site or application

Waka Kotahi	Waka Kotahi NZ Transport Agency (Waka Kotahi, NZTA) is a New Zealand Crown entity tasked with promoting safe and functional transport by land, including the responsibility for driver and vehicle licensing, and administering the New Zealand state highway network
Wear and tear	Damage that naturally and inevitably occurs as a result of normal use or aging
Work vehicle	A vehicle carrying out a work activity adjacent to the road, or on the carriageway, or supporting personnel on foot. Work vehicles are task specific and complete only one task at a time
Vehicle actuated detection	Vehicle actuated detection gives portable traffic signals the capability to identify and respond to the presence of vehicles waiting.
Xenon warning lights	A strobed warning light fitted to a light arrow system

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Delineation and Channelling

Delineation

The following general notes apply to all delineation devices:

- Delineation devices such as cones, tubular delineators and barrels must be specifically designed and manufactured for temporary traffic management use.
- Manufacturers must be able to demonstrate colour and luminance compliance and photometric performance compliance of the retro-reflective material from a recognised independent testing laboratory's certificate of compliance. Such certificate must note the device tested.
- To confirm device compliance, the letters **TTMC XX/YY** (month and year of compliance certificate) of a practicable size must be embossed or otherwise permanently marked on the upper base of the device.
- It should be recognised by suppliers and users of these delineation devices that colour and luminance fades in direct sunlight. While this cannot be avoided when the device is in use it may be good practice to store out of direct sunlight when not in use. Users should be aware of device suitability for purpose at the time of use; that colour and retro-reflective performance is appropriate for the conditions, retro-reflective bands remain firmly affixed in position and the device is clean of environmental soiling.
- All delineation devices (e.g., cones, tubular delineators and barrels) must be fluorescent orange with chromaticity coordinates in accordance with table 2.6 of AS 1906.1:2017, and minimum luminance factor in accordance with table 2.9 of AS 1906.1:2017.
- Internal colour and the underside of the base of cones, tubular delineators and barrels must be either a reasonably distinctive white or orange to ensure the device remains visible if knocked over. Black is not permitted. Orange must be compliant to the chromaticity coordinates above but need not be fluorescent as per the luminance factor above. White can be adjudged compared to a commercial paint chart that depicts white.

Note: Colour dispensation will be allowed for the underside of a cone base that is manufactured using a minimum of 30% of recycled cone material. In such instances colour must comply with the specification in AS/NZS 1906.4 for orange-red:

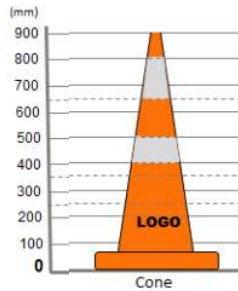
x	0.690	0.595	0.458	0.550
y	0.310	0.315	0.404	0.450

For continued production to remain compliant and in order to avoid the need to test each batch for colour and luminance compliance, a certificate of compliance for the device may remain valid for a maximum of 36 months. During this time, manufacturers are expected to take all practicable steps to ensure that colour and luminance remain within specification. A new certificate of compliance must be completed within 36 months.

Note: Waka Kotahi reserves the right to effect or require confirmation testing at any time to reconfirm colour compliance.

- Delineation devices must have white or silver retro-reflective bands that:
 - Meet a minimum of the photometric performance requirements for Class 300 material in table 2.4 of AS 1906.1:2017,
 - Conform to the band width and positioning on the device as noted below,
 - Be affixed securely to the device with an adhesive that is appropriate for use with such material.
 - Have a test certificate of compliance for retro-reflective material to confirm retro-reflective performance is a minimum of Class 300 AS 1906.1:2017 each 36 months in order to maintain the device's certificate of compliance

Standard Cones



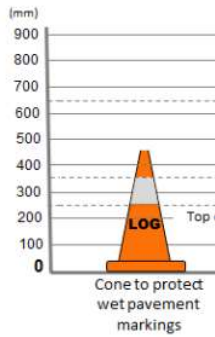
SUMMARY

Road level/categories	All road levels and categories
Status	Accepted

TECHNICAL INFORMATION

Height (mm)	<p>Standard height = 900 Height tolerance = +20, -0</p> <p>NOTE:</p> <ul style="list-style-type: none"> 900mm is the industry standard cone height for TTM applications taper rates and cone spacing critical lower cone heights will compromise visibility height departures to be assessed by risk assessment of organisational activity
Maximum weight	7.0kg (excluding any attached ballast or stabilising strips)
Number of retroreflective bands	2
Colour of bands	White or silver (Class 300 silver high intensity or Class 400 white microprismatic high intensity)
Upper band (mm)	<ul style="list-style-type: none"> From bottom edge of band to ground: 650 ±5 Band width: 157.5 ±7
Lower band (mm)	<ul style="list-style-type: none"> From bottom edge of band to ground: 400±5 Band width: 105 ±5
Logo dimensions	Company logos applied to the sides of delineation devices must be no greater than 5000mm ² (e.g. 50mm x 100mm) with the top of the logo being no higher than 200mm (±20mm) from the road surface.
Other restrictions / considerations	<p>All cones must:</p> <ol style="list-style-type: none"> Be sufficiently stable to remain upright in most anticipated service conditions Have a base designed to stop the cone from rolling if knocked over Be capable of returning to their original shape after impact Be made of a flexible polymer or similar material <p>In locations where high wind speed is a concern, cones may be either:</p> <ol style="list-style-type: none"> Ballasted with sandbags Stabilised using light weight short flexible connecting strips. The combined weight of a single cone and stabilising strip must not exceed 7.0kgs

Line Marking Cones



SUMMARY

Road level/categories All road levels and categories

Status Accepted

TECHNICAL INFORMATION

Height (mm) Standard height = 450
Standard height 450
Height tolerance = +10, - 0

Maximum weight (kg) 2.0

Number of retroreflective bands 1

Colour of band White or silver (Class 300 silver high intensity or Class 400 white microprismatic high intensity)

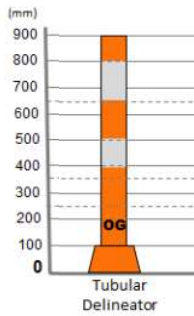
Band width (mm) 105 ± 5

Height of band (mm) From bottom of band to ground: 250 ± 5

Logo dimensions Company logos applied to the sides of delineation devices must be no greater than 5000mm^2 (e.g. $50\text{mm} \times 100\text{mm}$) with the top of the logo being no higher than 200mm ($\pm 20\text{mm}$) from the road surface.

Other restrictions / considerations May be used to delineate and protect wet road markings but will not be compliant for any other use

Tubular Delineators



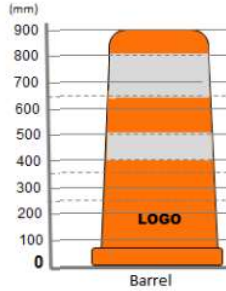
SUMMARY

Road level/categories	All road levels and categories
Status	Accepted

TECHNICAL INFORMATION

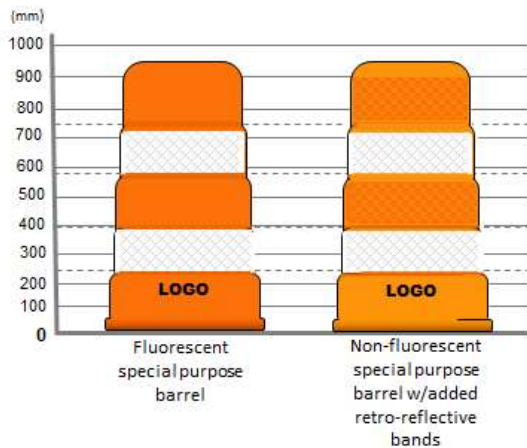
Dimensions (mm)	Standard height = 900 Height tolerance = +20, - 0
Maximum weight (kg)	7.0kg (excluding any attached ballast or stabilising strips)
Number of retroreflective bands	2
Colour of bands	White or silver (Class 300 silver high intensity or Class 400 white microprismatic high intensity)
Upper band (mm)	<ul style="list-style-type: none"> From bottom edge of band to ground: 650 ±5 Band width: 157.5 ±7.5
Lower band (mm)	<ul style="list-style-type: none"> From bottom edge of band to ground: 400±5 Band width: 105 ±5
Logo dimensions	Company logos applied to the sides of delineation devices must be no greater than 5000mm ² (e.g., 50mm x 100mm) with the top of the logo being no higher than 200mm (±20mm) from the road surface.
Circular type & "x" type restrictions	Must be no less than 75mm when viewed from any direction
"T" type restrictions	The primary approach face must be no less than 75mm in width and the reinforcing spine measurement no less than 55mm from primary face
Other restrictions	<ul style="list-style-type: none"> Must be capable of returning to their original shape after impact (unless dislodged from its base) Must not use a method of fixing that will damage the pavement surfacing

Barrels



SUMMARY	
Road level/categories	All road levels and categories
Status	Accepted
TECHNICAL INFORMATION	
Dimensions (mm)	Standard height = 900 Height tolerance = +20, – 0 excluding base and handle.
Maximum weight	7.0kg (excluding any attached ballast or stabilising strips)
Number of retroreflective bands	2
Colour of bands	White or silver (Class 300 silver high intensity or Class 400 white microprismatic high intensity)
Upper band (mm)	<ul style="list-style-type: none"> ▪ From bottom edge of band to ground: 650 ±5 ▪ Band width: 157.5 ±7.5
Lower band (mm)	<ul style="list-style-type: none"> ▪ From bottom edge of band to ground: 400 ±5 ▪ Band width: 105 ±5
Logo dimensions	Company logos applied to the sides of delineation devices must be no greater than 5000mm ² (e.g, 50mm x 100mm) with the top of the logo being no higher than 200mm (±20mm) from the road surface.
Other restrictions	<ul style="list-style-type: none"> ▪ The design of the barrel must: <ol style="list-style-type: none"> i. Have a minimum base dimension of 600mm x 600mm ii. Have a stable base design that will accommodate sandbags as ballast iii. Be made of a flexible polymer or similar material

Special Purpose Barrels



SUMMARY

Road level/categories	All road levels and categories (though NOT to be used for general traffic guidance and delineation)
Status	Accepted

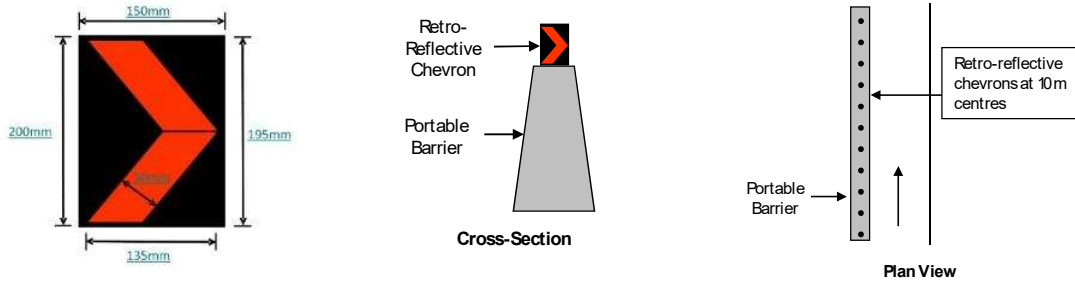
TECHNICAL INFORMATION

Dimensions (mm)	Standard height = 925 Height tolerance = $\pm 35, - 0$
Maximum weight	7.0kg (excluding any attached ballast or stabilising strips)
Number of retroreflective bands	2 White or silver 2 Fluorescent orange – refer “Other restrictions”
Colour of bands	White or silver Fluorescent orange - (refer “Other restrictions”)
Upper band (mm)	White or silver <ul style="list-style-type: none"> i. From bottom edge of band to ground: 565 ± 10 ii. Band width: 157.5 ± 7.5 Fluorescent Orange Fluorescent Orange (if required) <ul style="list-style-type: none"> i. From bottom edge of band to ground: 730 ± 10 ii. Band width: 157.5 ± 7.5
Lower band (mm)	White or silver <ul style="list-style-type: none"> i. From bottom edge of band to ground: 240 ± 10 ii. Band width: 157.5 ± 7.5 Fluorescent Orange Fluorescent Orange (if required)

	<ul style="list-style-type: none"> i. From bottom edge of band to ground: 400 ±10 ii. Band width: 157.5 ±7.5
Logo dimensions	Company logos applied to the sides of delineation devices must be no greater than 5000mm ² (e.g., 50mm x 100mm) with the top of the logo being no higher than 200mm (±20mm) from the road surface.
Other restrictions	<p>The special purpose barrel is for purposes other than general traffic guidance delineation</p> <p>The design of the barrel must:</p> <ul style="list-style-type: none"> i. Have a minimum base dimension of 600mm x 600mm ii. Have a stable base design that will accommodate sandbags as ballast iii. Be made of a flexible polymer or similar material <p>If the device is not compliant fluorescent orange, then 2 fluorescent orange retroreflective bands must be added as noted in the figure and photo above</p>

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Chevron Delineators



SUMMARY

Road level/categories	All road levels and categories
For use with	Approved temporary road safety barriers (see M23 Appendix C for a list of approved temporary road safety barriers); or barricades and pedestrian fencing
Status	Accepted

TECHNICAL INFORMATION

Dimensions (mm)	<p>Plate dimension – 150 (w) x 200 (h)</p> <p>Arrowhead/symbol – 135 (w) x 195 (h)</p> <p>Arrowhead width - 50</p>
Colour	Retroreflective fluorescent orange (AS 1906.1 Minimum Class 400) arrowhead on a rectangular black background
Spacing between chevrons	Maximum 10m
Other restrictions / considerations	<ul style="list-style-type: none"> Must be fitted to all temporary road safety barrier systems The chevron must point to the side of the barrier that the traffic is to pass on Must be fixed/mounted to the barrier system with an adhesive product (not bolted or otherwise which requires modifying the barrier system) May be used with barricades or safety fences (see Safety Fence section below)

WORKING

Channelizing

The following general notes apply to all channelizing devices:

- a) Are intended to create side friction to help road users stay within their lane, follow a new path and/or travel at appropriate speeds
- b) Must be installed as per the manufacturer's specifications and by a person suitably qualified to install specific device.
- c) Are to supplement existing approved delineation or to have delineators incorporated into the device.
- d) Are not intended to re-direct traffic (like a temporary road safety barrier). They are to help create side friction or give tactile information to vehicle users if struck.
- e) Must have retroreflectivity properties to ensure visibility in low light conditions that must be a minimum of Class 300 High Intensity Grade retro-reflective sheeting complying with AS/NZS 1906.1.2007 Table 2.4
- f) Must be inspected on a regular basis to ensure devices are compliant to manufacturers specification, or are not damaged to the point where they can create a hazard to road users

WORKING DRAFT

Cone Bars



SUMMARY	
Road level/categories	All road levels and categories
For use with	Standard cones as described above
Status	Accepted
TECHNICAL INFORMATION	
Length (mm)	Minimum length 1000 ; may extend up to a maximum of 2200 overall
Diameter (mm)	35 minimum 100 maximum
Weight (kg)	7.0 maximum
Colour	<ul style="list-style-type: none"> ▪ Alternating black and orange or black and yellow stripes ▪ Minimum length – 150mm ▪ Maximum length – 300mm
Retro-reflectivity	Orange or yellow must be Class 100 engineer grade retro-reflective sheeting complying with AS1906.1:2017 Table 2.5
Frangibility	<ul style="list-style-type: none"> ▪ Non-splintering, frangible type material ▪ Will not present a hazard to vehicles after falling from the cone support
Other restrictions./ considerations	<ul style="list-style-type: none"> ▪ Cone bars may be used to provide a channel for pedestrians on worksites where workers are in attendance ▪ Cone bars must not be used to replace a safety fence and may not be left on an unattended work site

Vanguard Flexible Traffic Separator



SUMMARY	
Road level/categories	All road levels and categories
For use with	<p>Not accepted for general use in temporary traffic management</p> <p>May be used in place of cones in lit urban (low speed) long term sites requiring a degree of channelisation for safe operation</p> <p>Use on any lit high speed (local or State highway) site requires careful consideration of risks such as:</p> <ul style="list-style-type: none"> - lack of night conspicuity should tubular delineators become detached - potential damage to surface (particularly chipseal) allowing water ingress due to the pinning and projectile creation should a section become detached <p>Must not be used in unlit areas or in lieu of cone tapers</p>
Status	Accepted – site specific applications (refer above)
TECHNICAL INFORMATION	
Dimensions (mm)	<p>Centre module: 1000 (L) x 250 (W) x 80 (H)</p> <p>End cap: 500 (L) x 250 (W) x 80 (H)</p> <p>Flexi-post: 900 (H)</p>
Colour	<p>Centre module: black or non-fluorescent yellow (compliance could be AS 1906.1 Table 2.6 colour and Table 2.8 luminance but possibly should check what yellow the photo shows or ask supplier)</p> <p>Centre module: black or non-fluorescent yellow</p> <p>End cap: black or yellow</p> <p>Flexi-post: Fluorescent orange as for Tubular delineators</p>
Installation	<ul style="list-style-type: none"> ▪ Temporary: loose laid on surface (low speed sites only) ▪ Asphalt surface: M12 x 150mm concrete screw, 2 per centre module, 1 per end cap ▪ Concrete surface: M12 x 300mm galvanised spike, 2 per centre module, 1 per end cap
Spacing between flexi posts	Minimum – every second centre module (every 2m)
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Separators must be fitted with orange post ▪ End caps must be used on each string

Access Prevention

Safety fences

Safety fences are required to prevent people from gaining access into a hazardous area.

This is particularly important at unattended worksites. The following general notes apply to all safety fences. Safety fences must:

- a) Have a secure supportive top and bottom rail
- b) Have the top rail located a minimum of 1m above ground level
- c) Have the bottom rail located a maximum of 100mm above ground level
- d) Be continuous around the hazard
- e) Be clipped or joined together, if in sections, to form a continuous fence surrounding the hazard
- f) Have top and bottom rails that terminate with a vertical post
- g) Have a child proof in-fill or solid panels that are difficult to climb
- h) Remain upright and stable under all expected worksite conditions
- i) Be free of sharp objects.

Where the safety fence is to be used at night, then the following must be complied with:

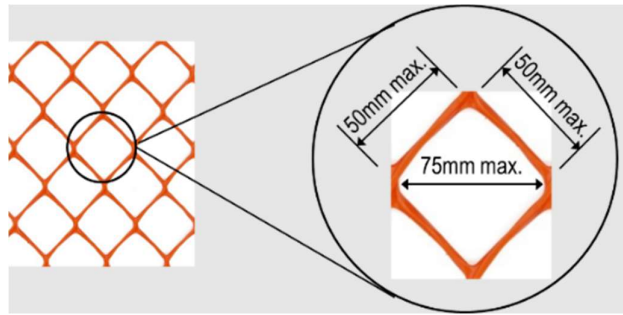
- a) For Level LV, Level 1, and Level 2 roads where there is a hazard on a footpath or cycle lane, amber-flashing warning lamps may be placed on safety fences and barricades as per the following:
 - A lamp may also be placed on each corner of the barricade/fence, to help make the worksite and hazard more identifiable.
 - If there is insufficient lighting to highlight the approach pathway and any hazards on the path, then amber flashing warning lamps must be installed.
 - Amber flashing warning lamps must be capable of maintaining their flashing mode throughout the night.
 - Amber flashing warning lamps must be clearly visible from a height of 1.1m to 2.4m over a distance ranging from 0m to 600m from the light.
 - Amber flashing warning lamps may also be used as part of the advance warning for the worksite.
 - When used in this manner they must be placed so that the nearest edge is at least 500mm clear of the travelled path of vehicles for level LV and level 1 roads, and at least 1250mm clear of the travelled path of vehicles for level 2 and 3 roads.
 - Whatever is holding the lamp must be frangible.
 - Long length worksites delineated entirely with amber flashing lamps may confuse approaching road users. Delineation with retroreflective type devices reduces confusion for long worksites.
- b) On all levels of road where hazards parallel to the road are protected by safety fences, these fences must be fitted with suitable retroreflective bands on the end uprights (and centre upright) as for 900mm Standard cones.
- c) Retro-reflective chevron delineators may be used to assist delineate the safety fence. These are to be installed at ten-metre spacings and at every change of direction of the safety fence
- d) On level LV, level 1 and level 2 roads where there is a hazard on a footpath or cycle lane, amber flashing warning lamps may be placed on any barricades and fences.

Plastic Pedestrian Fence



SUMMARY	
Road level/categories	All road levels and categories
Status	Accepted
TECHNICAL INFORMATION	
Dimensions	Minimum height 1000mm above ground level
Requirements	Have a secure and supportive top and bottom rail that terminate with vertical post.
Bottom rail height	Not more than 100mm above ground level
Vertical members	<ul style="list-style-type: none"> ▪ No greater than 100mm separation ▪ Minimum Class 300 retroreflective on end uprights matching cone band dimensions and positions.
Installation	Clipped or joined together, to form a continuous fence surrounding the hazard
Child proofing	Panels to have a child proof in-fill or solid panels that are difficult to climb
Colour	Panels to be orange in colour complying with AS 1906.1 Table 2.6 with luminance complying with Table 2.8.

Pedestrian Fence with Mesh



SUMMARY	
Road level/categories	All road levels and categories
Status	Accepted
TECHNICAL INFORMATION	
Dimensions	Minimum height 1000mm above ground level
Requirements	Have a secure and supportive top and bottom rail that terminate with vertical post.
Bottom rail height	Not more than 100mm above ground level
Vertical frame members	Minimum Class 300 retroreflective on end uprights matching cone band dimensions and positions.
Diagonal gap in mesh dimensions	No greater than 75mm, which is achieved by a 50mm x 50mm mesh as shown above
Mesh Colour	Fluorescent orange
Installation	Clipped or joined together, to form a continuous fence surrounding the hazard

WORKING

Chain Link Temporary Fencing



SUMMARY	
Road level/categories	All road levels and categories
Status	Accepted
TECHNICAL INFORMATION	
Dimensions (mm)	1800 (h) x 2400 (w) OR 2100 (h) x 2400 (w)
Requirements	Have a secure and supportive top and bottom rail that terminate with vertical post.
Bottom rail height	No more than 100mm above ground level
Gap in mesh dimensions	Diagonal mesh: No greater than 75mm, which is achieved by a 50mm x 50mm mesh. Vertical mesh: No greater than 50mm apart
Material	Galvanised Steel
Installation	Fence coupler and temporary fence feet to connect fence panels and close off hazards.

Traffic Control Systems

Portable traffic signals - general

The following describes the standard requirements for all portable traffic signal systems approved for use by Waka Kotahi. Below that is single page for each individual system already approved for use by Waka Kotahi.

General

- a) Portable traffic signals must comply with the Australian Standard AS 4191 Portable traffic signal systems and must only have two phases. Each phase permits a particular traffic movement and consists of a green period, a yellow period and an all-red period.
- b) Portable signals are usually adequate for traffic control at worksites where their operation is supervised. Where they are required to operate outside working periods, signals must be regularly monitored to ensure they are continuing to function correctly. The frequency of monitoring is to be documented in the TMP.
- c) The requirements for a portable traffic signal installation are normally less stringent than those for a normal signalised intersection. The minimum requirements for a portable traffic signal installation are:
 - A power supply source
 - Two signal posts each with a three-aspect signal display
 - A vehicle-actuated detection system, except where a fixed time or manually-operated signal operation is shown to be adequate
 - A system to link each item of hardware
 - A control mechanism
 - An audio alarm system to alert worksite staff in the event of signal malfunction.

Certification

- a) Portable traffic signals must be certified as complying with AS 4191.
- b) Contractors are required to apply to the RCA to use portable traffic signals.
- c) Application must be made with the TMP and the details of the system must be provided (manufacturer and model description/number).
- d) RCAs must approve the use of all portable traffic signals before they are installed at a worksite.
- e) A register of compliant systems is available on the NZTA's website.
- f) The representative of the RCA must ensure that the system is listed as compliant before signing off the TMP.
- g) New systems can be tested to AS 4191 standards at either a qualified independent Australian laboratory or at WSP Research (Lower Hutt) in New Zealand.
- h) New approvals will be added as they pass testing. Testing is to be undertaken at own expense. For details of testing or to have a portable signal system tested contact M23.Queries@nzta.govt.nz

Power Supply

- a) The power supply may be either mains or battery, but the source and lamp combination must be able to produce the signal lantern light output required by the Austroads Guide to Traffic Management Part 10: Traffic Control and Communications Devices.

Signal Displays

- b) At most worksites a single signal post with a three-aspect lantern display is sufficient. The display is normally positioned to the left, and adjacent, to a limit line that is located at a point where normal two-way traffic operation is restored.
- c) The location of the signal displays in relation to the limit lines and adjacent carriageways must conform to the requirements of the Austroads Guide to Traffic Management Part 10: Traffic Control and Communications Devices.

Detection Systems

- a) Vehicle detection may be by microwave or infra-red detectors, or by induction loops cut in the road surface.
- b) The system must be set up to minimise false detections due to adjacent worksite activity and vehicles on the road that are leaving the controlled area.

Linking

- a) The linking between the signal displays on each approach to the controlled area may be provided by a hardwired cable system or by radio transmission.
- b) Coordinated time clock systems are not recommended because a temporary failure on one approach will result in the loss of coordination. This is unacceptable under alternating flow conditions.
- c) Where cable linking is used, and the cable must cross the trafficked carriageway within the controlled area, the cable is laid in a saw cut at the crossing point. If saw cutting is not feasible, vehicles may be ramped over the cable using an appropriate ramping system. In general the crossing is best positioned at the midpoint of the controlled area to minimise the effects of vehicle acceleration, braking and deceleration at the crossing point.
- d) Radio linking must use a suitable frequency and be set up in such a manner that it is unaffected by interruptions to the line of sight between the signal equipment at each end of the controlled area.
- e) In special circumstances linking cables may be suspended from securely-anchored wires. The cables must be at least 1m above the maximum legal vehicle height. Six metres is normally an adequate minimum clearance.

Controllers

- a) The signal controller must provide a two-phase operation with each phase having the following features:
 - a) A fixed minimum green period
 - b) A variable or fixed maximum green period
 - c) A variable or fixed gap timer
 - d) A fixed yellow time which must not be less than three seconds, and
 - e) A variable all-red time.
- b) The preferred method of operation for a vehicle-actuated system is that, in the absence of a vehicle demand, it 'rests-in-green' on the last approach serviced.
- c) Some portable controllers can generate a dummy opposing demand after a pre-set time, e.g., three minutes, to ensure a non-detected vehicle is never trapped on either approach.

Maintenance and Emergencies

- a) A maintenance contract to ensure immediate priority attention to a fault in an alternating flow traffic signal system must be arranged prior to the installation of the system.
- b) A person experienced in the operation of traffic signals undertakes the design and installation of the control and detection equipment.
- c) The contractor must have access to a back-up system that can take over from the traffic signal operation in the event of unusual congestion or failure of the control system. The signal displays must be removed or securely covered before such a back-up system is implemented.

Portable traffic signals – types of operation

The three modes of portable traffic signal operation are:

- Vehicle actuated
- Fixed time
- Manual

Vehicle Actuated Operations

- a) Vehicle-actuated operation is the preferred operating mode and must be used wherever possible.
- b) Vehicle-actuated operation allows the signals to automatically respond to vehicle demands. Phase lengths are adjusted automatically to suit the traffic flows and this ensures that traffic queues and delays are kept to a minimum.
- c) For alternating flow under vehicle-actuated operation the signals must change automatically when either:
 - There is a steady stream of vehicles and the maximum green timer has expired, or
 - The gap between successive vehicles is greater than a predetermined interval and the minimum green timer has expired.
- d) If the phase changes at the maximum green time, a new demand must be automatically generated for that phase. This ensures that any vehicles stopped by the signal change and undetected will be serviced, without the need for the system to detect the arrival of another vehicle on that approach.

Fixed Time Operations

- a) Fixed-time operation is an automatic mode that cannot respond to varying vehicle demands. The traffic signal cycles are set according to predetermined timings and this is likely to result in vehicles being delayed for no apparent reason when the road is clear.
- b) Fixed-time control must, therefore, only be used under the following conditions:
 - A vehicle detector fails, and
 - No manual signal operator is available.

Manual Operations

- a) Manually operated portable traffic signals are useful:
 - When a detector fails in a vehicle-actuated system, and/or
 - For the management of plant crossing the road at irregular intervals.

Signage to be placed on Temporary Signals while in operation

- a) A RP61 sign stating “stop on red signal” shall be mounted onto the unit, and a temporary limit lane should be installed on the traffic lane. The sign should be mounted directly under the green lantern.



- b) If a temporary limit line cannot be installed, RP62 sign stating “stop here on red signal” shall be mounted onto the unit. The sign should be mounted directly under the green lantern.



Height of Traffic Aspect

- a) Road users must be able to view traffic lanterns/aspects from a distance, and have sufficient clear sight distance to enable the road users to react to phase changes
- b) The traffic lanterns/aspect must be installed to a height of 1.6m from ground level to the centre of the green lantern/aspect.

WORKING DRAFT

Portable traffic signals – timing of signal displays

The following section details the standard requirements for signal display timing for all approved portable traffic signal systems.

Fixed Minimum Green

- a) A fixed minimum green period of six seconds is normally sufficient to ensure that the traffic flow can start up and that detection of successive vehicles will activate the gap timer in the appropriate manner.
- b) This will extend the green period, up to the maximum green time set if necessary.

Gap

- a) This timer is activated by the detection system and times the gap between successive vehicles on the approach to the signal, when the signal is showing a green display. Its normal value is in the range two to six seconds, but it is site specific and very much dependent on traffic speed.
- b) Traffic flows when the signal is showing a green display must be observed at various times of the day. If the phase seems to regularly terminate before the maximum green time expires, and the distances between successive vehicles in the traffic flow are not excessive, the gap time may be increased, in one-half second increments.
- c) Conversely, if the phase seems to regularly terminate at the maximum green time or the distances between successive vehicles in the traffic flow seem excessive, the gap time may be decreased. Minor adjustment to the gap time can have a major effect on the efficiency of a vehicle-actuated traffic signal operation.

Maximum Green

- a) For a vehicle-actuated traffic signal operation, the maximum green timing starts as soon as the green signal is displayed if there is already a vehicle call for the other phase, or immediately a vehicle call for the other phase is received during the current phase, whichever is the sooner.
- b) The green signal will continue to be shown provided there is constant stream of traffic and vehicle spacings are less than the gap time setting. The phase will terminate when the maximum green timer expires.
- c) When a fixed-time traffic signal operation is employed, the green time for each phase will always be the maximum value set, irrespective of traffic demands. Maximum green time settings may, therefore, be changed for the peak hours, off peak times, weekends and nights, to avoid excessive delays. Changes may be made manually or by 'time of day' commands, depending on the type of signal controller being used. Fixed-time traffic signal operation is NOT recommended for TTM.
- d) The following method may be used for setting maximum green times at short duration worksites where flows do not exceed **800 vehicles per hour (vph)** and are roughly equal in each direction.

Step 1

Measure the worksite length and set the maximum green time to the value shown the table below.

Worksite length (m)	Maximum green time setting (seconds)
30 – 74	35
75 – 134	40
135 – 194	45
195 - 300	50

Table 1 - Maximum Green Settings

Step 2

Observe the traffic queues at various times of the day. If the last vehicle in queue regularly takes more than one green period to reach the limit line, increase that approaches maximum green time setting by five seconds.

Where the traffic flows exceed 800vph a more precise calculation will be required to determine the appropriate maximum green time setting. A person familiar with traffic signal analysis must be employed to carry out this work.

Fixed Yellow

- a) The fixed yellow time for alternating flow traffic signal worksites is **four seconds**.

All Red

- a) The length of the all-red period is a function of the length of the worksite, site conditions and the average speed of vehicles through the worksite. A very long all-red setting can result in long delays that cause road user frustration, which in turn can lead to a red signal being disregarded. A very short all-red signal, particularly where visibility is restricted, can be equally dangerous.
- b) The all-red time must be **at least five seconds**.
- c) The all-red times recommended for straight level worksites are given in Table 2 below.

Straight, level worksite length (m)	Recommended all red time (seconds)
<50	5
50 – 99	10
100 – 149	15
150 - 199	20
200 – 249	25
250 - 300	30

Table 2 - Recommended All Red Time

Note: Worksite length is the distance between the traffic signal limit lines at each end of the worksite.

- d) The all-red time may need to be adjusted where gradient, road surface condition or a high proportion of heavy vehicles affect travel times through the worksite. As activity progresses the all-red times are reviewed on a regular basis to ensure they are neither too long nor too short.

Inter-Green

- a) The inter-green time is the period between successive green phases when all signals display a red aspect.
- b) The inter-green time is the sum of the yellow time and the red time for that phase, and allows vehicles to safely clear the controlled area.

Start-Up Sequence

- a) Portable traffic signals must start up with the following sequence:
 - Display a flashing yellow signal on all approaches for at least 10 seconds
 - Display a continuous yellow signal to all approaches for the preset yellow time
 - Display a red signal on all approaches for at least 10 seconds, and then
 - Display a green signal for the first approach in the phasing sequence.
- b) Portable traffic signals that comply with the AS 4191–1994 will automatically start up with this sequence.

Flashing Yellow Mode

- a) In flashing yellow mode, the red and green signals remain blank and the yellow aspects on all approaches flash at a rate of approximately 60 flashes per minute.
- b) Portable traffic signals must operate in a flashing yellow mode during the start-up sequence
- c) Portable traffic signals must operate in a flashing yellow mode automatically within a half a second of any of the following hazardous conditions occurring:
 - A green signal is shown simultaneously on both approaches of an alternating flow operation
 - A green or yellow signal is shown to one approach and red on the other approach of a haul route crossing control operation
 - If one approach shows a green signal and the other approach shows yellow signal
 - When any lamp fails
 - Under fixed-time or vehicle-actuated operation a lamp fails to extinguish
 - Under manual operation a green or yellow signal does not remain illuminated for the minimum green or yellow time
 - If more than one aspect is illuminated on a signal display
 - If the communication link between components in a system is disrupted for a continuous period of five seconds. This applies to any breakdown in data transmission
 - If a radio-linked system receives conflicting commands or status data from another signal installation within radio range.

- d) The Traffic Regulations 1976 and The Official New Zealand Road Code include driving rules for the flashing yellow traffic signal display. When a traffic signal shows a flashing yellow display the give way rules apply.
- e) Flashing yellow will be displayed for a short period of time when traffic signals are starting up.
- f) Portable traffic signals that comply with AS 4191–1994 must automatically display flashing yellows in accordance with this procedure.

WORKING DRAFT

Portable traffic signals – Accepted Systems

A1 Roadlines Portable Traffic Light Signal System Model PTC-1000



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	A1 Roadlines Pty Ltd
Approving lab or authority	RTA NSW 0005 - PTS3AR1-0-1
Date of approval(s)	18 May 2000
Status	Accepted
TECHNICAL INFORMATION	
Power	Batteries with solar charging
Remote controller	Yes (CS200 controller wired or radio)
Number of units	2
Connectivity between units	Transceiver radio-link communication between units
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Additional endorsements on 17 January 2005; 1 February 2005; and 9 March 2005 ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ The type of vehicle sensor used will detect movement only

Bartco Portable Traffic Signals Model BTEPTS



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Bartco Traffic Equipment Pty Ltd
Approving lab or authority	Allan Woodward Consultancy Services
Date of approval(s)	25 October 2005
Status	Accepted

TECHNICAL INFORMATION

Power	Batteries with solar charging
Remote controller	Yes – 100 m wired remote controller, or radio remote controller
Number of units	2
Connectivity between units	Communications between the units is by radio or cable link.
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ The type of vehicle sensor used will detect movement only ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ Maximum distance between units is 1000m

Bartco Portable Traffic Signals Model CS200



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Bartco Traffic Equipment Pty Ltd
Approving lab or authority	RTA NSW 0807 - PTS3AR1-0-1
Date of approval(s)	4 July 2008 (extended for 5 years 19 March 2014)
Status	Accepted

TECHNICAL INFORMATION

Power	Batteries with solar charging
Remote controller	Yes – 100 m wired remote controller, or radio remote controller
Number of units	2
Connectivity between units	Communications between the units is by radio or cable link.
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ The type of vehicle sensor used will detect movement only ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ Maximum distance between units is 1000m ▪ BTLC100 Controller endorsed 6 February 2015

Data Signs Pty Ltd Portable Traffic Signals PTL 300



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Data Signs Pty Ltd
Approving lab or authority	Roads & Maritime Services (NSW) Type Approval Certificate ITS-TAN000036
Date of approval(s)	24 August 2018
Status	Accepted

TECHNICAL INFORMATION

Power	Battery with solar
Remote controller	Yes
Number of units	4
Connectivity between units	RF communication
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ Two versions available: <ol style="list-style-type: none"> i. 'Wheel barrow' mounted ii. Trailer mounted ▪ Operating range of up to 1.6km line-of-sight which can be extended up to 3km with additional antennas



SAFETY

SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Fulton Hogan Signs & Graphics
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.15
Date of approval(s)	1 November 2019
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery
Remote controller	Yes
Number of units	2+ (more than 2 units can be used provided each lantern has its own operator)
Connectivity between units	No connectivity between unit, must be operated by remote control.
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the eStop Operator guide as supplied by the manufacturer ▪ Each traffic lantern requires its own operator unless the following conditions can be met: <ol style="list-style-type: none"> i. The operator must have clear view of approaching road users for at least 120m in advance of each traffic lantern ii. The distance between each traffic lantern is no more than 400m

Harding Traffic Systems LZA 500 Traffic Signals



SUMMARY

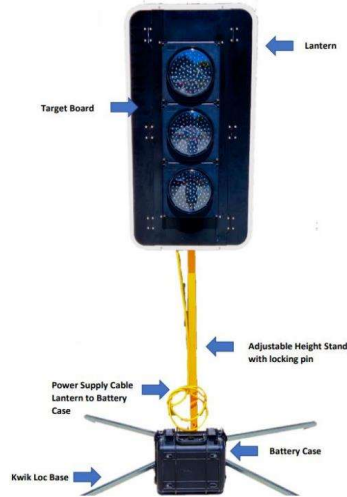
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Harding Traffic Signals
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.05
Date of approval(s)	1 January 2012
Status	Accepted

TECHNICAL INFORMATION

Power	Battery
Remote controller	Nil
Number of units	4 (radio), 16 (cable)
Connectivity between units	Radio or cable
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ The signal system is composed of an Adolf Nissen Elektrobau CmbH, model LZA 500, as modified by Harding Traffic Systems - The Nissen signal lanterns have been replaced with Aldridge Traffic Signal Lanterns (Aldridge Traffic Signals Pty Ltd, model 2000, part No. RA553.

WOKH

Harvest Electronics Stop/Go Portable Traffic Lights



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Harvest Electronics
Approving lab or authority	WSP New Zealand Limited, Research and Innovation Centre, Petone Report 528024.19
Date of approval(s)	29 July 2021
Status	Accepted

TECHNICAL INFORMATION

Power	Battery
Remote controller	Yes
Number of units	2
Connectivity between units	No connectivity between unit, must be operated by remote control.
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the operators guide as supplied by the manufacturer ▪ Maximum distance between each traffic lantern is to be no more than 400m ▪ Only requires a single operator.

Highway 1 Ltd Portable Traffic Signals TPTL-PTSS-01_NZ



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Highway 1 Ltd
Approving lab or authority	WSP New Zealand Limited, Research and Innovation Centre, Petone Report 528024.24
Date of approval(s)	1 October 2020
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery
Remote controller	Hand held controller
Number of units	2
Connectivity between units	RF (radio) communication system
Other restrictions / considerations	Operators must comply with the operators guide as supplied by the manufacturer.

Horizon Multi-Signal Type 26420



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Highway 1 Ltd
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.14
Date of approval(s)	1 March 2017
Status	Accepted

TECHNICAL INFORMATION

Power	Battery
Remote controller	Nil
Number of units	2 phase (2 units) or 4 (4 units) phase variants
Connectivity between units	Cable/radio
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ The maximum site length to be taken as that as measured by the approving lab (Opus) being 700m with a clear line of sight between the signals (at greater separations radio communication was intermittent). ▪ This system must not be applied over 700 metres. ▪ Operators must comply with the operator guide as supplied by the manufacturer

ISP Temporary Traffic Signals MPB4000



DRAFT

SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	International Safety Products
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.00
Date of approval(s)	27 April 2007
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery
Remote controller	Yes (wired or wireless)
Number of units	4+
Connectivity between units	Cable or radio-operated
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Can be installed for the following applications: <ol style="list-style-type: none"> i. One-way alternating-direction ii. Junction or merging iii. Pedestrian installations iv. Intersection signal installations ▪ Operators must comply with the operator guide as supplied by the manufacturer ▪ Vehicles are detected using directional radar detectors

Peter Berghaus MBA Traffic Signals



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	International Safety Products NZ Ltd (Peter Berghaus NZ)
Approving lab or authority	WSP Research, Lower Hutt Report 5-28024.18
Date of approval(s)	8 August 2022
Status	Accepted

TECHNICAL INFORMATION

Power	Battery
Remote controller	Yes (wired or wireless)
Number of units	2
Connectivity between units	Radio
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Manual mode only ▪ Maximum distance of 1.3kms between each unit ▪ Operators must comply with the operator guide as supplied by the manufacturer

Peter Berghaus MPB 3200 & 3400



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	International Safety Products NZ Ltd (Peter Berghaus NZ)
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.08
Date of approval(s)	1 September 2013
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery
Remote controller	Nil
Number of units	2
Connectivity between units	Radio, cable modes
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Maximum distance of 1.3kms between each unit ▪ Operators must comply with the operator guide as supplied by the manufacturer

Sykes Safeway Portable Traffic Signals



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Sykes Pumps Australia
Approving lab or authority	Vicroads Cert 1977 – 16 RTA NSW 9504-PTS3AR1-0-1
Date of approval(s)	Vic Roads: 1 December 1997 RTA NSW: 26 September 1997
Status	Accepted

TECHNICAL INFORMATION

Power	Battery only standard, but with optional solar charging system that can be added (shown in photo)
Remote controller	Nil
Number of units	Unknown
Connectivity between units	Unknown
Other restrictions / considerations	Operators must comply with the operator guide as supplied by the manufacturer

Traffic Signs NZ Ltd Model Smart Switch Vehicle Activated (SSVA)



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Traffic Signs NZ Ltd
Approving lab or authority	Opus International Consultants, Central Laboratories, Lower Hutt Report 528024.13
Date of approval(s)	1 July 2016
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery power supply with solar recharging system
Remote controller	Wireless remote control for manual controlling, range up to 500m
Number of units	2
Connectivity between units	Radio link
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Maximum range between unit is 2km ▪ Operators must comply with the operator guide as supplied by the manufacturer

Traffic Signs NZ Ltd Quick Set Light Weight Portable Traffic Lights



SAFE

SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Traffic Signs NZ Ltd
Approving lab or authority	WSP New Zealand Limited, Research and Innovation Centre, Petone Report 528024.16
Date of approval(s)	1 October 2020
Status	Accepted
TECHNICAL INFORMATION	
Power	Battery
Remote controller	Yes
Number of units	2+ (more than 2 can be used provided each lantern has its own operator)
Connectivity between units	No connectivity between unit, must be operated by remote control.
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the Quick Set Operator guide as supplied by the manufacturer ▪ Each traffic lantern requires its own operator

SAFE

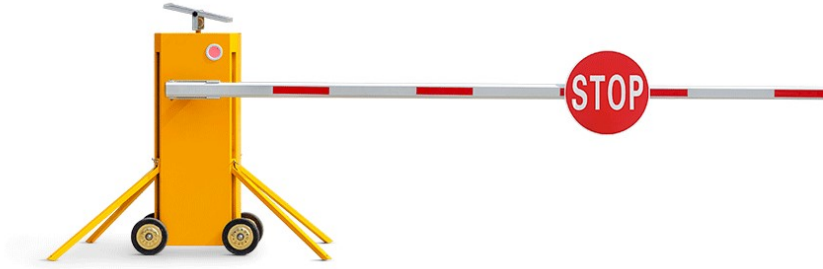
Manual traffic control systems

The below notes are required for all automated manual traffic control systems:

- a) Approach signage must be as what would be required for a standard manual traffic control operation in accordance with the relevant RCA's requirements
- b) Always test units prior to deploying them on the road to ensure that they are working correctly
- c) The systems are only permitted to be used during the hours of daylight
- d) The systems are only designed for two-way traffic flow, if there are additional approaches requiring manual traffic control, then an actual manual traffic controller will be required for the additional approaches
- e) The contractor must be prepared and have a suitable, and realistic contingency plan to take over manual traffic control operations in the event of equipment breakdown

WORKING DRAFT

Highway 1 Boom Gate



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Highway 1 Ltd
Status	Accepted
TECHNICAL INFORMATION	
Visibility	Operator must have at least 120m visibility of the approach to their unit
Distance	<ul style="list-style-type: none"> A MTC operator must be located at each unit Each operator must be able to invoke manual operation immediately if it is needed
Boom Detail	<ul style="list-style-type: none"> Retroreflective white and red as shown – conspicuity tape is acceptable R2-1 Stop sign must be a minimum of Class 400 retroreflective AS 1906.1
Communication interference	Nil
Other restrictions / considerations	<ul style="list-style-type: none"> Operators must comply with the Highway 1 Boom Gate operation guide as supplied by the manufacturer Remote operation, with manual over-ride for breakdowns

WORKING

Instaboom Go



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	RTL
Status	Accepted
TECHNICAL INFORMATION	
Sign Colour	<ul style="list-style-type: none"> Red and Green. For use in daytime conditions only these need only be Class 100 AS 1906.1 Table 2.5
Visibility	<ul style="list-style-type: none"> Operation of units within hours of daylight only The operator must not be more than 100m from either base unit The operator must have a safe and central vantage point with a clear view of both Stop/Go boards and oncoming traffic
Distance	Base units to not exceed 600m apart
Traffic volume	Two-way traffic volume to not exceed 850vph
Communication interference	<ul style="list-style-type: none"> Ensure no other RF units are close enough to interfere with your signals No other Instaboom Go systems (unless intentionally paired) are within 1000 metres of your installation
Other restrictions / considerations	<p>Operator must have clear line of sight to all Instaboom Go units</p> <p>Operators must comply with the Instaboom Go system operators guide as supplied by the manufacturer</p>

Instaboom Lite



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	RTL
Status	Accepted
TECHNICAL INFORMATION	
Visibility	Operator must have at least 120m visibility of the approach to their unit
Distance	<ul style="list-style-type: none"> ▪ A MTC operator must be located at each unit ▪ Each operator must be able to invoke manual operation immediately if it is needed
Boom Detail	<ul style="list-style-type: none"> ▪ Retroreflective white and red as shown – conspicuity tape is acceptable ▪ R2-1 Stop sign must be a minimum of Class 400 retroreflective AS 1906.1
Communication interference	Nil
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the Instaboom Lite operation guide as supplied by the manufacturer ▪ Remote operation, with manual over-ride for breakdowns

Portaboom



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Traffic and Access Solutions
Status	Accepted
TECHNICAL INFORMATION	
Visibility	Operator must have at least 120m visibility of the approach to their unit
Distance	<ul style="list-style-type: none"> ▪ A MTC operator must be located at each unit ▪ Each operator is positioned no more than 75m from their unit ▪ Each operator must be able to invoke manual operation immediately if it is needed
Boom Detail	<ul style="list-style-type: none"> ▪ Retroreflective white and red as shown – conspicuity tape is acceptable ▪ R2-1 Stop sign must be a minimum of Class 400 retroreflective AS 1906.1
Communication interference	Nil
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Operators must comply with the Portaboom Site Operational Instructions as supplied by the manufacturer ▪ If wind speeds exceed 50km/h, sandbags can be added to stability legs ▪ Remote operation, with manual over-ride for breakdowns

Robosign



SUMMARY	
Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	CSP Pacific
Status	Accepted
TECHNICAL INFORMATION	
Sign Colour	<ul style="list-style-type: none"> Red and Green. For use in daytime conditions only these need only be Class 100 AS 1906.1 Table 2.5
Visibility	<ul style="list-style-type: none"> Operation of units within hours of daylight only The operator must not be more than 100m from either base unit The operator must have a safe and central vantage point with a clear view of both Stop/Go boards and oncoming traffic
Distance	Base units to not exceed 200m apart
Traffic volume	Two-way traffic volume to not exceed 850vph
Communication interference	<ul style="list-style-type: none"> Ensure no other units are close enough to interfere with your signals No other RoboSign systems are within 1000 metres of your installation
Other restrictions / considerations	Operators must comply with the RoboSign Stop/Go Traffic Control System operators guide as supplied by the manufacturer

The Gibney



SUMMARY

Road level/categories	Level LV, Level 1, Level 2 or Category A and B
Manufacturer	Fulton Hogan Signs & Graphics
Status	Accepted

TECHNICAL INFORMATION

Colour	<ul style="list-style-type: none"> Sign Red (Stop) and Green (Go) Minimum Class 400 retroreflectivity AS 1906.1 Table 2.3. Pole colour alternatively retroreflective white and retroreflective red – minimum Class 400 conspicuity tape is acceptable
Visibility	Recommended for unit operators be equipped with the MTC specific long sleeve high visibility garment
Distance	A MTC operator must be located at each unit
Traffic volume	Nil
Communication interference	Nil
Other restrictions / considerations	Operators must comply with The Gibney Operators Guide as supplied by the manufacturer

Lighting and illuminated directional messaging

Lighting

This section details the standard requirements for all lighting systems used in temporary traffic management

Examples of lighting systems covered in this section include:

- a) Flashing beacons
- b) Xenon or LED warning lights
- c) Temporary artificial lighting systems for manual traffic control or illumination of the work site
- d) Temporary street lighting

WORKING DRAFT

Flashing Beacons



SUMMARY				
Road level/categories	All road levels and categories			
For use with	All vehicles involved in a mobile TTM operation, or accessing a static site through a site access point or otherwise unassisted access			
Status	Accepted			
TECHNICAL INFORMATION				
Mounting	May be permanently fixed, or use a temporary magnetic or similar system			
Visibility	The beacon(s) are to be mounted on a vehicle in such positions as to give a 360° uninterrupted view in the horizontal plane.			
Flash/revolving	May either flash (strobe) or appear to flash when circled by a rotating reflector.			
Compliance	<ul style="list-style-type: none"> All flashing beacons used in New Zealand must comply with section 11 of the Land Transport Rule: Vehicle lighting 2004 The flash conditions, the amber colour coordinates and the light output of the beacon must comply with the criteria specified below which was identified from within ECE Regulation 65. Compliance with these conditions must be contingent on certification obtained from an IANZ accredited laboratory. The light output conditions permit beacons with a single light output level as well as those having dual (night/day) light output levels. 			
Flash rate	Rotating or flashing sources			
	Frequency f(Hz)	Max	4	
		Min	2	
	'ON' time (sec)	Max	0.4f	
'OFF' time (sec)	Min	0.1f		
Light output	Colour - AMBER			
	Minimum value of the effective luminous intensity within the specific vertical angles and a horizontal angle of 360° around the reference axis	0°	By day	230
			By night	100
		±4°	By day	-
			By night	-
		±8°	By day	170
			By night	70
	Maximum value of the effective luminous intensity	Inside ±2°	By day	1,700
			By night	700
		Inside ±8°	By day	1,500
By night			600	
Outside the above areas		By day	1,000	
		By night	300	

Table values are in candelas

Continued next page

Chromaticity

Other restrictions / considerations

The trichromatic coordinates of light emitted through the filters used for special amber warning lamps shall lie within the following x and y boundaries of the CIE 1931 chromaticity diagram [reference CIE 15 – Colorimetry:2004]

Limit towards green	$y \leq x - 0.120$
Limit towards red	$y \geq 0.390$
Limit towards white	$y \geq 0.790 - 0.670x$

NOTE: Vehicle hazard warning lights are not beacons

WORKING DRAFT

Xenon or LED Warning Lights



SUMMARY	
Road level/categories	All road levels and categories (AWVMS only) Level 2 and Level 3 roads (LAS only)
For use with	Advanced warning variable message signs (AWVMS) Light arrow systems (LAS) as fitted to TMA vehicles
Status	Accepted
TECHNICAL INFORMATION	
Mounting	Minimum height of 3.5m to the centre of the light. Maximum clear height of 4.25m to the top of the light above the ground surface.
Visibility	<ul style="list-style-type: none"> ▪ The reference axis of light emitted from each Xenon or LED warning lamp must not fall below a line parallel to the surface on which the vehicle is standing. ▪ EN12352 uses the terms 'principal axis' and 'reference axis' which are defined as: <ol style="list-style-type: none"> i. Principal axis is the horizontal axis which lies on the vertical plane of symmetry of the lens and passes through the photometric centre of the warning light when it is in its normal operating position. ii. Reference axis, unless otherwise specified by the manufacturer, is the axis of maximum luminous intensity within 2° in any direction of the principal axis. ▪ The specified height and orientation are required to ensure that road users are not unduly affected by the operation of the Xenon or LED warning lights.
Compliance	Xenon and LED warning lights must comply with EN12352
Light emitting surface	Area: $\geq 700\text{cm}^2$ Diameter: $\geq 300\text{mm}$ (340mm desirable)
Angle range	Horizontal: $+ 1.5^\circ$ to $- 1.5^\circ$ Vertical: $+ 1.5^\circ$ to $- 1.5^\circ$
Luminosity intensity for nominal voltage	L_{Rmin} [minimum effective luminous intensity measured on the reference axis: 2000cd L_{Amax} [maximum effective luminous intensity measured at any point within angle range: 8000cd
Other restrictions / considerations	Nil

Illuminated directional messaging systems

This section details the standard requirements for all illuminated directional messaging equipment as below:

Types of illuminated directional messaging equipment includes:

- a) Horizontal arrow boards
- b) Light arrow systems (LAS)
- c) Advanced warning variable message signs (AWVMS)
- d) Variable message signs (VMS)

Horizontal Arrow Boards

Horizontal arrow boards are utilised on traffic management vehicles on Level LV and Level 1 roads only. The vehicles they are fitted to form part of mobile operations on these roads

Light Arrow Systems

Light arrow systems are utilised on traffic management vehicles on Level 2 and Level 3 roads only. The vehicles they are fitted to form part of mobile operations on these roads.

Variable Message Signs

There are two different types of VMS used in a temporary traffic management scenario, with different applications. Both are briefly described below:

- a) **AWVMS** – mounted on a small utility vehicle or small trailer. Used for:
 - Taking the place of a tail pilot in mobile operations
 - Setting up a worksite for a static operation
 - Providing additional information for a static operation
- b) Detailed specifications for the AWVMS are listed in Appendix E of Waka Kotahi's ITS-02-001-202010
- c) The AWVMS must be capable of being operated from within the cab of its support vehicle. If it is to be used as a standard VMS it must comply with:
 - Relevant legislation
 - Sections of this manual, and
 - Waka Kotahi's ITS-02-001-202010-SPEC-VMS-FIXED document
- d) **Mobile VMS** – Mounted on a trailer. Used as a relocatable sign providing information ahead of worksites, blockages diversions, etc. While in operation it is stationary. See below:
 - May be used, where they can be justified, instead of large temporary traffic information signs. They have particular value where messages, including a blank sign, are required to be changed throughout the course of the work. They are an additional form of traffic management and must not be used to replace the normal signs or devices used for TTM.
 - Must be located in a similar position to an equivalent conventional temporary traffic sign. Signs must be located behind an approved delineation device or be protected by an approved barrier system or a non-gating re-directive crash attenuator.
 - Must comply with Waka Kotahi's P37 specification for mobile variable message signs

VMS Messaging

Waka Kotahi has established three levels of documentation relating to the operation of all new and existing mobile, regional and ATMS VMSs. These comprise the following:

- a) Waka Kotahi's ITS-02-001-202010-SPEC-VMS-FIXED document

This national document outlines the *overall operating policy* relating to the control of messages on the NZTA's VMS and mobile VMS. It covers motorway, urban and rural locations, and has important links to the national operating procedure described below. Please refer to this document for direction on all policy aspects, including:

- All message applications
- Responding to emergency services requests
- Blanking of signs

- Verification of information
- Whether the state highway number (e.g. SH1) should be included
- A VMS's boundary of influence.

b) Waka Kotahi's ITS-02-001-202010-SPEC-VMS-FIXED document

This is a national document that addresses the *operating procedures* governing the NZTA's VMS and mobile VMS. It contains a menu of standard messages and outlines the best practice processes used to compose messages. The national operating procedure sits below and is consistent with the national operating policy.

c) Regional schedules

These regional documents contain contact details of authorised consultants and contractors, approved message wording for commonly occurring events, frequently used local place names, and identify linked VMS for each common incident location.

They also include the type of detailed information required for maintenance or asset management purposes.

The collation and updating of these schedules is the responsibility of each region.

WORKING DRAFT

Horizontal Arrow Board



SUMMARY

Road level/categories	Level LV and Level 1 only
For use with	Must be mounted on a traffic management vehicle
Status	Accepted

TECHNICAL INFORMATION

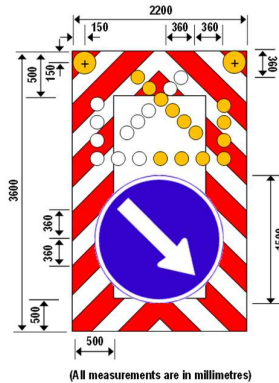
Visibility	<ul style="list-style-type: none"> Horizontal arrow boards must be legible at distances greater than 800m When a horizontal arrow board is operating, all other vehicles with flashing beacons in the working area must be positioned such that the visual performance of the horizontal arrow board is not impaired
Lamp colour	Amber
Lamp diameter	Minimum of 80mm
Lamp flash rate	25 – 40 flashes per minute
Number of lamps	Minimum of 25
Lamp dimming	Adjustable intensity with automatic and manual switching to not more than 50 percent of rated voltage
Dimensions	<ul style="list-style-type: none"> Width: 1200mm (minimum) Height: 600mm (minimum) The height and width measurements are minimums. Maximum measurements will be subject to legal vehicle widths and heights
Rear panel specification	<ul style="list-style-type: none"> Primary strip – Red minimum of Class 4 400 retro-reflective AS 1906.1 Table 2.3. Alternate strip – White minimum of Class 4 400 retro-reflective AS 1906.1 Table 2.3 These primary and alternate strips must be uniform in size and can be either 360mm or 140mm wide. If the truck's tray width does not allow for the full red hatching to be displayed on each side of the horizontal arrow board, this hatching width may be decreased to the width of the tray. The red hatching must be maintained in the panels above and below the arrow board The TV4 PASS WITH CARE sign must be displayed either above or below the red hatching
Other restrictions / considerations	<ul style="list-style-type: none"> RD6L/R signs are not to be used Horizontal arrow boards must not show a left and a right arrow at the same time Horizontal arrow boards must not be used to direct traffic into opposing traffic flows They must at least comply with the requirements of the joint Australian and New Zealand standard AS/NZS 4192:2006 (and amendments) Illuminated flashing arrow signs (AS/NZS 4192:2006) and preferably with the American Federal Highway Administration's Manual on uniform traffic control devices for streets and highways section 6F.61 Arrow boards and figure 6F-6 Advance warning arrow board display specifications

Light Arrow System (LAS)



SUMMARY	
Road level/categories	Level 2 and Level 3 only
For use with	Must be mounted on a truck mounted attenuator (TMA) vehicle, with complying rear panel
Status	Accepted
TECHNICAL INFORMATION	
Visibility	<ul style="list-style-type: none"> LAS must be legible at distances greater than 800m When a LAS is operating, all other vehicles with flashing beacons in the working area must be positioned such that the visual performance of the LAS is not impaired
Lamp colour	The lens must be amber in colour
Lamp diameter	Minimum of 80mm
Lamp flash rate	<ul style="list-style-type: none"> 55 - 75 flashes per minute (with the on-period twice the length of the off-period) When the arrow lamps are operating, the two synchronised Xenon flashing lights must only flash during the off-period of the arrow lamps.
Number of lamps	Minimum of 24 with a maximum of 25
Lamp dimming	<ul style="list-style-type: none"> Adjustment of the light intensity of the lanterns for night-time operations must be controlled by an automatic light-sensitive multistage light dimming device The light intensity during hours of darkness must not exceed 800 candelas since this may cause glare and make the sign difficult to read.
Light emitting surface	<ul style="list-style-type: none"> Area: $\geq 250\text{cm}^2$ Diameter: $\geq 180\text{mm}$
Angle range	Horizontal: $+ 7.5^\circ$ to $- 7.5^\circ$ Vertical: $+ 5.0^\circ$ to $- 5.0^\circ$
Luminosity intensity for nominal voltage	L_{Rmin} [minimum effective luminous intensity measured on the reference axis: 1500cd L_{Amax} [maximum effective luminous intensity measured at any point within angle range: 5000cd
Colour	<ul style="list-style-type: none"> Primary strip: Red retroreflective minimum Class 400 AS 1906.1 Table 2.3 Alternate strip: White retroreflective minimum Class 400 AS 1906.1 Table 2.3
Other restrictions / considerations	<ul style="list-style-type: none"> The LAS must not show a left and a right arrow at the same time The LAS must not be used to direct traffic into opposing traffic flows The arrow lamps must comply with European Standard EN12352 Traffic control equipment - Warning and safety light devices for Class L8H warning lights



Rear panel of TMA vehicle



SUMMARY	
Road level/categories	Level 2 and Level 3 only
For use with	Must be mounted on a truck mounted attenuator (TMA) vehicle
Status	Accepted
TECHNICAL INFORMATION	
Colour	<ul style="list-style-type: none"> Primary strip: Red retroreflective minimum Class 400 AS 1906.1 Table 2.3 Alternate strip: White retroreflective minimum Class 400 AS 1906.1 Table 2.3
Height	The overall height of the panel must not exceed 4.25m above the road. The lower 500mm of the panel will need to be installed on the rear of the TMA to remain under the maximum height specified in law
LAS	As per LAS specification above
RD6T	<ul style="list-style-type: none"> 1500mm diameter (± 50mm) White on blue retroreflective minimum Class 400 AS 1906.1 Table 2.3
Warning lights	340mm minimum diameter Xenon or LED warning lights are to be installed in the top left and top right corners of the panel
Equipment controls	<ul style="list-style-type: none"> The rear panel must have a device installed to ensure that the arrow board and the RD6L are always aligned A display must be visible to the operator to confirm orientation
Deck mounted up lighting	A white up-light with a minimum output of 50 watt is to be attached to the deck to adequately illuminate the RD6L/R
Flashing beacons	One, preferably two, amber flashing beacons must be visible to the rear of the vehicle until such time as the LAS is fully deployed and the xenon lights are fully operational and at the correct height
Organisation logo's/signage	Must not be installed on the rear panel of the TMA
Other restrictions / considerations	Nil

Advanced Warning Variable Message Sign (AWVMS) – truck or trailer mount



SUMMARY		
Road level/categories	All road levels and categories	
For use with	Mounted to a light vehicle, rigid vehicle or light trailer (NOTE: At all times, the Support Vehicle must be compliant with the Land Transport Rule including Vehicle Standards Compliance)	
Status	Accepted	
TECHNICAL INFORMATION		
Display Compliance	Both display panels and associated hardware used for AWVMS operations must comply with Waka Kotahi specification ITS-02-001-202010-SPEC-VMS-FIXED document Maximum upper VMS panel size: 1000mm wide x 1000mm high (± 50 mm) Maximum lower VMS panel size: 1200mm wide x 1500mm high (± 50 mm)	
Height	The bottom of the message panel must be positioned a minimum of 600mm above the ground surface.	
Tailboard	The tailboard below the bottom text panel must be covered with red and white retro-reflective stripes minimum Class 400 AS 1906.1 Table 2.3 (see the two options below). Option  1: Option 2: 	
AWVMS on light goods vehicle (vehicle dimensions)	Vehicle width (excluding mirrors)	2550mm max
	Gross weight (GVM)	Not exceeding 6000kg
AWVMS on light trailer (vehicle dimensions)	Trailer width	2550mm max
	Total vehicle length	5000mm max
	Gross weight (GVM)	Not exceeding 750kg (as per Class TA in accordance with trailer requirements of Land Transport Rule: Vehicle Dimensions and Mass 2016)
Other restrictions / considerations	<ol style="list-style-type: none"> 1. The AWVMS (truck or trailer mounted) must be capable of being operated from within the cab of its support vehicle or remotely (wireless or wired) in the case of trailer mounted systems to ensure the operator can position themselves safely when changing modes and messages. 2. Only Waka Kotahi approved signs and messages maybe displayed 	

Mobile VMS – trailer mount



SUMMARY

Road level/categories	All road levels and categories
For use with	Mounted to a registered braked trailer fully compliant with requirements of Land Transport Rule: Vehicle Dimensions and Mass 2016). Refer Waka Kotahi Specification ITS-06-04
Status	Accepted

TECHNICAL INFORMATION

Display Compliance	Display panels and associated hardware used for Mobile VMS operations must comply with Waka Kotahi specification ITS-02-001-202010-SPEC-VMS-FIXED document	
Height	When in operation mode, the bottom of the VMS panel must be positioned between 2100mm and 2500mm above the ground surface.	
Transport dimensions (vehicle dimensions)	Width (inclusive of VMS)	2300mm max
	Height (inclusive of VMS)	1.7 x main axle wheel track or 3500mm max
	Total vehicle length	6000mm max
	Gross weight (GVM)	Not exceeding 2400kg (in accordance with trailer requirements of Land Transport Rule: Vehicle Dimensions and Mass 2016)
Other restrictions / considerations	<ol style="list-style-type: none"> 3. The VMS system must be capable of being operated remotely (wireless or wired) to ensure the operator can position themselves safely when changing modes and messages. 4. Only Waka Kotahi approved signs and messages maybe displayed 	

WAKA KOTAH

Temporary hazard covers

Road plates

The following general notes apply to all road plate installations:

- a) Prior to the installation of any road plates, a risk assessment needs to be completed to ensure the suitability of their use. Assessment to cover the following points as a minimum:
 - Can the road plate carry the expected point or UDL loading
 - The depth and width of the trench below the plate
 - Sub-surface construction/materials
 - Surface water issues
 - Potential erosion of materials beneath the plate
 - Proximity to other road plates and hazards
 - Suitability for pedestrians
 - Skid resistance must be considered depending on their application
- b) If road plates are on the carriage way the following additional considerations are needed:
 - The plates to be secured and to be chamfered with asphalt or other suitable material to ensure vehicles can safely mount the road plate and to remove tripping hazards for pedestrians
 - Temporary speed limit should be considered
 - TTM signage to be installed to warn road users of uneven surface caused by the road plate

WORKING DRAFT

Lowpro Safe Cover 12/8



SUMMARY	
Road level/categories	Level LV and Level 1 only – Level 2 only if used on a footpath
Status	Accepted
TECHNICAL INFORMATION	
Dimensions (mm)	1200 (l) x 800(w) x 28(h)
Weight (kg)	17
Weight rating	Distributed weight – 2.0 tonnes Point load – 500kg
Colour	Yellow
Material	Fibreglass with steel frame
Slip resistance	Meets AS3996 for weight rating and slip resistance
Pedestrian usage	Meets 1428:1 Design for Access and Mobility
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ This is a non-electrical conducting product ▪ Must be fixed to pavement using pre-moulded fixing holes, ensuring edges are flush to pavement to prevent trip hazard.

Temporary signs

Sign standards

The below section details the standards required for all signs used for temporary traffic management

General

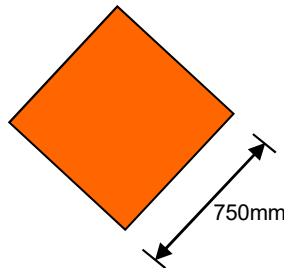
- All signs must comply with the requirements in the Land Transport Rule Traffic Control Devices 2004 Schedule 1 and Australian Standard 1906.1:2017 Retro-reflective materials and devices for road traffic control purposes - Part 1 Retro-reflective sheeting plus Amendment 1:2020 (AS 1906.1:2017) and NZTA M25 Specification for retroreflective sheeting.
- Retro-reflective performance must be a minimum of Class 400
- Sign substrate must be:
 - Aluminium at a minimum of 2.0mm thickness unframed or 1.2mm when fully framed; or
 - A composite material at a minimum of 3.0mm thickness
- All sign faces (temporary and regulatory) must have retro-reflective material backgrounds. Retro-reflective material must only be applied to substrates approved by the manufacturer and application methods must comply with the manufacturer's recommendations.
- Most temporary warning signs must have retro-reflective fluorescent orange backgrounds. For exceptions, refer to the TCD Rule, Schedule 1

Level LV and Level 1 Roads

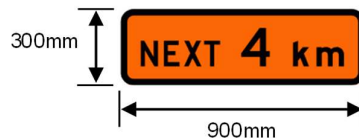
For **warning signs** on low volume and Level 1 roads:

- All signs must comply with the dimensions and facings (retro-reflective, fluorescent orange backgrounds) detailed in the TCD Rule, Schedule 1.
- Typically, Level 1 signs are used on level LV and Level 1 roads.
- The larger Level 2 and 3 signs may be used at the road controlling authority's (RCA) discretion
- The minimum size for a diamond-shaped sign is 750mm x 750mm.

Level 1

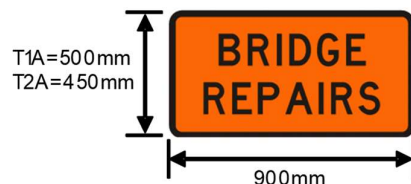


- The minimum size for a supplementary plate with a single line is 900mm x 300mm.



- The minimum size for a supplementary plate with a double line is:

- 900mm x 500mm for any T1A supplementary plate
- 900mm x 450mm for any T2A supplementary plate



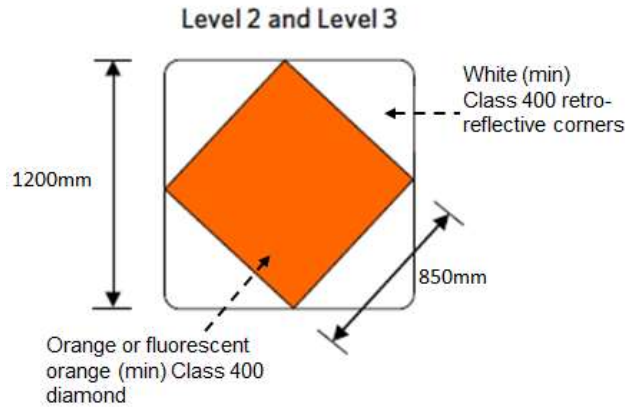
For **regulatory signs** see below:

- The minimum size for a regulatory sign is 750mm diameter. However, 600mm diameter signs may be used for mobile operations.

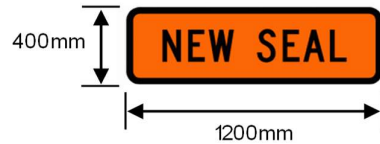
Level 2 and Level 3 Roads

For **warning signs** on Level 2 and Level 3 roads:

- a) All signs must comply with the dimensions and facings (retro-reflective, fluorescent orange backgrounds) detailed in the TCD Rule, Schedule 1
- b) The minimum size for a diamond-shaped sign must be 850mm x 850mm and it must be superimposed on a white 1200mm x 1200mm square-shaped backing board



- c) The minimum size for a level 2 and 3 supplementary or rectangular sign with a single line is 1200mm x 400mm



- d) The minimum size for a level 2 and 3 supplementary or rectangular sign with a double line is 1200mm x 600mm



For **regulatory signs** on Level 2 and Level 3 roads

- a) The minimum size for regulatory signs on **Level 2** roads is as below:
 - 1200mm diameter for regulatory speed (RS1) signs
 - 900mm diameter for all other regulatory signs
 - 750mm diameter for vehicle-mounted signs
- b) The minimum size for regulatory signs on Level 3 roads is as below:
 - 1200mm diameter for all regulatory signs
 - 750mm diameter for vehicle-mounted signs

NOTE: Where shoulders, medians and roadside areas will not accommodate a full-size sign, a 900mm warning or regulatory sign including a speed limit sign may be used with the RCA's permission. These 900mm signs must not be used at other worksites without the approval of the RCA.

Non-Standard, One-Off, or Special Signs

In the event that a non-standard, one-off or special sign is required when planning the temporary traffic management for a specific project or piece of work:

- a) The words and symbols on existing signs are chosen from experience and are designed to maintain consistency.
- b) Only those signs approved in the TCD Rule are to be used
- c) Signs for special purposes can be approved by the RCA. These must comply with the TCD Rule. The signs must comply with the following general temporary warning sign requirements:
 - Signs must be symbolic rather than in words wherever possible
 - Where permanent warning sign legends/symbols are adopted for TTM purposes at worksites, the sign background must be specified as retro-reflective orange or retro-reflective fluorescent orange rather than the retro-reflective yellow
 - Additional direction signs must comply with the usual format used by the RCA. Letter sizes and spacing must match those on permanent sign faces and be related to the vehicle-approach speed at the sign location
- d) If a contractor considers the range of signs inadequate and a sign with a different legend is required, a request must be made to ttm.consult@nzta.govt.nz and the Traffic Control Devices Steering Group who will consider the request and notify the decision

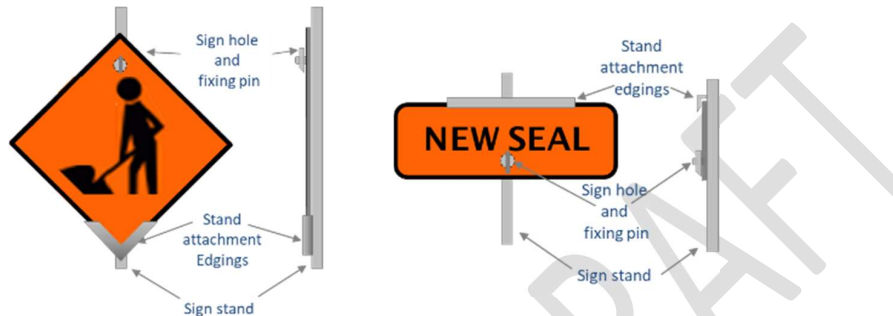
WORKING DRAFT

Sign supports and stands

The below section details the standards required for all sign supports and stands used for temporary traffic management

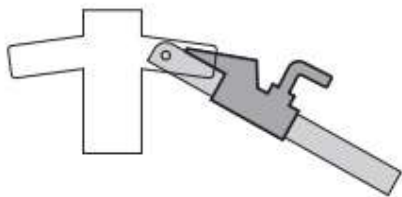
General

- a) Sign stands and/or support systems must be accepted by Waka Kotahi and must be designed to ensure they:
- Will not cause significant damage to a vehicle if struck by one
 - Are stable under all reasonably expected weather conditions and air turbulence from passing traffic, and
 - Will not present a hazard to vehicles, including bicycles, after being knocked or falling over, i.e. the sign's support and stand must lie relatively flat with no part more than 150mm above the ground surface
 - Are designed to hold the displayed sign firmly onto the stand or support in a manner that does not interfere with the sign's message or mask any section of the sign greater than 25mm from the sign's edge.



- b) Sandbagging is an effective method of securing signs. Signs must not be secured by hanging a weight from any part of the sign. Concrete and heavy steel (truck wheel rims, welded water pipe, etc) must not be used as a base for signs.
- c) Where ballast is used on a sign stand or base it must:
- be designed so that it cannot roll
 - be constructed from hessian, rubber or plastic bags containing a soft granular material, and
 - be no higher than 300mm above ground level.
 - Sign bases must:
 - be designed so they cannot roll
 - be able to be placed/disassembled to a height equal to or less than 150mm
 - be designed to break away from the rest of the sign support system on impact.
- d) Subject to risk assessment and application via a TMP and approval by the RCA median barrier brackets may be used to support TTM signs. When a sign on a barrier is removed, the bracket must also be removed.
- e) Sign 'spikes' are not to be used unless specifically accepted by the RCA following a formal risk assessment of the proposed activity/application.

Wedgee



SUMMARY	
Road level/categories	Low Volume and Level 1 only
For use with	Standard, collapsible sign base
Status	Accepted
TECHNICAL INFORMATION	
Other restrictions / considerations	Must comply with the manufacturer's operating instructions

WORKING DRAFT

Traffic calming devices

Temporary speed humps

The following general notes apply to all temporary speed hump devices and installations

- a) The height of temporary speed humps system shall not exceed 40mm (+ 10mm tolerance)
- b) The length of temporary speed hump system shall be 3m or longer
- c) The width of temporary speed hump system shall be less than 500mm
- d) The initial rise step of the temporary speed hump system to be no greater than 25mm, with a top profile curve
- e) The colour of the temporary speed hump system is to be a fluorescent orange or yellow
- f) At night the speed humps must be clearly visible by using either retro-reflective means or illumination. Legal requirement covered by the TCD rule, section 7.9
- g) Each speed hump system to be approved by the RCA
- h) Temporary speed hump must only be used at attended worksites with other positive traffic management measures in place, unless it has been approved by the RCA under an approved site-specific TMP
- i) The speed hump must be positioned a minimum of a sign spacing after a 30km/h TSL, and both the edge line and centreline must be coned from the 30km/hr TSL to the speed hump
- j) Speed humps should not be used within a cycle lane

WORKING DRAFT

RTL Portable Speed Hump



Middle Section



End Caps



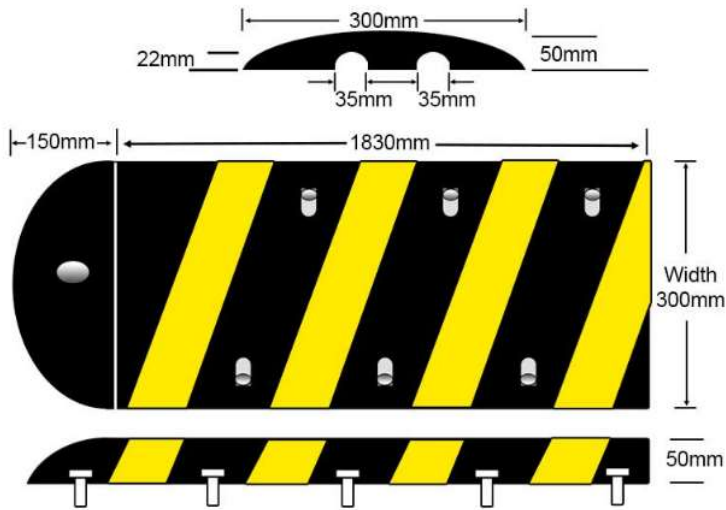
SUMMARY

Road level / category	Level LV, Level 1 and Level 2, or Category A and B
Status	Accepted

TECHNICAL INFORMATION

Dimensions	Middle section: 500mm (L) x 350mm (W) x 50mm (H) End cap: 250mm (L) x 350mm (W) x 50mm (H)
Weight	Middle section: 7.10kg End cap: 3kg
Material	Rubber
Minimum number of units	5 middle sections + 2 end caps
Rating	Maximum 20 tonne truck at 40km/h
Installation	Asphalt surface: four (middle section) or two (end cap) 10mm x 100mm coach screw with washer Concrete surface: four (middle section) or two (end cap) 10mm x 75mm sleeve anchors/dyna-bolts or masonry anchors with washer
Reflectivity	Yes, via internal reflectors facing traffic

Premier Workplace Solutions Speed Hump Cable Protector



SUMMARY

Road level / category	Category A and B
Status	Accepted

TECHNICAL INFORMATION

Dimensions	Middle section: 1830mm (L) x 300mm (W) x 50mm (H) End cap: 150mm (L) x 350mm (W) x 50mm (H)
Weight	Middle section: 22kg
Material	Rubber
Minimum number of units	2 middle sections + 2 end caps
Installation	Asphalt surface: ten (middle section) or one (end cap) asphalt fasteners Concrete surface: ten (middle section) or one (end cap) concrete fasteners
Reflectivity	Yes, integral
Other considerations	Two built-in channels provide cable cover access

Vehicle arrest systems

Vehicle arrest systems

This section details standards required for use of vehicle arrest systems.

TMP Planning:

- a) The vehicle arrest system must be deployed in the “safety zone” with a minimum of 60m separation from “work zone”.
- b) The vehicle arrest system should be deployed as part of the TMP establishment. – e.g. if the vehicle arrest system measures 3m deep, then the longitudinal safety zone would be 63m for each installation.
- c) The vehicle arrest systems are to be deployed behind “Road Closed” signage and additional rows of cones.
- d) Every installation of the vehicle arrest system must cover the entire width of the carriageway. I.e. it must allow for both front wheels of the vehicle to engage with the net at the same time.
- e) The vehicle arrest system must be deployed on straights or curves with a large radius and perpendicular to the direction of the traffic to be arrested and must allow sufficient clear straight carriageway for the vehicle to be brought safely to a halt before the work area.
- f) The temporary warning signs “Road Spikes” must be installed, a notation will be added to the TMP and installed prior to laying the vehicle arrest system.

Installation:

- a) The vehicle arrest system should only be set out once all other aspects of the TMP are correctly set up. I.e. it is important that the site is established under normal TTM conditions and then the vehicle arrest system can be set out inside the work zone.
- b) Required equipment for installing a vehicle arrest system (as per operator guide) must be worn by staff setting out the vehicle arrest system.
- c) For deployment, the user manual should be followed. Special attention should be given to the way the net is unpacked and repacked to avoid damage and to ensure safe operation.
- d) The vehicle arrest system alone is subject to interference from wind, therefore;
 - Cones may be used to hold the vehicle arrest system in place.
 - Ties (provided in the system) may be pinned to the berm, this should be done as indicated in the user manual.
 - Lanyard deployment – for pre-planned arrest positions

NOTE: ARRESTS SHOULD NOT BE ATTEMPTED AGAINST MOTORCYCLES OR ARTICULATED VEHICLES INCLUDING VEHICLES TOWING TRAILERS.

X-net® 3T



SUMMARY

Road level / category	Level 3 or Category C
To be used on	Cars and small sport utility vehicles weighing up to 3 tonnes.
Status	Approved

TECHNICAL INFORMATION

Dimensions (deployed)	6m wide x 3m deep	
Weight	22kgs	
Material	Barbed spikes & plastic sheaths.	
Arrest distances	Vehicle Speed	Typical distance to arrest
	48kmph (30mph)	25 meters
	64kmph (40mph)	36 meters
	80kmph (50mph)	55 meters
Other restrictions / considerations	<ul style="list-style-type: none"> ▪ Effective service life of 4 years from manufacture date ▪ Consult with manufacturer/supplier before attempting use of this system to ensure safe and correct deployment. ▪ Operators must comply with the operator guide as supplied by the manufacturer 	

WORKING