Land Transport Rule

Vehicle Dimensions and Mass 2016

Rule 41001

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Objective of the rule

Land Transport Rule: Vehicle Dimensions and Mass 2016 specifies requirements for dimension and mass limits for vehicles operating on New Zealand roads. It also includes some provisions that relate to the performance and operation of motor vehicles.

This Rule revokes and replaces *Land Transport Rule: Vehicle Dimensions and Mass 2002* (the 2002 Rule).

The Rule is designed to create a reasonable balance between the efficient operation of the heavy motor vehicle fleet, within the constraints imposed by the road network, while ensuring that heavy motor vehicles are operated safely. It does this by creating limits to the permitted dimensions and mass of vehicles, with particular emphasis on large combination vehicles.

This Rule clarifies and rationalises the existing requirements for vehicle dimension and mass limits. It also includes some limited increases in axle and gross mass limits over those stated in the 2002 Rule.

This Rule continues the distinction between general access limits and the requirement to obtain a permit if the vehicle is to be operated at higher mass or is a large overdimension vehicle or load.

This Rule applies to all motor vehicles and, in respect of projecting loads, to cycles.

This Rule cannot legislate for every situation and every driver and operator has a responsibility to exercise good judgement. This is consistent with the general duties stated in section 6, 7, 8 and 9 of the Land Transport Act 1998 (which relate to vehicle safety, driver responsibility, and the need to secure loads).

The issue of a permit under this Rule does not displace those general responsibilities. This Rule also does not displace a restriction imposed by other legislation. For example, general access limits do not allow a heavy vehicle to cross a bridge with a posted limit (authorised by a bylaw) that is lower than the vehicle's actual gross mass.

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Part 1
Rule requirements
Section 1 Application

1.1 Title

This rule is *Land Transport Rule: Vehicle Dimensions and Mass 2016*.

1.2 Commencement and revocation

1.2(1) This rule comes into force on [1 November 2016].

1.2(2) This rule revokes and replaces *Land Transport Rule: Vehicle Dimensions and Mass 2002*.

1.3 Application of the rule

1.3(1) This rule applies to—

(a) all motor vehicles; and

(b) vehicles of Classes AA and AB in *Part 2, Table A*.

1.3(2) Except as otherwise provided in this rule, reference to the dimensions and mass of a vehicle includes reference to its load, load restraints, fittings, attachments, equipment, and accessories.

1.3(3) If there is a conflict between a provision of this rule and the corresponding provision of a document incorporated by reference in the rule, the provision of this rule applies.

1.3(4) If there is a conflict between a provision of this rule and a provision of *Land Transport Rule: Vehicle Standards Compliance 2002*, the provision of *Land Transport Rule: Vehicle Standards Compliance 2002* applies.

1.4 Transitional and savings provisions

1.4(1) A vehicle that was first registered in New Zealand before [date this rule comes into force], and that complies with dimension and mass limits imposed by or under any enactment in force before that date, may continue to operate under the dimension and mass limits imposed by or under that enactment.

1.4(2) A permit issued under *sections 5* or *6* of *Land Transport Rule: Vehicle Dimensions and Mass 2002* that is current immediately before [date this rule comes into force] continues to be valid until it expires unless it is replaced or revoked.

Note: In this rule, dimensions less than one metre are expressed in millimetres (mm). Dimensions of one metre or more are expressed in metres (m).

Section 2 Vehicle requirements

2.1 Operation of a vehicle

2.1(1) A vehicle and its load must comply with the dimension and performance requirements in this rule.

2.1(2) A vehicle must be manoeuvrable, fit safely on a road, and interact safely with road users for the route on which it operates.

2.1(3) The distribution of the gross mass of a motor vehicle over its axles, and the position of the centre of gravity of the vehicle, must ensure that the dynamic handling characteristics of the vehicle remain safe in terms of stability and steering manoeuvres for the design speed of the road.

2.1(4) A vehicle must not be operated on a road if it or its load is likely to damage any wires, cables or construction lawfully on, over or alongside that road, including an overdimension motor vehicle of excess height that complies with the operating requirements in *Schedule 3.3*.

2.2 Dimension requirements

2.2(1) Except as otherwise provided in this section and in *1.4*, a vehicle must comply with the applicable dimension requirements in *Table 1* of *Schedule 1* (*Table 1*), and with other applicable requirements in this section.

2.2(2) An overdimension motor vehicle that does not comply with a dimension requirement in *Table 1*, must comply with the requirements applicable to its overdimension category in *section 5*, and:

(a) if the width limit in *Table 1* is exceeded, the inter-vehicle spacing requirement in *2.4(2)* does not apply;

(b) if the length limit in *Table 1* is exceeded, the rear trailing unit distance requirement in *Table 1* may also be exceeded;

(c) if the width, forward distance or length limit in *Table 1* is exceeded, the outside turning circle for a 360-degree turn requirement in *Table 1* may also be exceeded.

2.2(3) A vehicle does not have to comply with the height and ground clearance requirements in *Table 1* if—

(a) the vehicle is moving at slow speed; and

(b) the vehicle's suspension is temporarily lowered or raised to enable the vehicle to clear an overhead or ground obstruction.

2.2(4) A heavy motor vehicle that does not comply with a dimension requirement in *Table 1* that is listed in *4.7(5)*, may operate on a road—

(a) without a permit, if it is unladen and is not longer than 23 m overall length and is only operated temporarily for the purpose of moving between the manufacturer and the customer or between the manufacturer and a vehicle compliance certifier; or

(b) in accordance with a high-productivity motor vehicle permit issued under *4.7(1)*, if the vehicle complies with a variation to a dimension requirement that is approved under *4.7(2)* and is specified on the permit.

Flags, hazard warning panels and lights for projecting loads

2.2(5) A motor vehicle transporting a projecting load that extends more than 1 m to the rear, or more than 1 m forward from, or more than 200 mm out from the side of, the body of the vehicle—

(a) must, other than during the hours of darkness, indicate the projection by displaying—

(i) a clean white flag, or a red, orange or yellow fluorescent flag, which must be at least 400 mm long and 300 mm wide; or

(ii) a hazard warning panel that—

(A) complies with *5.4(4)*; and

(B) to the extent it extends beyond the body of the vehicle, is frangible; and

(b) during the hours of darkness, may display the flags or hazard warning panels required in *paragraph (a)*; and must be fitted, and operated, with the following lights:

(i) for a load exceeding 1 m in width extending from the rear of the vehicle, one red lamp fitted on each side of the load at the rear of the load;

(ii) for a load that is 1 m in width or less extending from the rear of the vehicle, one red lamp fitted centrally at the rear of the load;

(iii) for a load exceeding 1 m in width extending from the front of the vehicle, one white or amber lamp fitted on each side of the load at the front of the load;

(iv) for a load that is 1 m in width or less extending from the front of the vehicle, one white or amber lamp fitted centrally at the front of the load;

(v) for a load that extends more than 200 mm beyond the side of the body of the vehicle:

(A) one red lamp fitted on each side of the load at the rear; and

(B) one white or amber lamp fitted on each side of the load at the front.

2.2(6) A lamp in *2.2(5)* must be clearly visible in clear weather at a distance of at least 200 m during the hours of darkness.

2.2(7) An overdimension motor vehicle that is required to display a flag or hazard warning panel to indicate a projecting load must instead display hazard warning flags and panels as required by *5.4*.

2.2(8) An overdimension motor vehicle that is required to be fitted with, and operate, lights to indicate a projecting load must instead comply with the lighting requirements in *5.4*.

2.2(9) A motor vehicle or its load must not display a hazard warning flag unless—

(a) the vehicle is an overdimension motor vehicle and is required to display a flag in *Schedule 3.1*; or

(b) the vehicle is transporting a load that extends beyond the body of the vehicle.

2.2(10) A motor vehicle may not display a hazard warning panel unless:

(a) the vehicle or its load is overdimension and is required to display the panel under *Schedule 3.1*; or

(b) the vehicle has a load that extends beyond the body of the vehicle.

Exceptions to width limits

2.2(11) The following items are not included in determining whether a vehicle complies with the width requirements in *Table 1*:

(a) side marker lamps and direction indicators;

(b) collapsible mirrors that extend not more than—

(i) 240 mm beyond the side of the vehicle or its trailer; and

(ii) 1.49 m when measured from the vehicle's longitudinal centre-line;

(c) central tyre inflation system hoses that extend not more than 75 mm beyond the outside of the tyre on the drive axles of a heavy motor vehicle;

(d) hubodometers that extend not more than 25 mm beyond the 2.55-m width limit from a non-lifting, non-steering axle whose outer casings are of a light colour, provided the hubodometer is fitted on the axle that causes the least overwidth;

(e) cab exterior grabrails that extend not more than 50 mm from either side of the vehicle;

(f) the bulge towards the bottom of a tyre;

(g) trolley bus poles and their safety cables, when extended to collect electric power from overhead conducting wires, provided there is a 2.5 m ground clearance outside the body of the bus;

(h) a camera mounted on the left side exterior of a passenger service vehicle that extends not more than 70 mm from the side wall of the vehicle;

(i) close monitoring systems that extend not more than 50 mm from either side of the vehicle;

(j) aerodynamic tabs that extend not more than 25 mm from either side of the vehicle.

2.2(12) A motor vehicle may exceed the width limit in *Table 1* to transport—

(a) hay bales or wool bales if the load does not exceed a width of 2.7 m; or

(b) concrete pipes with a minimum nominal bore of 300 mm that are loaded transversely on the deck if the load—

(i) does not exceed a width of 2.7 m; and

(ii) does not project more than 1.35 m beyond either side of the longitudinal centre-line of the vehicle.

Exceptions to length limits

2.2(13) A bicycle rack fitted to the front of a bus of Class MD3, MD4, or ME is not included in determining the overall length or forward distance of the

bus, provided that the vehicle complies with the applicable swept path performance measures in *Schedule 6*.

2.2(14) A ferry securing point that extends not more than 50 mm beyond the body of the vehicle at the front or at the rear of the vehicle is not included in determining the overall length of the vehicle.

2.2(15) A collapsible mirror is not included in determining the overall length or forward distance of a vehicle.

Exceptions and limits relating to height

2.2(16) The load height of a towing vehicle and of a trailer with an open deck may be restricted if necessary to ensure that the vehicle complies with the SRT requirements in 2.5.

2.2(17) Trolley bus poles, when extended to collect electric power from an overhead conducting wire, are not included in determining whether a vehicle complies with the height requirements in *Table 1*.

2.2(18) Ground clearance for a heavy motor vehicle does not include flexible mudflaps, wheels, tyres or devices designed to discharge static electricity.

2.3 Vehicle configuration requirements

General vehicle requirements

2.3(1) An articulated bus must be able to complete a 360-degree turn in either direction without any part of the vehicle, except for collapsible mirrors, encroaching within a concentric internal radius of 5.3 m.

2.3(2) In carrying out a 360-degree turn at the 25-m diameter, as specified in *Table 1*, no part of a vehicle in a combination, other than its articulation mechanism, may come into contact with the other vehicle in the combination.

2.3(3) A towing vehicle and full trailer combination that complies with all of the dimension requirements in *Table 1* must be fitted with an adjustable or removable rear underrun protection device if—

(a) the overall length of the combination is more than 21 m; and

(b) the height of any substantive overhang above the ground is greater than 0.55 m.

2.3(4) A rear underrun protection device fitted to a vehicle in *2.3(3)* must be certified by a vehicle inspector or inspecting organisation as meeting the technical requirements of *UN/ECE Regulation 58: Uniform provisions concerning the approval of: I. Rear underrun protective devices (*RUPDs*), II. Vehicles with regard to the installation of an* RUPD *of an approved type, III. Vehicles with regard to their rear underrun protection (*RUP*).*

Drawbars and drawbeams

2.3(5) Clauses *2.3(6)* to *2.3(9)* apply to a drawbar or a drawbeam between a towing vehicle and a full trailer.

2.3(6) A drawbar must have only one operating position and must not be extendable, except as described in *2.3(7)* or *2.3(8)*.

2.3(7) A drawbar may be retractable if—

(a) it is used only to facilitate the through loading or unloading of livestock or goods; and

(b) the drawbar has only one set of holes for locking pins; and

(c) the holes are positioned so that the drawbar is fully extended when locked.

2.3(8) A drawbar on a trailer that is used to transport logs may have up to three fixed positions and one sliding position if the drawbar has—

(a) one sliding position for long logs; and

(b) one or two fixed positions for short logs; and

(c) a fixed position for storage of the drawbar when it is out of use while the trailer is being transported on a rigid vehicle or another trailer.

2.3(9) A drawbeam must not be sliding or adjustable.

Axle requirements for heavy motor vehicles

2.3(10) A heavy rigid motor vehicle must be supported by:

(a) one axle set towards the front of the vehicle, which must be either a single axle set or a twin-steer axle set; and

(b) one axle set towards the rear of the vehicle, which must be a single axle set, a tandem axle set or a tri-axle set.

2.3(11) A heavy motor vehicle must not have any rear steering axles except—

(a) a forklift, the rear unit of an articulated bus, or a mobile crane may have one or more rear steering axles;

(b) a rigid vehicle without a heavy tow coupling or a semi-trailer (other than a semi-trailer in an A-train combination or a B- train combination unless specified in a high-productivity motor vehicle permit) may have one steering axle in the rear axle set.

(c) a semi-trailer with a quad axle set must have one steering axle that complies with *2.3(18)*.

2.3(12) A mobile crane must have at least one rear axle locked so that it is non-steering when the mobile crane is being operated on a road.

2.3(13) A rigid motor vehicle or semi-trailer, fitted with rear steering axles, must comply, in all configurations, with the rear overhang requirements and forward distance requirements in Table 1.

2.3(14) The axle sets, except a twin-steer axle set, of a heavy motor vehicle must be load sharing.

2.3(15) If a tandem axle set has a single large-tyred axle with a load-share ratio of 60%:40% or 55%:45%, the manufacturer of the vehicle must securely affix to the vehicle an indelible plate, so that it is clearly visible to the person who is weighing the vehicle, that specifies the—

(a) load-share ratio of the axle set; and

(b) tyre size on each axle; and

(c) maximum individual axle ratings.

Trailer requirements

2.3(16) An A-train must have—

(a) two motor-driven axles in either a tandem axle set or a tri-axle set; or

(b) three motor-driven axles in a tri-axle set.

2.3(17) A semi-trailer must be supported by one axle set only, which must be set towards the rear of the vehicle and must be:

(a) a single axle set; or

(b) a tandem axle set; or

(c) a tri-axle set; or

(d) a quad-axle set (except if the semi-trailer is in an A-train combination or a B-train combination unless specified in a high-productivity motor vehicle permit).

2.3(18) A semi-trailer with a quad-axle set must have a single rear steering axle that—

(a) is the rearmost axle; and

(b) is capable of turning in both directions through an angle of at least 15 degrees.

2.3(19) A semi-trailer with a quad-axle set containing a steering axle must be certified for compliance with *2.3(18)* by a vehicle inspector or inspecting organisation.

2.3(20) The axle set towards the front of a full trailer must—

(a) connect all wheels for that part of the trailer to the drawbar steering system; and

(b) be either a single axle set or a tandem axle set.

2.3(21) The axle set towards the rear of a full trailer must be—

(a) a single axle set; or

(b) a tandem axle set; or

(c) a tri-axle set on a trailer in which the front axle set is a tandem axle set.

2.3(22) A simple trailer must be supported by one of the following:

(a) a single axle set;

(b) a tandem axle set;

(c) a tri-axle set.

2.3(23) A pole trailer with one axle set may only carry poles or long loads that are not part of the trailer, and must be supported by a single axle set, a tandem axle set or a tri-axle set.

2.3(24) A pole trailer with two axle sets must have—

(a) an axle set towards the front of the trailer that—

(i) connects all wheels for that part of the trailer to the drawbar steering system; and

(ii) is either a single axle set or a tandem axle set; and

(b) an axle set towards the rear of the trailer that is—

(i) a single axle set; or

(ii) a tandem axle set; or

(iii) a tri-axle set on a trailer in which the front axle set is a tandem axle set.

Retractable axles

2.3(25) A heavy motor vehicle, other than an A-train or a B-train, may have a retractable axle if—

(a) the retractable axle is in a rear axle set; and

(b) the retractable axle has an automated control that ensures the remaining axle or axles and axle set or axle sets in contact with the ground remain within the mass limits in *Schedule 1* and within all manufacturer's component ratings for all retracted axle configurations; and

(c) the forward distance requirements and rear overhang requirements in *Table 1* are complied with, whether the axle is in contact with the road or is in a retracted position; and

(d) the retractable axle is certified for compliance with this clause by a vehicle inspector or inspecting organisation; and

(e) the vehicle meets all applicable requirements in the *Road User Charges Act 2012*.

Specialist overdimension vehicle

2.3(26) A specialist overdimension motor vehicle, or a motor vehicle designed principally to transport an overdimension load or an overweight load or both must have axle sets that are load sharing, except a twin-steer axle set.

2.3(27) Except as specified in *2.3(26)*, a specialist overdimension motor vehicle, or a motor vehicle designed principally to transport an overdimension load or an overweight load or both does not have to comply with other axle requirements in *2.3(10)* to *2.3(25)*.

2.4 Towing requirements

2.4(1) A trailer must be of one of the following types:

(a) a simple trailer;

(b) a semi-trailer;

(c) a full trailer;

(d) a pole trailer.

Tow spacing

2.4(2) The inter-vehicle spacing between a towing vehicle and a full trailer, when in a straight line, must not be less than the greater of 1 m or half the width of the foremost point of the trailer (including its load but excluding the drawbar and front dolly assembly).

2.4(3) A light motor vehicle must not tow more than one trailer except if—

(a) the motor vehicle is a tractor; and

(b) only two light trailers are towed; and

(c) the tractor manufacturer's ratings are not exceeded.

2.4(4) A heavy motor vehicle must not tow more than one trailer, except if that vehicle is—

(a) an A-train; or

(b) a B-train; or

(c) a rigid vehicle towing a converter dolly coupled to a semi-trailer; or

(d) a rigid vehicle towing two trailers whose total gross mass is less than 20,000 kg, provided the rearmost trailer is a light trailer; or

(e) a vehicle operating under *section 4* or *section 5*; or

(f) a heavy vehicle recovery service vehicle towing a disabled heavy vehicle and any attached trailers in accordance with *2.4(12)*.

2.4(5) A light motor vehicle must not tow a heavy trailer if the gross mass of the trailer exceeds—

(a) 1.5 times the gross mass of the towing vehicle; or

(b) the maximum towed mass specified by the manufacturer.

2.4(6) A light passenger service vehicle must not tow a trailer that has a gross vehicle mass of 2000 kg or more.

2.4(7) A heavy passenger service vehicle must not tow a trailer that has a gross vehicle mass exceeding 3500 kg.

2.4(8) An articulated bus must not tow a trailer.

2.4(9) A heavy rigid vehicle must not tow more than one heavy rigid vehicle that is without power.

2.4(10) A heavy rigid vehicle must not tow both a trailer and a rigid vehicle without power unless—

(a) the combination consists of a rigid vehicle towing a semi-trailer that is towing a rigid vehicle without power; or

(b) the total gross mass of the combination is less than 20,000 kg, and the rearmost vehicle is a light trailer or other light motor vehicle; or

(c) the towing vehicle is a heavy vehicle recovery service vehicle towing a disabled heavy vehicle and any attached trailers in accordance with *2.4(12)*.

2.4(11) A heavy rigid vehicle must not tow two rigid vehicles without power unless—

(a) the total gross mass of the combination is less than 20,000 kg; and

(b) the rearmost vehicle is a light motor vehicle; and

(c) at least one towing connection between consecutive vehicles consists of a rigid bar or A-frame.

2.4(12) A heavy vehicle recovery service vehicle may tow a heavy motor vehicle that has become disabled while on a roadway, and any attached trailers, to the nearest safe area, taking account of traffic volume, vehicle load, and the ability to undertake repair safely at the roadside, off the roadway (that is accessible without contravening any posted bridge weight limit) and does not have to—

(a) comply with the dimension requirements in *Table 1*;

(b) comply with the mass ratio of towed and towing vehicles in *3.1(11)* and *3.1(12)*;

(c) obtain an overdimension permit.

2.5 Stability performance requirements: Static Roll Threshold

Note: Static Roll Threshold (SRT) performance requirements for heavy motor vehicles are intended to ensure the stability of heavy motor vehicles when negotiating corners within posted advisory speeds and when undertaking evasive manoeuvres to avoid a collision.

Compliance with minimum SRT

2.5(1) A vehicle of Class NC or Class TD, whether laden or unladen, must comply with an SRT of at least 0.35 g unless the vehicle is—

(a) a vehicle of Class NC that does not have a deck or body on which to carry a load and is fitted with a turntable coupling to tow a semi-trailer;

(b) a vehicle operating under *section 5*, or with a vehicle axle index above 1.1 and operating under an overweight permit, or both, and the operator of the vehicle complies with the conditions of the permit and the applicable requirements in *section 5*;

(c) a vehicle that is being used on a road or portion of a road that is designated as a road construction zone under *regulation 12 of the Heavy Motor Vehicle Regulations 1974*;

(d) a vehicle that is being used on a road or portion of a road that is a road construction zone approved by the road controlling authority;

(e) a vehicle that is not normally used on a road and that a road controlling authority has authorised to cross a road;

(f) a vehicle that is designed exclusively for transporting earth or other bulk material and that may only be used unladen on a road;

(g) a vehicle with a tipping body, but only when the tipping body is raised for the purpose of discharging a load at a speed not exceeding 10 km/h;

(h) a vehicle recovery service vehicle that is principally designed to tow or transport a heavy motor vehicle;

(i) a vehicle first registered in New Zealand before 1 January 1940.

2.5(2) For the avoidance of doubt, a high-productivity motor vehicle must comply with the minimum SRT requirements except, if the vehicle is a vehicle with a tipping body, when the tipping body is raised for the purpose of discharging a load at a speed not exceeding 10 km/h.

Methods for determining SRT

2.5(3) SRT must be determined by one of the following methods:

(a) a physical test of the vehicle on a tilt table according to the procedure in the *SAE J2180-DEC 1998 of The American Society of Automotive Engineers* and carried out using a procedure approved by International Accreditation New Zealand; or

(b) a calculation using any "SRT Calculator" approved by the Agency and published on the Agency's website; or

(c) a calculation using the method in *Schedule 6.1*; or

(d) any other methodology approved by the Agency and published on its website.

Determining the appropriate loading of a vehicle for different load types

2.5(4) The following methodology must be applied to determine the appropriate vehicle loading:

(a) for mixed freight loads and uniform density loads:

(i) if the vehicle is loaded to the maximum internal body height or to the maximum height specified in *Table 1*, the maximum allowable gross mass must be determined;

(ii) if the vehicle is loaded to the maximum allowable gross mass specified in *section 3*, the maximum allowable load height must be determined;

(b) for all other loads, for a particular height above ground level of the centre of gravity of the load, the maximum allowable gross mass of the vehicle and its load must be determined.

2.5(5) The combination of load height and load mass in *2.5(4)* applies for a particular standard type of loading that must be appropriate for the particular type of deck or body with which a heavy motor vehicle is fitted, and must be one of the following types of load:

(a) mixed freight, where 70% of the load mass is in the bottom half of the load space and 30% of the load mass is in the top half of the load space;

(b) uniform density, where the load is uniformly distributed between the load bed and the top of the load so that the centre of gravity of the load lies midway between the load bed and the load height;

(c) other loads where the height above ground of the centre of gravity of the load is entered in the calculation.

2.5(6) If the deck or body fitted on a heavy motor vehicle is changed to allow a different type of load to be carried, the SRT must be determined, and the vehicle recertified, for the new loading.

2.5(7) A motor vehicle with a retractable axle or axles must be assessed under a methodology in *2.5(3)* with its axles in a non-retracted position.

2.5(8) The maximum allowable load height for logs must be determined by—

(a) measuring the height above ground of the highest point of the load; and

(b) if the height in *paragraph (a)* does not comply with the minimum SRT, then measuring the height above ground of the highest point at each end of the highest packet and calculating an average of the two measurements; and

(c) if the height in *paragraph (a) or (b)* does not comply with the minimum SRT, and the load comprises multiple packets and the highest points of all of the packets differ in height by no more than 1 m, measuring the average height of each packet by the

method described in *paragraph (b)* and calculating an average height of all packets.

Certifying results of SRT test

2.5(9) SRT test results must be—

(a) verified for compliance with loading and mass specifications by a vehicle inspector, or an inspecting organisation; and

(b) specified in a document of compliance that complies with a form approved by the Agency.

2.5(10) SRT test results must be displayed on a vehicle's certificate of loading—

(a) in this format: "SRT 0.35 g X1/Y1, Y2/X2"; and

(b) with the options for load height and gross mass specified as—

(i) maximum allowable load height above ground in metres to two decimal places (X1);

(ii) maximum safe gross mass to nearest tonne to meet SRT of 0.35 g (Y1);

(iii) maximum allowable gross mass to nearest tonne (Y2);

(iv) maximum safe load height above ground in metres to two decimal places to meet SRT of 0.35 g (X2).

Note: X1/Y1 represents the maximum allowable load height (X1) of the vehicle that is used to calculate the maximum safe gross mass (Y1) of the vehicle to meet an SRT of 0.35 g. Y2/X2 represents the maximum allowable gross mass (Y2) of the vehicle when loaded that is used to calculate the maximum safe load height (X2) of the vehicle to meet an SRT of 0.35 g. The procedure is fully explained in 2.5(4).

Section 3 Mass limits

3.1 Gross mass limits

Calculating allowable gross mass

3.1(1) A heavy motor vehicle must not exceed the gross mass limit in—

(a) for a vehicle operating under general access limits, *Schedule 1, Tables 3A* or *3B*; or

(b) for a vehicle operating under a permit issued under *section 4*, the gross mass limit stated on that permit.

3.1(2) The gross mass of a heavy motor vehicle must not exceed the lowest total derived from the following gross mass limits:

(a) a design limit for the vehicle overall set by a manufacturer or modifier (which may include, but is not limited to, the gross vehicle mass for that vehicle);

(b) a design limit set by a manufacturer or modifier for a vehicle component (which may include, but is not limited to, axle limits or towing connections);

(c) a limitation placed by a road controlling authority under any enactment on any route or structure;

(d) a limit imposed by this rule in respect of the configuration of the vehicle (set out in *3.1(4)* to *3.1(10))*.

Steering mass ratio

3.1(3) The mass on the front axle set or twin-steer axle set of a heavy rigid vehicle must, at all times, be at least 20% of the sum of the axle mass of the heavy rigid motor vehicle.

Limits set by vehicle configuration

3.1(4) The combined gross mass of an A-train must not exceed 39,000 kg.

3.1(5) The combined gross mass of a towing vehicle and a pole trailer, a towing vehicle and a semi-trailer, or a B-train must not exceed 39,000 kg, except if the towing vehicle has—

(a) two motor-driven axles in a tandem axle set or tri-axle set; or

(b) three motor-driven axles in a tri-axle set.

3.1(6) The combined gross mass of a towing vehicle and a full trailer must not exceed 39,000 kg, except if the towing vehicle has:

(a) a twin-steer axle set, or a wheelbase of at least 4.3 m; and

(b) two motor-driven axles in a tandem axle set or tri-axle set, or three motor-driven axles in a tri-axle set.

3.1(7) The combined gross mass of a towing vehicle and a full trailer must not exceed 42,000 kg, except if:

(a) the towing vehicle has a twin-steer axle set or a tri-axle set; or

(b) the trailer is a four-axle trailer with two tandem axle sets; or

(c) the trailer is a five-axle trailer.

3.1(8) The combined gross mass of a towing vehicle and a simple trailer must not exceed—

(a) 36,000 kg; or

(b) 40,000 kg if—

(i) the towing connection is a roll-coupled hitch; and

(ii) a high-productivity motor vehicle permit has been issued for the vehicle to vary from a dimension requirement in *Schedule 1, Table 1* listed in *4.7(5)*.

3.1(9) A heavy motor vehicle operating under general access limits that does not have at least 7 axles and a distance from the centre of the first axle to the centre of the last axle of 16.8 m or more must not exceed the gross axle mass limits in *Schedule 2, Table 3A*.

3.1(10) A heavy motor vehicle operating under general access limits stated in *Schedule 1*, *Table 3B* that has at least 7 axles and a distance from the centre of the first axle to the centre of the last axle of 16.8 m or more—

(a) must not exceed the gross mass limits in *Schedule 1, Table 3B*; and

(b) before 1 November 2017 must not exceed the gross mass limits in *Schedule 2, Table 3A* unless it is travelling on a route that has been identified as suitable for operation by a high-productivity motor vehicle by the Agency.

Mass ratio of towed and towing vehicles for heavy combination vehicles

3.1(11) For an A-train, a B-train or a rigid vehicle towing two vehicles, the gross mass of the rearmost vehicle must not exceed 1.5 times the gross mass of the towing vehicle and the first towed vehicle, that is:

$$\frac{\text{Gross mass of the rearmost trailer}}{\text{Gross mass of towing vehicle + first towed vehicle}} = 1.5 \text{ or less}$$

3.1(12) For all other heavy combination vehicles, except those operating under an overweight permit with a Vehicle Axle Index (VAI) exceeding 1.1, or those restricted to an operating speed of 40 km/h or less, the gross mass of the towed vehicle must not exceed 1.5 times the gross mass of the towing vehicle, that is:

$$\frac{\text{Gross mass of towed vehicle}}{\text{Gross mass of towing vehicle}} = 1.5 \text{ or less}$$

Mass and weight

3.1(13) For the avoidance of doubt, the mass limits for axles, axle sets and gross mass in this rule import the equivalent weight limits.

3.2 Axle mass limits

A heavy motor vehicle must not exceed the lowest of the mass limits applicable to axles and axle sets derived from the following mass limits :

(a) for a vehicle operating under general access limits, *Schedule 1, Table 2*;

(b) for a vehicle operating under a permit issued under *section 4*, the mass limits specified in the permit, or if not specified in the permit, in *Schedule 1, Table 4*;

(c) a design limit set by a manufacturer or modifier for that axle;

(d) a design or load limit determined for the tyres on that axle, either by a manufacturer or by the provisions of *Land Transport Rule: Tyres and Wheels 2001*;

(e) an axle mass limitation placed by a road controlling authority under any enactment on any route or structure.

Note: Requirements for vehicle mass are divided into general access (where the vehicle can operate without a permit, subject to any specific route or bridge restrictions) and heavier mass allowances which are only available where a permit to exceed general access limits has been issued to the vehicle operator.
Section 3 and *Tables 2* (axle mass) and *3A or 3B* (gross mass) describe limits for vehicles operating under general access.
Section 4 and *Tables 4* (axles) and *5* (gross mass) describe limits for vehicles operating under a permit.
Gross mass limits are designed to manage the impact of heavy vehicles on bridges and other road infrastructure.
Axle limits are designed to manage the impact of heavy vehicles on pavements.
This section deals with axles fitted with standard tyres. Axles fitted with specialist wide profile tyres must also meet these limits but may apply for a permit to exceed the *Table 2* limits on the basis of their vehicle axle index.

Section 4 Permits for overweight vehicles and divisible loads

4.1 Motor vehicle requires permit to exceed mass limits

4.1(1) A motor vehicle must not exceed the mass limits in *section 3* unless it is operating under a permit in one of the following categories:

(a) overweight vehicles transporting indivisible loads;

(b) high-productivity motor vehicles;

(c) specialist vehicles carrying divisible loads.

4.1(2) The fee for the issue of a permit under this section is—

(a) prescribed under *regulation 7(1A) of the Heavy Motor Vehicle Regulations 1974*; and

(b) specified in *Schedule 4A* of those regulations.

4.2 Road controlling authorities may issue permits

Criteria for issuing permits

4.2(1) A road controlling authority must before issuing a permit under this section consider—

(a) the safety and suitability of the vehicle; and

(b) the safety of road users; and

(c) the durability of roads and bridges on which the vehicle may operate.

4.2(2) A road controlling authority may, in considering whether a permit should be issued, have regard to the traffic offending history of the person who has applied for the permit including, but not limited to, breaches of the conditions of any permit issued under a land transport rule.

4.2(3) A road controlling authority must not issue a permit under this section for a vehicle to exceed vehicle design mass limits, including those specified in *3.1(2)(a) and (b)*.

4.2(4) A permit issued under this section may specify additional conditions under which the vehicle may be operated that the road controlling authority considers necessary to ensure the safety of road users, the protection of infrastructure, or to provide for compliance with the permit (including tracking systems that allow the vehicle to be checked for route and mass limit compliance).

Roads under the control of other road controlling authorities

4.2(5) Before a road controlling authority (the issuing authority) issues a permit that allows a vehicle to exceed a gross mass of 44,000 kg for a route that includes a road under the control of a second road controlling authority, the issuing authority must obtain the written approval of the second road controlling authority, given in accordance with *4.2(6)*.

4.2(6) If an approval is required by *4.2(5)*, a second road controlling authority may approve the issue of a permit by an issuing authority for travel on roads under the second road controlling authority's control if that road authority has considered, for those roads—

(a) the durability of roads and bridges on which the permitted vehicles may operate and

(b) the suitability of those roads for use by overweight or high-productivity motor vehicles.

Form of a permit

4.2(7) A permit issued under this section must:

(a) include the information specified as mandatory in *Schedule 2*; and

(b) include any additional conditions imposed by the Agency or the road controlling authority under *4.2(4)*, or *4.6(4)*; and

(c) be signed by a duly authorised officer of the road controlling authority.

4.2(8) A permit may include other information as specified in *Schedule 2*.

4.3 Validity of a permit

4.3(1) A permit issued under this section is invalid if it is altered without the authority of the road controlling authority which issued the permit.

4.3(2) A permit only applies to the vehicles identified either individually or by type, in the permit.

4.3(3) A permit may only be used by the person identified as the operator in the permit.

4.4 A permit may be revoked

4.4(1) A road controlling authority may revoke a permit issued by it under this section if it considers that:

(a) any of the conditions of the permit have not been complied with; or

(b) in its opinion, the continued operation of the vehicle to which that permit relates may cause extraordinary damage to the road.

4.4(2) Without limiting (or being limited by) the power to revoke a permit in *4.4(1)*, the Agency may revoke a permit issued under this section if the Agency considers there is a significant risk to public safety.

4.4(3) Revocation of a permit must be advised as soon as is practicable to the operator of the vehicle by the road controlling authority or the Agency as applicable, providing reasons for the revocation.

4.5 Operating under a permit

4.5(1) A vehicle operating under a permit issued under this section must comply with the following critical conditions:

(a) the gross mass of the vehicle must not exceed the maximum gross mass specified in the permit; and

(b) the gross mass of the vehicle must not exceed the gross vehicle mass, gross combination mass, maximum towed mass or brake code mass if any of these limits apply to the vehicle; and

(c) the vehicle must comply with all bridge restrictions specified in the permit.

Note: If a critical condition of a permit is breached, the applicable penalties are both the penalty for breach of this clause and the penalty for overloading specified in the *Land Transport (Offences and Penalties) Regulations 1999*.

4.5(2) A permit issued under this section must:

(a) be produced for inspection on demand to an enforcement officer, or an authorised agent of the Agency or a road controlling authority; and

(b) be carried in the vehicle for the period of travel covered by the permit.

4.6 Permits for overweight vehicles transporting indivisible loads

4.6(1) A road controlling authority may issue a permit under this clause for a heavy motor vehicle that:

(a) exceeds the mass limits prescribed in *Schedule 1, Table 2* or *Table 3*; and

(b) either—

(i) transports an indivisible load; or

(ii) is an indivisible vehicle designed for a specialised purpose that does not include the carriage of goods (such as a mobile machine or agricultural trailer); and

(c) is not a high-productivity motor vehicle.

4.6(2) Indivisible loads, for the purposes of *4.6(1)*, may be transported on a combination vehicle and include, but are not limited to:

(a) transformer oil;

(b) platform trailers;

(c) construction equipment;

(d) load dividers;

(e) ballast;

(f) towing of disabled vehicles;

(g) fire-fighting vehicles carrying water;

(h) slurry sealing;

(i) converter dolly;

(j) ancillary items associated with the indivisible load or vehicle.

4.6(3) A road controlling authority may, before issuing a permit under this clause, consider the vehicle axle index for the purpose of establishing the effect of the vehicle mass on roads and bridges.

4.6(4) A permit issued under this clause may specify the following additional conditions:

(a) the number of trips the vehicle is allowed to make;

(b) restrictions on the vehicle's speed;

(c) restrictions relating to weather conditions;

(d) the type and amount of the load transported;

(e) the times of the day during which the vehicle may be operated;

(f) requirements for an engineering assessment of bridges on the route;

(g) any other conditions under which the vehicle may be operated.

4.6(5) A vehicle operating under a permit issued under this clause must comply with the following conditions:

(a) any individual axle mass, any axle set mass and the mass on any two or more axles must not exceed the limits that are specified in the permit or, if not specified, that are prescribed in *Schedule 1, Table 2*; and

(b) any additional condition in *4.6(4)* that is specified in the permit form.

4.7 Permits for high-productivity motor vehicles

4.7(1) A road controlling authority may issue a permit under this clause for a high-productivity motor vehicle that carries a divisible load to—

(a) operate with a gross mass exceeding 44,000 kg; or

(b) operate with an approved variation from a dimension requirement in *Table 1*; or

(c) both exceed a gross mass of 44,000 kg and operate with an approved variation from a dimension requirement in *Table 1*.

4.7(2) Before an application for a high-productivity motor vehicle permit to operate with a variation from a dimension requirement in *Table 1* is made, that variation must be approved by the Agency.

4.7(3) A high-productivity motor vehicle permit may specify axle, axle set or gross mass limits that—

(a) exceed the mass limits prescribed in *Schedule 1, Table 2* and *Table 3*; and

(b) do not exceed the mass limits prescribed in *Schedule 1, Table 4* and *Table 5*.

4.7(4) The axle and axle set requirements for the issue of a high-productivity motor vehicle permit to exceed a gross mass limit of 44,000 kg are:

(a) the towing vehicle must have two motor-driven axles in a tandem axle or tri-axle set, or three motor-driven axles in a tri-axle set; and

(b) a semi-trailer that is not in a B-train must have a tri-axle or quad-axle set with no more than one steering axle; and

(c) a semi-trailer in a B-train must have a tandem axle set or a tri-axle set or a quad-axle set; and

(d) a full trailer must have either:

(i) two tandem axle sets; or

(ii) one tandem axle set and one tri-axle set.

4.7(5) The Agency, or an organisation or a person appointed by the Agency, may approve, for use as a high-productivity motor vehicle, a variation from any of the following dimension requirements in *Schedule 1, Table 1*:

(a) overall length;

(b) forward distance;

(c) rear overhang;

(d) front overhang;

(e) rear trailing unit distance;

(f) articulated vehicle point of attachment;

(g) tow coupling position;

(h) coupling point distance;

(i) inter-vehicle spacing;

(j) outside turning circle in either direction for 360-degree turn.

4.7(6) In approving a variation under *4.7(5)*, the Agency or organisation or person appointed by the Agency must be satisfied that the vehicle has the equivalent safety performance as a standard motor vehicle for the proposed roads to be used under the permit, and may impose any conditions it considers necessary to ensure this.

4.7(7) The effect of an approval under *4.7(5)* is that the vehicle is deemed to comply with the dimension requirements of this rule when operated within any conditions contained in the approval (such as restrictions on combinations with other heavy vehicles).

4.7(8) A vehicle operating as a high-productivity motor vehicle must comply with the following conditions:

(a) an individual axle mass, an axle set mass, and the maximum sum of mass on any two or more axles must not exceed the limits that are specified in the permit or, if not specified in the permit, the applicable mass limit in *Schedule 1, Table 2* or *Table 3*; and

(b) the dimension requirements in *Table 1*, unless a variation from *Table 1* has been approved by the Agency and is specified in the permit; and

(c) the axle and axle set requirements in *4.7(4)*; and

(d) it must operate as a high-productivity motor vehicle only on the roads specified in the permit and when doing so must display a high-productivity motor vehicle sign that complies with *4.7(10)*.

(e) additional conditions that are specified in the permit in accordance with *4.2(4)*.

4.7(9) For the avoidance of doubt, the operator of a high-productivity motor vehicle issued with a permit under this clause does not have to comply with the requirements in *section 5*.

High-productivity motor vehicle sign

4.7(10) A high-productivity motor vehicle sign that is displayed on a high-productivity motor vehicle must—

(a) display the letter "H"; and

(b) comply with the dimensions specified in *Figure 5* in *Schedule 4*; and

(c) be mounted at the front and rear of the high-productivity motor vehicle, so that the sign can be seen clearly by drivers approaching from the front and rear; and

(d) consist of retroreflective material with black lettering on a yellow-green background with a black border; and

(e) comply with *AS/NZS 1906.1.2007, Retroreflective materials and devices for road traffic control purposes, Part1: Retroreflective materials*.

4.7(11) A motor vehicle must not display a high-productivity motor vehicle sign unless it has a permit for a high-productivity motor vehicle.

4.8 Permits for specialist vehicles

4.8(1) A road controlling authority may issue a permit for a specialist vehicle that is identified in *4.8(2)*.

4.8(2) A permit for a specialist vehicle must only be issued for one of the following types of vehicle:

(a) passenger service vehicle;

(b) concrete mixer;

(c) ground-spreader truck;

(d) rubbish truck.

4.8(3) A permit may be issued under this clause for a specialist vehicle to operate on the routes specified in the permit with axle set mass limits of not more than the mass limits prescribed in *Schedule 1, Table 4.6*.

4.8(4) A specialist vehicle operating under a permit must comply with the following conditions:

(a) a condition imposed by the road controlling authority under *4.2(4)*; and

(b) the vehicle must not exceed the axle set mass limits in *Schedule 1, Table 4.6*; and

(c) for axle mass limits other than those specified in *Schedule 1, Table 4.6*, the vehicle must not exceed the axle and axle set limits in *Schedule 1, Table 2* and *Table 3*.

Note: heavy motor vehicles that operate at axle masses higher than those stated in *Table 2* (General Access), or gross mass limits that exceed the limits stated in *Table 3* (General Access), or that exceed the length limits in *Table 1* and transport a divisible load require a permit issued under this section to exceed those limits.
The NZ Transport Agency ("the Agency") is a road controlling authority, acting in its statutory role as manager of the national highways network.

Section 5 Overdimension motor vehicles and overdimension loads

5.1 Scope and responsibilities

Scope

5.1(1) This section applies to:

(a) a standard motor vehicle that is transporting an overdimension load; and

(b) a specialist overdimension motor vehicle; and

(c) a motor vehicle designed primarily to transport overdimension loads.

5.1(2) In this section, Category 1, Category 2, Category 3, and Category 4 are categories into which an overdimension vehicle is classified according to its width, forward distance, length, front overhang, and rear overhang dimensions as specified in *Schedule 3.1*.

5.1(3) This section does not apply to—

(a) a high-productivity motor vehicle;

(b) a motor vehicle that is being operated on a road or a portion of a road that is designated as a road construction zone under *regulation 12 of the Heavy Motor Vehicle Regulations 1974*, or that is a road works zone operated under a traffic management plan approved by a road controlling authority.

Responsibilities

5.1(4) A vehicle in *5.1(1)* must comply with the requirements in this section when operating on a road.

5.1(5) A person in control of an overdimension vehicle or load that requires a permit under this section is responsible for ensuring that:

(a) the vehicle to transport the load is suitable, and complies with the requirements of this rule; and

(b) the route has been assessed, and is suitable for the load; and

(c) where route restrictions require, mitigation measures are in place (beyond the provisions of the rule) to manage the load; and

(d) the persons who will act as lead pilot, other pilots and the driver of the load are appropriately qualified and experienced.

Note: Overdimension vehicles have various constraints placed on them, which are determined by their category (determined by width and other dimension characteristics), the routes they use, and the time of day they travel. Generally, the larger the vehicle the more constraints imposed. Larger vehicles (in higher numbered categories) require permits from the Agency before they travel. 'Overdimension load' and 'overdimension motor vehicle' are defined terms.

5.2 Overdimension permits

Requirement for permits

5.2(1) Before travelling on a road , the operator of a motor vehicle described in *5.2(2)* must:

(a) apply for, and be issued with, a permit by the Agency; and

(b) pay a fee specified in *Schedule 1A* of the *Traffic Regulations 1976*; and

(c) if the vehicle or load exceeds 5 m in width, notify the Agency at least 30 minutes before the journey is to begin.

5.2(2) The requirement to obtain an overdimension permit under *5.2(1)* applies to the following motor vehicles:

(a) a motor vehicle with width and forward distance combination fitting within Category 3 or Category 4;

(b) a motor vehicle with a height exceeding 5 m;

(c) a motor vehicle with a front overhang or rear overhang exceeding 7 m;

(d) a motor vehicle with an overall length exceeding 25 m;

(e) a motor vehicle that—

(i) exceeds any of the dimension limits specified in Category 4; or

(ii) has a width that exceeds 11 m; or

(iii) uses the entire available road width.

(f) a motor vehicle in any of Categories 1, 2, 3 or 4 that, is unable, for a particular reason, to comply with the operational requirements that apply to its category.

5.2(3) Despite *5.2(1)*, an overdimension motor vehicle does not have to be operated under a permit if the operator can provide evidence that the vehicle was required by—

(a) a road controlling authority to repair, or restore access to, a road, railway, or bridge; or

(b) a territorial authority, or a public utility provider, to restore a public utility service; or

(c) the New Zealand Police to attend an incident or accident; or

(d) a territorial or local authority to stabilise land or otherwise reduce an imminent risk to persons or property; or

(e) the Controller, or any member of the New Zealand Police, or any person acting under their authority, to carry out emergency response work during a state of emergency declared under the *Civil Defence Emergency Management Act 2002*.

5.2(4) Despite *5.2(1)*, an enforcement officer may:

(a) approve the immediate use of an overdimension motor vehicle on a road in an emergency or unforeseen circumstance; and

(b) impose any safety conditions considered necessary to ensure that the overdimension vehicle is operated safely.

Application

5.2(5) An application for an overdimension permit under *5.2(1)* must include—

(a) a description of the vehicle and its load (if applicable); and

(b) the proposed route (if applicable); and

(c) any other information required by the Agency.

5.2(6) An application for a permit for a vehicle in Category 4 must also include a statement that the route has been assessed, and the load can be safely managed—

(a) by meeting the piloting requirements set out in this rule; or

(b) with necessary risk management measures, that are additional to the requirements of the rule, for defined sections of the route.

5.2(7) An application for a permit for a load that exceeds 11 m in width must in addition to the requirements in *5.2(6)* include an engineering assessment of—

(a) the route; and

(b) the suitability of the vehicle; and

(c) the adequacy of load stability and security.

Issue of permit

5.2(8) Before issuing a permit, the Agency must consider:

(a) the safety and suitability of the vehicle;

(b) the safety of other road users.

5.2(9) The Agency may, in considering an application for a permit, have regard to—

(a) the suitability of the route;

(b) potential congestion affecting other traffic;

(c) the adequacy of the risk management measures identified by the applicant;

(d) the traffic offending history of the person who has applied for the permit including, but not limited to, breaches of the conditions of any permit issued under a land transport rule.

5.2(10) The Agency must not issue an overdimension permit if—

(a) a road controlling authority notifies the Agency that it objects to the permit being issued; or

(b) the overdimension load could otherwise be transported within the dimension limits in *Schedule 1, Table 1*; or

(c) the vehicle or load would exceed vehicle design mass limits.

Permit form and validity

5.2(11) A permit issued under this section must include:

(a) a description of the vehicle and any load;

(b) identification of the person in control of the vehicle or load;

(c) the conditions prescribed in this rule under which the permit is invalid;

(d) the critical conditions prescribed in *5.2(15)*.

5.2(12) A permit issued under this section may specify the following additional conditions:

(a) the number of trips the vehicle is allowed to make;

(b) restrictions on the vehicle's speed;

(c) restrictions relating to weather conditions;

(d) the type and amount of the load transported;

(e) the times of the day and the dates of permitted travel;

(f) the route to be followed;

(g) pilots and pilot vehicles additional to those required by the rule;

(h) any additional conditions, under which the vehicle may be operated, that the Agency considers necessary.

5.2(13) If a permit authorises the movement of two or more overdimension vehicles in convoy, the permit must specify piloting requirements.

5.2(14) A permit is invalid if:

(a) it is altered without the authority of the Agency or the road controlling authority which issued the permit; or

(b) the load or vehicle are not those described on the permit; or

(c) the load is not being managed by the operator named on the permit.

5.2(15) A vehicle operating under a permit issued under this section must comply with the following critical conditions:

(a) the vehicle or its load must not exceed the dimension limits stated in the permit;

(b) the person responsible for the vehicle must provide pilots and pilot vehicles as specified on the permit, or if not specified on the permit, as required by this rule.

Revocation

5.2(16) The Agency may revoke a permit if the Agency considers there is a significant risk to public safety.

5.2(17) The revocation of a permit must be made in writing and provided to the operator as soon as is practicable, giving reasons for the revocation.

5.2(18) A revocation of a permit takes effect immediately after it is provided to the operator.

Additional requirements

5.2(19) If aware of the presence on the road of another overdimension vehicle that may create a hazardous situation, or if advised by New Zealand Police or the Agency or any other road controlling authority of this, the operator of each overdimension vehicle must manage the operation of their vehicle's movement in relation to that other vehicle.

5.2(20) A permit or other authorisation issued under this section must—

(a) be produced for inspection on demand to an operator of a pilot vehicle or an enforcement officer; and

(b) be carried in the vehicle for the period of travel covered by the permit.

5.3 Requirements for all overdimension motor vehicles

General operating requirements for overdimension motor vehicles

5.3(1) An overdimension motor vehicle must:

(a) when available, use a route designated by a road controlling authority as suitable for overdimension motor vehicles; and

(b) comply with the route restrictions in *Schedule 5.3*.

5.3(2) An overdimension motor vehicle must comply with the requirements relevant to its category specified in *Schedule 3.1* for hazard warning equipment, travel times and piloting requirements, unless *5.3(10)*, *5.3(11)* or *5.3(12)* applies.

5.3(3) A motor vehicle that exceeds 4.3 m in height must comply with the requirements relevant to its height in *Schedule 3.3*.

5.3(4) An overdimension motor vehicle must not interfere with or damage a traffic control device, bridge, tunnel or other structure, or trees or other foliage unless—

(a) the operator has obtained the road controlling authority's or owner's permission; and

(b) evidence of that permission is carried in the vehicle; and

(c) that evidence is produced for inspection on demand to an operator of a pilot vehicle or an enforcement officer.

5.3(5) A traffic control device may be removed temporarily to allow safe passage of an overdimension motor vehicle if—

(a) the operator of the vehicle obtains permission from the road controlling authority or owner; and

(b) the traffic control device is immediately re-erected in its original position after the vehicle has passed that position on the road.

5.3(6) An overdimension motor vehicle must not travel on a road if fog, heavy rain, hail or any other factor restricts ambient visibility to less than 500 m. If, after the vehicle has begun its journey, ambient visibility is reduced to less than 500 m, the vehicle must, at the earliest opportunity, be stopped clear of moving traffic until ambient visibility is at least 500 m.

5.3(7) An overdimension motor vehicle must be operated with due consideration for other road users and, where it is safe to do so, other road users must be allowed to pass the vehicle at the earliest opportunity.

5.3(8) The operator of an overdimension motor vehicle must notify the emergency services who are operating in the area where the vehicle or its load is likely to restrict a route in a way that would significantly delay the emergency services.

5.3(9) If an enforcement officer, the Agency or a road controlling authority believes on reasonable grounds that an overdimension motor vehicle does not comply with a condition imposed under this section or that a prohibition is necessary in the interests of safety or traffic management, that person may—

(a) prohibit the use of a road by that vehicle at any time; or

(b) impose special conditions for that vehicle to be operated on a road, so as to minimise adverse safety effects on other road users.

5.3(10) A Category 1 or Category 2 overdimension motor vehicle does not have to comply with the travel time requirements specified in *5.5(3)*, *5.5(5)* or *5.5(6)* provided that the vehicle or any load or equipment it carries does not project outside the lane in which it is travelling; and

(a) the vehicle's:

(i) performance dimensions have been verified by a person or an organisation appointed by the Agency as meeting those of a maximum-sized standard motor vehicle, as specified in *Schedule 6*; and

(ii) load or equipment carried by or attached to the vehicle, or the vehicle itself, does not exceed the maximum dimensions specified by the appointed person or organisation; or

(b) the vehicle is an agricultural motor vehicle or

(c) the vehicle is a specialist ground spreader, operated without a trailer or towing a trailer that does not exceed 2.55 m in width.

5.3(11) A Category 2 overdimension motor vehicle whose performance dimensions have been verified by a person or organisation appointed by the Agency as meeting the requirements of a Category 1 overdimension motor vehicle, as specified in *Schedule 6*, may be operated in accordance with the operating requirements for a Category 1 overdimension motor vehicle, provided any load or equipment carried by or attached to the vehicle does not exceed the maximum dimensions specified by the approved person or organisation.

Standard motor vehicles transporting overdimension loads

5.3(12) A standard motor vehicle may transport an overdimension load that exceeds the dimension limits specified in *Table 1*, provided that the load—

(a) is indivisible; and

(b) is loaded in a way that minimises its width, unless the height or instability of the load, or both, make it necessary to transport the load widthways.

5.3(13) A standard motor vehicle may transport an overdimension load as well as a divisible load, provided that the divisible load does not exceed—

(a) a width of 2.55 m;

(b) a height of 4.3 m;

(c) the appropriate requirements for length or rear overhang in *section 2*.

5.3(14) A standard motor vehicle may transport more than one overdimension load, if the loads—

(a) loaded side-by-side, do not exceed a width of 2.55 m;

(b) loaded one above the other, do not exceed a height of 4.3 m;

(c) loaded one behind the other, do not exceed the appropriate requirements for length or rear overhang in *section 2*.

5.3(15) Despite *5.3(13)*, a standard motor vehicle may transport the disassembled parts of a crane boom if—

(a) the load is stacked to a height of not more than 4.5 m; and

(b) the load does not exceed 3.1 m in width; and

(c) the vehicle complies with the requirements in this section for a category 1 overdimension vehicle.

5.3(16) The following combination motor vehicles must not exceed the rear overhang or overall length limits in *Table 1* when transporting an overdimension load:

(a) a rigid vehicle towing a simple trailer;

(b) a rigid vehicle towing a full trailer;

(c) an A-train;

(d) a B-train.

Specialist overdimension motor vehicles

5.3(17) A motor vehicle that is designed for a primary purpose of carrying out a specialist function that requires overdimension equipment (not to transport overdimension or overweight loads) is a specialist overdimension motor vehicle and may exceed the dimension limits in *Schedule 1, Table 1*, if:

(a) dismantling of the vehicle's equipment would make the equipment unusable for its intended purpose; or

(b) it would take more than four hours to dismantle the vehicle's equipment; or

(c) the vehicle is an agricultural motor vehicle and the operator ensures that the vehicle complies with the general safety requirements in *clause 2.2* of *Land Transport Rule: External Projections 2001*.

5.3(18) A specialist overdimension motor vehicle of a type specified in *5.3(18)* that is transporting a divisible load may not exceed the dimension limits in *Schedule 1, Table 1*, if those limits can be complied with by reducing the vehicle's divisible load.

Motor vehicles designed primarily to transport overdimensions and overweight loads

5.3(19) A motor vehicle designed primarily to transport an overdimension or overweight load, or both, may transport a load that exceeds the dimension limits in *Schedule 1, Table 1*, provided that the load:

(a) is indivisible; and

(b) is loaded in a way that minimises its width, unless the load's height or instability, or both, makes it necessary to transport the load widthways.

5.3(20) A motor vehicle in *5.3(20)* may transport more than one overdimension load, provided that the loads:

(a) if loaded side-by-side, do not exceed a width of 2.55 m;

(b) if loaded one above the other, do not exceed a height of 4.3 m;

(c) if loaded one behind the other, do not exceed the appropriate requirements for length, front overhang or rear overhang in Table 1, unless they comply with *5.3(22)*.

5.3(21) If two or more overdimension loads have the same departure and destination points, and one of the loads exceeds 5 m in width, the loads may be carried one behind the other on a semi-trailer, provided that:

(a) the forward distance of the semi-trailer does not exceed 20 m; and

(b) the overall length does not exceed 35 m; and

(c) the rear overhang does not exceed 7 m.

5.3(22) A motor vehicle in *5.3(20)* must be reduced to the smallest dimension practicable, if it is not transporting an overdimension load.

5.3(23) A motor vehicle in *5.3(20)* must not transport a divisible load, unless:

(a) one direction of the vehicle's journey requires an overdimension vehicle to transport an indivisible overdimension object; or

(b) the weight or instability of the divisible load requires the use of an overdimension motor vehicle.

5.3(24) A motor vehicle to which *5.3(24)* applies may transport divisible loads provided that the loads, if loaded:

(a) side-by-side, do not exceed the width of the vehicle reduced to its smallest position;

(b) one above the other, do not exceed a height of 4.3 m;

(c) one behind the other, do not exceed the length of the vehicle reduced to its smallest position.

5.3(25) Two or more motor vehicles designed primarily to transport an overdimension or overweight load or both that meet the criteria in 5.3(20) that have the same point of departure and the same point of destination may travel together, provided that:

(a) traffic volumes do not exceed 50 vehicles an hour; and

(b) the vehicles are escorted by at least one Class 1 pilot vehicle and three Class 2 pilot vehicles.

Dimension requirements for overdimension motor vehicles

5.3(26) The operator of an overdimension motor vehicle that has an overall length exceeding 25 m must not travel over a level crossing unless the operator—

(a) has obtained written permission from the access provider; and

(b) carries evidence of that permission in the vehicle; and

(c) produces that evidence for inspection on demand to an operator of a pilot vehicle or an enforcement officer.

5.3(27) An overdimension motor vehicle transporting a load that exceeds 30 m in length must use a rear steering facility.

5.3(28) If an overdimension motor vehicle is operated with a manned steering jinker or a pole trailer, the rear overhang is measured between the centre of the rear turntable load support and the rearmost part of the load.

5.3(29) If the vehicle combination includes a load-sharing trailer, the load-sharing trailer does not have to be included in forward distance

calculations if the forward distance is 3.5 m or less. If the forward distance exceeds 3.5 m, this distance must be added to the forward distance of the main trailer, less 3.5 m.

5.3(30) If the vehicle combination includes a manned steering jinker, the forward distance used for determining operating requirements in *Schedule 3.1* is half the distance between the two turntables supporting the load.

5.4 Hazard warning equipment for overdimension vehicles

Hazard warning flags

5.4(1) Unless *5.4(3)* applies, a hazard warning flag displayed on an overdimension motor vehicle as required in *Schedule 3.1*—

(a) must be attached to the vehicle or its load:

(i) on each side of an overwidth load or vehicle at its front and rear;

(ii) at the front of a load or vehicle with excess front overhang;

(iii) at the rear of a load or vehicle with excess rear overhang;

(iv) at the rear of a load or vehicle with excess length; and

(b) must be fluorescent yellow and at least 400 mm long and at least 300 mm wide.

5.4(2) An overdimension motor vehicle in Category 1 that is required to display a hazard warning flag during daylight hours must display instead warning panels as specified in *5.4(4)*, if it is travelling during the hours of darkness.

5.4(3) Instead of displaying a hazard warning flag at the front of the vehicle, the boom head of a mobile crane may be painted to delineate its excess front overhang, provided that the colour of the paint on the front face of the boom head and each side of the boom head is either white, yellow, or red or a combination of these colours so that the area on each side of the boom head that is painted covers an area of not less than 0.12 square metres.

Hazard warning panels

5.4(4) Unless *5.4(9)*, *5.4(10)*, or *5.4(11)* applies, a hazard warning panel required in *Schedule 3.1* to be displayed on an overdimension motor vehicle must:

(a) be attached:

(i) on each side of an overwidth load or vehicle at its front and rear, as close as practicable to the outside edge in the position specified in *Figure 2 in Schedule 4*;

(ii) at the front of a load or vehicle with excess front overhang;

(iii) at the rear of a load or vehicle with excess rear overhang;

(iv) at the rear of a load or vehicle for excess length; and

(b) comply with *AS/NZS 1906.1:2007, Retroreflective materials and devices for road traffic control purposes, Part 1: Retroreflective materials*; and

(c) consist of retroreflective material with a 200-mm-wide diagonal stripe pattern with alternate yellow-green, and orange retroreflective sheeting as specified in *Figure 1* in *Schedule 4*; and

(d) comply with the dimensions in *Figure 1* or *Figure 1A* in *Schedule 4*; and

(e) be frangible for those portions which extend beyond the vehicle's limits.

5.4(5) Unless *5.4(6)(b)* applies, an overdimension motor vehicle that is required in *Schedule 3.1* to display hazard warning panels must display panels that comply with the minimum dimensions specified in:

(a) *Figure 1 in Schedule 4*; or

(b) *Figure 1A in Schedule 4* if:

(i) the design of the vehicle, or the configuration of the load, or the dimensions of the hazard panel make fitting the panels in *Figure 1* impractical; or

(ii) more effective warning would be achieved by using a hazard panel with the minimum dimensions specified in *Figure 1A*.

5.4(6) A motor vehicle that is required in *Schedule 3.1* to display hazard warning panels must either—

(a) display the hazard warning panels specified in *5.4(4)*; or

(b) display alternative hazard warning panels that comply with the design, and conditions for use, of an alternative hazard warning panel that has been approved by the Agency and published on its website.

5.4(7) The Agency may approve an alternative hazard warning panel that varies from the panels specified in *5.4(4)*, for use on a vehicle if:

(a) the alternative panel is at least 1200 square mm in size; and

(b) the alternative panel will provide as effective or better warning to approaching vehicles as the panels specified in *5.4(4)*.

5.4(8) If the Agency approves an alternative hazard warning panel, the Agency must publish on its website:

(a) the alternative hazard panel design; and

(b) the vehicles on which the alternative hazard warning panel may be used; and

(c) the circumstances or conditions under which the alternative hazard panel may be used.

5.4(9) Instead of displaying a hazard warning panel at the front of the vehicle, the boom head of a mobile crane may be painted to delineate its excess front overhang, provided that:

(a) the colour of the paint on the front face of the boom head and each side of the boom head is either white, yellow or red or a combination of these colours; and

(b) the area on each side of the boom head that is painted covers an area of not less than 0.12 square metres.

5.4(10) Instead of displaying a hazard warning panel at the front of the vehicle, parts of an agricultural motor vehicle, including attachments or implements, that extend beyond the maximum front overhang of the vehicle may be painted with high visibility paint.

5.4(11) Instead of displaying a hazard warning panel an agricultural tractor with a width exceeding 2.55 m but less than 3.1 m may instead be fitted with and use an amber beacon when operated on a road.

"OVERSIZE" signs

5.4(12) An overdimension motor vehicle exceeding 3.1 m in width that is escorted by a pilot vehicle must display an "OVERSIZE" sign that complies with *5.4(13)*.

5.4(13) An "OVERSIZE" sign that is displayed on an overdimension motor vehicle as required in *Schedule 3.1* must:

(a) comply with the dimensions specified in *Figure 3* in *Schedule 4*; and

(b) be mounted at the front and at the rear of the overdimension motor vehicle, so that the sign can be seen clearly by approaching drivers; and

(c) if split into two parts, comply with the following:

(i) the word "OVER" and the word "SIZE" are on separate parts; and

(ii) both parts of the sign must be mounted at the same height; and

(iii) the combined length of the parts must be at least 1.1 m; and

(d) be frangible for those portions which extend beyond the vehicle's limits; and

(e) during daylight hours, have matt black lettering on a yellow-green background with a matt black border; and

(f) during the hours of darkness:

(i) consist of retroreflective material with black lettering on a yellow-green background; and

(ii) comply with *AS/NZS 1906.1:2007, Retroflective materials and devices for road traffic control purposes, Part 1: Retroreflective material*.

5.4(14) A motor vehicle must not display an "OVERSIZE" sign unless the vehicle is overdimension and is required by *Schedule 3.1* to display the sign.

Lighting requirements for overdimension motor vehicles

5.4(15) The headlights of an overdimension motor vehicle must be operated on low beam during daylight hours.

5.4(16) During the hours of darkness, the lamps in *5.4(17)* must be fitted to, and operated on, an overdimension motor vehicle, unless *5.4(21)* applies, and must be clearly visible in clear weather at a distance of at least 200 m during the hours of darkness.

5.4(17) The lamps to which *5.4(16)* refers are:

(a) steady white or amber lamps at the front, and steady red or amber lamps at the rear, of the vehicle's load that:

(i) have an area of at least 50 cm^2;

(ii) are spaced approximately 1 m apart at the extremities of the load that exceed the width of the vehicle, and at the extremities of the bottom of the load; and

(b) amber side marker lamps towards the front of the vehicle, spaced approximately 3 m apart; and

(c) red or amber side marker lamps towards the rear of the vehicle, spaced approximately 3 m apart.

5.4(18) An amber beacon must be fitted to an overdimension motor vehicle unless *5.4(21)* applies, so that it is visible to approaching traffic and must operate:

(a) during the hours of darkness, if the vehicle (including any load) is 3.7 m in width or less;

(b) at all times, if the vehicle (including any load) exceeds 3.7 m in width;

(c) at all times, if the vehicle is being escorted by a pilot vehicle.

5.4(19) During the hours of darkness, two or more white scene lamps, each with a minimum power output of 100 W, must be fitted to, and operate on, an overdimension motor vehicle whose load exceeds 5 m in width.

5.4(20) The scene lamps in *5.4(19)* must illuminate the front of the load, but must not be visible to following traffic.

5.4(21) Despite *5.4(16)* and *5.4(18)*, the lamps and beacons referred to in those subclauses may, but are not required to, be fitted to and operated on a standard motor vehicle that is transporting an overdimension load that does not exceed the overall length limits in *Schedule 1, Table 1* and does not exceed 2.7 m in width

5.5 Travel restrictions for overdimension vehicles

5.5(1) For the purposes of this clause and for *Schedule 5*, "city area" means the urban areas of Auckland (between Albany and Drury), Christchurch, Dunedin, Hamilton, Hastings, Invercargill, Napier, Nelson, New Plymouth, Palmerston North, Tauranga, Wanganui, Wellington (including all areas south of McKay's Crossing on State Highway 1 and Te Marua on State Highway 2), and Whangarei.

Level 1 restricted travel times

5.5(2) Except as provided in *5.5(11)* and subject to *5.5(9)*, *5.5(10),* and *5.5(11)*, a motor vehicle whose dimensions are within Category 1 must comply with the travel restrictions in *5.5(3)*.

5.5(3) A motor vehicle in *5.5(2)* must not travel:

(a) between:

(i) 0700 hours and 0900 hours, or 1600 hours and 1800 hours, on Monday to Friday inclusive, in any city area;

(ii) 1000 hours and 1300 hours, or 1600 hours and 1900 hours, on Saturday or Sunday;

(b) at times (other than those specified in *5.5(3)(a)*), when there are unusually heavy traffic volumes.

Level 2 restricted travel times

5.5(4) Except as provided in *5.5(11)* or *5.5(12)* and subject to *5.5(9)*, *5.5(10),* and *5.5(11)*, a motor vehicle whose dimensions are within Category 2 must comply with the travel restrictions in *5.5(5)* and *5.5(6)*.

5.5(5) A motor vehicle in *5.4(4)* must not travel:

(a) between 23 December and 3 January inclusive;

(b) on a national public holiday, or after 1600 hours on the day preceding a national public holiday;

(c) on a Saturday if that day is 25 April;

(d) in a province on its provincial anniversary holiday, or after 1600 hours on the day preceding that anniversary holiday.

5.5(6) A motor vehicle in *5.5(4)* must not travel:

(a) between:

(i) 0700 hours and 0900 hours, or 1600 hours and 1800 hours, on Monday to Friday inclusive, in any city area;

(ii) 1000 hours and 1300 hours, or 1600 hours and 1900 hours, on Saturday or Sunday;

(b) at times (other than those specified in *5.5(5)* and *5.5(6)(a)*) when there are unusually heavy traffic volumes, or when travel is likely to cause significant delay to other road users.

Level 3 restricted travel times

5.5(7) Subject to *5.5(9)*, *5.5(10)* and *5.5(11)*, a motor vehicle whose dimensions are within Category 3 or Category 4:

(a) must comply with the travel restrictions in *5.5(8)*; and

(b) may not travel at the times specified in *Schedule 5.1* within the areas specified in *Schedule 5.2*.

5.5(8) A motor vehicle in *5.5(7)* must not travel:

(a) between 22 December and 5 January inclusive;

(b) on a national public holiday, or for the rest of the day after the commencement of the earliest applicable morning travel restriction time specified in *Schedule 5* on the day preceding a national public holiday;

(c) in a province on its provincial anniversary holiday, or for the rest of the day after the commencement of the earliest applicable morning travel restriction time specified in *Schedule 5* on the day preceding that anniversary holiday;

(d) on a Saturday if that day is 25 April;

(e) at times (other than those specified in *5.5(7)* and *5.5(8)(a)* to *(d)*) when there are unusually heavy traffic volumes, or when travel is likely to cause significant delay to other road users.

5.5(9) If there is an unforeseen delay in a journey for an overdimension vehicle to which travel restrictions in *5.5(8)* apply, and there is no place to safely

park, the vehicle may continue its journey provided that the New Zealand Police are notified and agree to the extended travel time.

5.5(10) An extended travel time in *5.5(9)* must not exceed 30 minutes, unless an extended travel time greater than 30 minutes is necessary for the vehicle to reach a destination where it can safely park, and the New Zealand Police agree to this.

5.5(11) Travel time restrictions in this clause do not apply to a motor vehicle that is being used in an emergency if the operator of the vehicle can provide evidence that the vehicle was required by:

(a) a road controlling authority to repair, or restore access to, a road, railway or bridge; or

(b) a territorial authority, or a public utility provider, to restore a public utility service; or

(c) the New Zealand Police to attend an incident or accident; or

(d) a territorial or local authority to stabilise land or otherwise reduce an imminent risk to persons or property; or

(e) the Controller, or any member of the New Zealand Police, or any person acting under their authority, to carry out emergency response work during a state of emergency declared under the *Civil Defence Emergency Management Act 2002*.

5.6 Piloting requirements

Note: Class 2 pilot qualification is the entry level requirement; Class 1 is the advanced requirement.

Responsibilities

5.6(1) The operator of an overdimension motor vehicle must ensure that:

(a) there is an adequate number of pilot vehicles to accompany the vehicle so as to provide adequate warning to approaching traffic throughout the journey; and

(b) persons accompanying the load, either as pilots or drivers, are able to meet the responsibilities in *5.6(3)*; and

(c) if more than one pilot is required by the provisions of this rule, or as a condition on a permit issued under this section, a lead pilot is designated.

5.6(2) A lead pilot is responsible for ensuring that:

(a) other pilots (if present) and the load driver are appropriately briefed; and

(b) the load is secured and complies with the requirements of the rule.

5.6(3) Pilots are responsible for—

(a) ensuring the safety of other road users; and

(b) ensuring the safety of the load; and

(c) managing interactions with roadside signs or other infrastructure.

5.6(4) If an approaching vehicle or pedestrian is likely to encroach into the path of an overdimension motor vehicle, the operator of a pilot vehicle must take all practicable steps, including the use of a sound warning device if

available, to ensure that the driver of the approaching vehicle or the pedestrian is warned of the likely hazard so that the person has sufficient time to comply with the operator's instruction.

Requirement to provide pilot vehicles

5.6(5) An overdimension motor vehicle must be escorted by at least one Class 2 pilot vehicle, if:

(a) the overdimension vehicle or its load encroaches over the centre-line of the road on which it is travelling by 500 mm or more; or

(b) the overdimension vehicle or its load encroaches over half the available road space where a centre-line is not marked; or

(c) the overdimension vehicle or its load does not allow sufficient remaining road space for another standard motor vehicle travelling in the opposite direction to pass without a significant reduction in speed; or

(d) the overdimension vehicle travels on a road where, without a pilot vehicle, there would be inadequate warning to approaching road users of the overdimension hazard.

5.6(6) Despite *5.6(5)*, an overdimension motor vehicle that is travelling less than 500 m during daylight hours does not need to be accompanied by a pilot vehicle if the vehicle can travel safely without impeding other traffic.

5.6(7) An overdimension motor vehicle or overdimension load whose dimensions are within Category 1, and whose width exceeds 3.1 m, must be escorted by at least one Class 2 pilot vehicle, if operated:

(a) at a speed exceeding 40 km/h during daylight hours; or

(b) at any speed during the hours of darkness.

5.6(8) A motor vehicle whose dimensions are within Category 1 and whose width does not exceed 3.1 m does not have to be escorted by a Class 2 pilot vehicle, provided that the vehicle's compliance with the swept path performance measures in *Schedule 6* has been verified by a vehicle inspector or inspecting organisation.

5.6(9) An overdimension load or overdimension motor vehicle whose dimensions are within Category 2 must be escorted by at least one Class 1 pilot vehicle and one Class 2 pilot vehicle, if it is travelling on a road during the hours of darkness.

5.6(10) An overdimension motor vehicle whose dimensions are within Category 2 that has been certified as complying with the swept path performance measure in *Schedule 6.3* must be escorted by at least one Class 2 pilot vehicle.

5.6(11) An overdimension load or overdimension motor vehicle that is travelling in the lane for opposing traffic on a median-divided road or at a controlled intersection must be escorted by at least one Class 1 pilot vehicle and must have road controlling authority permission .

5.6(12) For the purposes of complying with *5.6(1)*, an adequate number of pilot vehicles for each vehicle in a convoy of up to three agricultural motor vehicles that are travelling in company and all have dimensions within Category 1 or Category 2, is one pilot vehicle at the front of the convoy and one pilot vehicle at the rear of the convoy.

Requirements for operators of pilot vehicles

5.6(13) The operator of a pilot vehicle must either be an enforcement officer or have completed a Class 1 or Class 2 pilot driver's course approved by the Agency.

5.6(14) A pilot vehicle must display adequate warning and information, consistent with the requirements of this Rule, concerning the overdimension hazard to approaching drivers.

5.7 Pilot vehicles

Pilot vehicles—General

5.7(1) A pilot vehicle must have sufficient manoeuvrability and dynamic performance to enable it to carry out its primary duty of providing adequate warning to road users.

5.7(2) A pilot vehicle must be clearly identifiable as a vehicle that is providing a warning of the overdimension motor vehicle that it is escorting.

5.7(3) A pilot vehicle may not carry an overdimension load or tow a trailer with an overdimension load.

5.7(4) All pilot vehicles and overdimension motor vehicles in a convoy must be in radio communication with each other.

5.7(5) A Class 1 pilot vehicle must be substantially white in colour.

Front pilot vehicles

5.7(6) A Class 1 pilot vehicle must be a motor vehicle with a gross vehicle mass not exceeding 3500 kg.

5.7(7) A Class 2 pilot vehicle at the front of an overdimension motor vehicle must be a motor vehicle with a gross vehicle mass not exceeding 7000 kg.

5.7(8) A pilot vehicle at the front of an overdimension motor vehicle may not tow another vehicle.

5.7(9) A pilot vehicle at the front of an overdimension motor vehicle must display above its roof a warning sign as specified in *Schedule 4*, or a variable message sign that has been approved by the Agency, describing the load behind it.

Rear pilot vehicles

5.7(10) Except as provided in *5.7(11)*, a pilot vehicle at the rear of an overdimension motor vehicle must be a rigid motor vehicle with not more than three axles.

5.7(11) A pilot vehicle at the rear of an overdimension motor vehicle may tow a simple trailer with a maximum of two axles.

5.7(12) A pilot vehicle (or its trailer) at the rear of an overdimension motor vehicle must display a warning sign as specified in *Schedule 4* or a variable message sign that has been approved by the Agency, that faces towards the rear of the vehicle (or the trailer, if the pilot vehicle is towing a trailer) and describes the load ahead of it.

5.7(13) The operator and driver of an overdimension motor vehicle must ensure that appropriate measures are taken to minimise the risks to the safety of road users presented by a pilot vehicle that is operating at the rear of an overdimension vehicle, particularly when the pilot vehicle has stopped.

Pilot signs

5.7(14) A Class 1 pilot vehicle must clearly display on its front doors a pilot logo that is approved by the Agency.

5.7(15) A Class 2 pilot vehicle may display on its front doors a pilot logo that is approved by the Agency.

5.7(16) A pilot warning sign must comply with the size and colour specifications in *Schedule 4*, or with a variable message sign that has been approved by the Agency.

5.7(17) The pilot warning sign required by this rule, may be displayed only when the vehicle is escorting an overdimension vehicle.

Lighting requirements for pilot vehicles

5.7(18) Except as provided in *5.7(24)*, the headlamps of a pilot vehicle must be operated on low beam when the pilot vehicle is escorting an overdimension motor vehicle during daylight hours.

5.7(19) The lighting in *5.7(20)* to *5.7(24)* may be operated only when a pilot vehicle is escorting an overdimension motor vehicle.

5.7(20) Except as provided in *5.7(21)*, a Class 2 pilot vehicle must have one or two flashing or revolving amber beacons fitted to its roof unless *5.7(22)* applies.

5.7(21) An overdimension motor vehicle whose load exceeds 5 m in width must be escorted by at least one Class 1 pilot vehicle and at least two Class 2 pilot vehicles, each of which has fitted to its roof, and operates:

(a) during daylight hours, two amber flashing or revolving beacons on the right, and two purple flashing or revolving beacons on the left; and

(b) during the hours of darkness, one amber flashing or revolving beacon on the right, and two purple flashing or revolving beacons on the left.

5.7(22) Despite *5.7(21)*, if the beacons required to be fitted to the roof of a pilot vehicle at the rear of an overdimension motor vehicle would not be clearly visible to following traffic then the beacons, or equivalent additional beacons, must be fitted to the rear of the pilot vehicle, or its trailer, in a position that ensures the beacons are clearly visible to traffic approaching from the rear of the overdimension motor vehicle.

5.7(23) If an overdimension motor vehicle has a width exceeding 5 m, the pilot vehicle that is travelling furthest ahead must display one pair of alternately flashing auxiliary lamps that emit a purple light in addition to the beacons required in *5.7(21)*.

5.7(24) If an overdimension motor vehicle has a width that exceeds 5 m, the pilot vehicle that is travelling furthest ahead may operate with one pair of alternately flashing headlamps, which must be operated on low beam.

5.7(25) During the hours of darkness, a pilot vehicle must be fitted with one or two lamps that emit a white light to illuminate a roof-mounted warning sign, provided that the light is not directly visible from the rear of the vehicle.

Enforcement officers' vehicles

5.7(26) Nothing in *5.6(13)*, *5.6(14)*, or *5.7* applies to an enforcement officer piloting an overdimension vehicle and load, provided the pilot vehicle displays blue and red flashing lights.

Section 6 Responsibilities

6.1 Responsibilities of operators

6.1(1) A person who operates a vehicle must ensure that the vehicle complies with this rule.

6.1(2) A person who operates a motor vehicle under an overweight or high-productivity motor vehicle or specialist vehicle permit that is issued under *section 4* must comply with—

(a) the critical conditions in *4.5(1)*; and

(b) all of the conditions specified on that permit.

6.1(3) A person who operates an overdimension motor vehicle must comply with the applicable operating requirements in *section 5*.

6.1(4) A person must, if required by *section 5*, obtain a permit prior to operating an overdimension vehicle.

6.1(5) A person who operates an overdimension motor vehicle under a permit issued under *section 5* must comply with—

(a) the critical conditions in *5.2(15)*; and

(b) all of the conditions specified on that permit.

6.1(6) A person who performs pilot functions for an overdimension motor vehicle must comply with the applicable operating requirements in *section 5*.

6.2 Responsibilities of modifiers

A person who modifies a motor vehicle must:

(a) ensure that the modification does not prevent the vehicle from complying with this rule; and

(b) ensure that the details provided to the Registrar of Motor Vehicles include an accurate description of the vehicle's design limits following modification; and

(c) notify the operator if the vehicle must be inspected, and, if necessary, certified, because there is reason to believe it is:

(i) a light motor vehicle that has been modified to become a low volume vehicle; or

(ii) a heavy motor vehicle that has been modified to affect its safety performance, capacity, or compliance with this rule.

6.3 Responsibilities of vehicle inspectors and inspecting organisations

A vehicle inspector or inspecting organisation must not certify a motor vehicle under *Land Transport Rule: Vehicle Standards Compliance 2002* if they

have reason to believe that the vehicle does not comply with *section 2* or *5* of this rule.

6.4 Responsibilities of manufacturers

A person who manufactures a motor vehicle, or installs fittings or attachments to that vehicle, must ensure that the relevant requirements of this rule are complied with.

6.5 Additional functions of the Agency

The Agency must ensure that any item this rule requires it to publish is published on a website that is available to the public.

Note: A breach of a responsibility in this section is an offence, as provided in the *Land Transport (Offences and Penalties) Regulations 1999*, and is subject to a penalty as specified in those regulations.

Part 2
Definitions and vehicle classes

Note: a term defined in *section 2 of the Land Transport Act 1998*, but not defined differently below, may be interpreted by reference to the Act.

Access provider has the meaning given in the *Railways Act 2005*

Agency means the New Zealand Transport Agency established under *section 93 of the Land Transport Management Act 2003*

Agricultural motor vehicle

(a) means a motor vehicle that is designed, constructed, or adapted for agricultural purposes; and

(b) includes:

(i) an agricultural trailer; and

(ii) an agricultural tractor; but

(a) does not include any vehicle that is:

(i) of a class specified in *Table A of Part 2 of Land Transport Rule: Vehicle Standards Compliance 2002*; and

(ii) designed or constructed for general road use

Agricultural purpose

(a) includes:

(i) land cultivation;

(ii) growing and harvesting crops (including horticulture and viticulture);

(iii) rearing livestock;

(iv) any land management operation undertaken in connection with:

(A) the operation or management of a farm; or

(B) a purpose described in *subparagraphs (i) to (iii)*; but

(b) does not include forestry, or any land management operation not referred to in *paragraph (a)(iv)*

Agricultural tractor means a vehicle that is designed and constructed principally for the purposes of:

(a) towing an agricultural trailer; or

(b) drawing, or powering, an implement ordinarily used for an agricultural purpose

Agricultural trailer

(a) means a trailer that is used principally for agricultural purposes; and

(b) includes a wheeled agricultural implement, the wheels of which are in contact with the road when the implement is being towed; but

(c) does not include:

(i) a trailer that is:

(A) designed principally for the carriage of goods; and

(B) operated at a speed exceeding 40 km/h; or

(ii) a logging trailer

Articulated bus means a bus consisting of two or more rigid sections that:

(a) articulate relative to each other; and

(b) have interconnecting passenger compartments that allow passengers to move freely between them; and

(c) are not easily detachable from each other without specialist equipment.

Articulated vehicle means any motor vehicle with a semi-trailer attached, so that part of the semi-trailer is superimposed upon the motor vehicle and a substantial part of the weight of the semi-trailer and of its load is borne by the motor vehicle

A-train means an articulated vehicle towing a full trailer

Axle means one or more shafts, spindles, or bearings in the same vertical transverse plane by means of which, in conjunction with wheels mounted on those shafts, spindles, or bearings, a portion of the weight of the vehicle is transmitted to the roadway, and:

(a) if two or more wheels of a motor vehicle are substantially in the same line transversely and some or all of them have separate axles, the axles of all those wheels are to be treated as one axle;

(b) if the longitudinal centre-line of an axle of a motor vehicle is less than 1 m distant from the longitudinal centre-line of another axle, the two axles are to be treated as one axle ("a dual axle");

(c) for the purposes of measuring the distance of a dual axle from any other axle, the measurement is taken from the longitudinal centre- line of the axle that is nearer to the axle from which the distance is to be measured

Axle set means a single axle set, a tandem axle set, a twin-steer axle set, a tri-axle set, or a quad-axle set

Beacon means a warning lamp comprising one or more sources designed to emit a flashing light or a revolving beacon of light

Brake code mass has the meaning given in *Schedule 4* of *Land Transport Rule: Heavy-vehicle Brakes 2006*.

B-train means a motor vehicle comprising a towing vehicle and two semi-trailers connected at two points of articulation where the forward distance of the longer trailer divided by the forward distance of the shorter trailer does not exceed 1.4 m

Caravan trailer means a trailer that is permanently equipped with features intended to make the vehicle suitable as a person's dwelling place, and must include at least one sleeping berth and one table, both of which may be of a design that allows them to be retracted or folded away

Category, in relation to an over dimension vehicle, means the category assigned to that vehicle by *Table 6*

Class, in relation to vehicles, means a category of vehicle of one of the Groups A, L, M, N and T, as specified in *Table A: Vehicle classes*

Combination vehicle means a towing vehicle in combination with one or more trailers or other motor vehicle that is being towed

Commissioner means the Commissioner of Police

Converter dolly means an individual trailer unit with a fifth wheel coupling used to convert a semi-trailer to a full trailer. A dolly must have either:

(a) a rigid drawbar associated with an oscillating fifth wheel and a single axle or a tandem axle set; or

(b) a tandem axle set with a hinged drawbar with a fixed fifth wheel

Direction-indicator means a lamp used for signalling an intention to change direction to the right or to the left

Emergency services means New Zealand Police, New Zealand Fire Service or an ambulance service

Enforcement officer means:

(a) a sworn member of the Police; or

(b) a non-sworn member of the Police who is authorised for the purpose by the Commissioner; or

(c) a person who is appointed to that office by warrant under *section 208* of the *Land Transport Act 1998* or who holds that office by virtue of the *Land Transport Act 1998*

Forklift means a motor vehicle (not fitted with self-laying tracks) designed principally for lifting, carrying and stacking goods by means of one or more tines, platens, or clamps

Forward distance means:

(a) in relation to a rigid vehicle, or the front section of an articulated bus, the distance from the rear axis to the front of the vehicle or its load, whichever is foremost;

(b) in relation to a full trailer, the distance from the rear axis to the front of the trailer (excluding the drawbar and front axle set with its associated carriage) or its load, whichever is foremost;

(c) in relation to a simple trailer, or the rear section of an articulated bus, the distance from the rear axis to the centre of the point of attachment to the towing vehicle;

(d) in relation to a semi-trailer, the distance from the rear axis to the centre of the kingpin;

(e) in relation to a pole trailer with only one axle set, the distance, excluding load, from the trailer's rear axis to the centre of the point of attachment to the towing vehicle with the drawbar fully extended;

(f) for a pole trailer having two axle sets, the distance, excluding load, from the trailer's front axis to the centre of the point of attachment on the towing vehicle with the drawbar fully extended

Frangible means breakable or readily deformable

Front axis means:

(a) the centre point of the front axle set of a trailer that has two axle sets and is steered by the front axle set; or

(b) the centre of the foremost axle of a rigid vehicle with motive power

Front overhang means the distance measured to the foremost point of the vehicle, including its load but in the case of a full trailer excluding the drawbar, from the following positions:

(a) for a rigid vehicle, from the front edge of the driver's seat, when in the rearmost position; or

(b) for a semi-trailer, the centre of the kingpin; or

(c) for a full trailer, the centre of the turntable; or

(d) for a simple trailer, the centre of the tow coupling; or

(e) for the load of a pole trailer combination, the centre of the turntable on the towing vehicle

Full trailer means a trailer with two axle sets, the foremost of which is steered by a drawbar; and includes a semi-trailer with non-steering axles coupled to a converter dolly

Gross combination mass has the meaning given in *Land Transport Rule: Heavy Vehicles 2004*

Gross mass, in relation to any vehicle or combination vehicle, means the total mass of that vehicle and its load, equipment, and accessories, which may be determined by calculating the sum of the mass on the vehicle's axles or axle sets

Gross vehicle mass means either:

(a) the maximum permitted mass of the vehicle, which includes the mass of the accessories, the crew, the passengers and load, and is, unless *paragraph (b)* applies, the gross vehicle mass specified (subsequent to the latest modification, if any) by the manufacturer of the vehicle; or

(b) if a person approved for the purpose by the Agency determines that the gross vehicle mass of a vehicle should differ from that specified by the manufacturer, taking into account evidence on the capability of the systems and components of the vehicle, or the effects of any modification, that mass determined by that person

Heavy motor vehicle means a motor vehicle that is either:

(a) of Class MD3, MD4, ME, NB, NC, TC or TD; or

(a) a vehicle (not of a class specified in *Table A: Vehicle classes*) with a gross vehicle mass that exceeds 3500 kg

Heavy passenger service vehicle means a passenger service vehicle with a gross vehicle mass that exceeds 3500 kg

High-productivity motor vehicle means a heavy motor vehicle or heavy combination vehicle that is operating under a permit issued under this rule to carry a divisible load and to, with or without a load:

(a) exceed a gross mass of 44,000 kg; or

(b) vary from a dimension requirement in *Schedule 1, Table 1* listed in *4.7(5)*; or

(c) both exceed a gross mass of 44,000 kg and vary from a dimension requirement in *Schedule 1, Table 1* listed in *4.7(5)*

Hours of darkness means:

(a) any period of time between half an hour after sunset on one day and half an hour before sunrise on the next day; or

(b) any other time when there is not sufficient daylight to render clearly visible a person or a vehicle at a distance of 100 m

Indivisible load means a load that cannot reasonably (without disproportionate effort, expense or risk of damage to the load) have its size reduced or be divided into two or more sections for road transport; and includes loads specified in this rule as indivisible

Inter-vehicle spacing means the distance between a towing vehicle (excluding the tow coupling shroud) and trailer (excluding the drawbar or tow rope or front dolly but including the load)

Level surface (including reasonably level surface) in relation to a road, means a road or weigh platform including weigh scale surfaces of such a minimal gradient that the heavy motor vehicle or combination vehicle on it does not move in a forwards or backwards direction after the enforcement officer has requested all brakes on such vehicle be released. The vehicle should not otherwise be restrained by any artificial restraining force, such as chocks, when the enforcement officer requests that the brakes be released

Light motor vehicle means a motor vehicle with a gross vehicle mass that is 3500 kg or less

Light passenger service vehicle means a passenger service vehicle with a gross vehicle mass that is 3500 kg or less

Load includes part of a load, and—

(a) includes covers, ropes, ties, blocks, tackles, barrows, or other equipment or objects used in the securing or containing of a load on a vehicle or the loading or unloading of a vehicle, whether or not any other load is on the vehicle; but

(b) does not include animal wastes discharged from animals being carried on a vehicle at the time

Load-sharing axle set means an axle set suspension system that has effective damping characteristics on all axles of the set and is built to divide the load between the tyres on the set so that no tyre carries a mass more than 10% greater than the mass it would carry if:

(a) the load were divided in the axle set so that each tyre carries an equal load; or

(a) the axle set is a tandem axle set comprising a twin-tyred axle and a single large-tyred axle and is built to divide the load between the tyres on the set so that:

(i) 60% of the load is borne by the twin-tyred axle and 40% of the load is borne by the single large-tyred axle; or

(ii) 55% of the load is borne by the twin-tyred axle and 45% of the load is borne by the single large-tyred axle

Load-sharing trailer means a type of short, load-sharing semi-trailer, that is not designed to directly carry any goods, and that has one or more axles equipped with a kingpin, a fifth wheel and other parts necessary for attaching it to the rear end of a towing vehicle and the front portion of a second gooseneck trailer

Manned steering jinker means a specialised load-bearing vehicle that is steered by an operator and that is used to carry the rear of a long load

Mass, in relation to a vehicle, means the quantity of material contained in or on the vehicle that, when subjected to acceleration due to gravity, will exert downwards on a level surface a force that can be measured as the weight of the vehicle

Maximum towed mass has the meaning given in *Land Transport Rule: Heavy Vehicles 2004*

Mobile crane means a non-load carrying self-propelled vehicle designed solely or principally for lifting objects using a boom with lifting gear

Mobility device has the meaning given in *section 2* of the *Land Transport Act 1998*

Modify, in relation to a vehicle, means to change the vehicle from its original state by altering, substituting, adding or removing any structure, system, component or equipment; but does not include repair

Motor vehicle means a vehicle drawn or propelled by mechanical power; and

(b) includes a trailer; but

(c) does not include—

(i) a vehicle running on rails; or

(ii) a trailer (other than a trailer designed solely for the carriage of goods) that is designed and used exclusively as part of the armament of the New Zealand Defence Force; or

(iii) a trailer running on one wheel and designed exclusively as a speed-measuring device or for testing the wear of vehicle tyres; or

(iv) a vehicle designed for amusement purposes and used exclusively within a place of recreation, amusement, or entertainment to which the public does not have access with motor vehicles; or

(v) a pedestrian-controlled machine; or

(vi) a vehicle that the Agency has declared, under *section 168A* of the *Land Transport Act 1998*, is not a motor vehicle; or

(vii) a mobility device

Non-steering axle means any axle of a vehicle the wheels of which remain substantially parallel with the longitudinal centre-line of the vehicle while the vehicle is turning

Operate, in relation to a vehicle, means to drive or use the vehicle on a road, or to cause or permit the vehicle to be on a road or to be driven on a road, whether or not the person is present with the vehicle, and **operator** has a corresponding meaning

Oscillating axle means any axle that complies with the following provisions:

(a) the axle has four wheels and four or eight tyres attached to it, consisting of two pairs of wheels; and

(b) each of the pair of wheels is mounted on a separate axle affixed to the vehicle so as to share the load equally between the two wheels and to permit oscillation of the separate axles in a vertical transverse plane that is at right angles to the longitudinal centre-line of the vehicle; and

(c) the centre of each such wheel is at least 500 mm distant from the centre of every other wheel fitted to the motor vehicle.

Overall length means the length of a vehicle or vehicle combination measured in a straight line, and includes—

(a) the length of any load; and

(b) the length of the drawbar in a fully extended horizontal straight ahead position measured to the towing eye centre of a full trailer when measured on its own

Overdimension load means an indivisible load on a motor vehicle that exceeds the dimension limits in *Table 1*

Overdimension motor vehicle means a motor vehicle or combination vehicle (including any load) that exceeds one or more of the dimension limits in *Table 1*

Overweight motor vehicle means a motor vehicle or combination vehicle (including any load) that exceeds the gross mass limits for general access in *Schedule 2, Tables 3A or 3B*

Passenger service vehicle has the meaning given in the *Land Transport Act 1998*

Pilot vehicle means a motor vehicle that escorts an overdimension and/or overweight motor vehicle, and that warns road users of the potential hazard created by the overdimension and/or overweight motor vehicle, or its load, or both

Pivot steer vehicle means a vehicle with a chassis that is split into two dependent parts that are connected by a permanent steering pivot

Pole trailer means a trailer that is attached to a towing vehicle by a telescoping or sliding pole, and is designed to support a common long load spanning between the trailer and the towing vehicle

Quad-axle set means a set of four axles where:

(a) the centres of the first and fourth axles are spaced not less than 3.75 m and not more than 4 m apart; and

(b) all axles contain an equal number of tyres; and

(c) none of the axles is a single standard-tyred axle

Rear axis—

(a) in relation to a vehicle with only one non-steering axle, means that axle;

(b) in relation to a vehicle with a non-steering axle set of two axles, means:

(i) midway between those axles, if each axle has an equal number of tyres on it; or

(ii) two-thirds of the distance from the lesser-tyred axle towards the greater-tyred axle, if one axle has twice as many tyres on it as the other axle;

(c) in relation to a vehicle with a non-steering tri-axle set or a non-steering quad-axle set, or an overdimension vehicle with more than three axles, means midway between the extreme axles of the set;

(d) except as specified in *paragraph (e)*, in relation to a vehicle whose rear axle set includes one or more steerable axles in conjunction with one or more non-steering axles, means midway between the extreme non-steering axles of the set;

(e) in relation to a semi-trailer with two non-steering axles at the front and two steering axles at the rear, means the centre-line of the second non-steering axle;

(f) in relation to a vehicle whose rear axle set includes one or more retracted axles in conjunction with one or more non-retracted axles, means midway between the extreme non-retracted axles of the set;

(g) in relation to a vehicle that does not have an axle arrangement that is in *paragraphs (a) to (f)*, means a position determined by the Agency

Rear overhang—

(a) for pole trailers transporting a long load, means the distance from the rear axis or centre of the bolster to the rear of the vehicle or its load, whichever is greater; and

(b) for all other vehicles, means the distance from the rear axis to the rear of the vehicle or its load, whichever is the greater

Rear trailing unit distance means the maximum distance from the centre of the fifth wheel or tow coupling on the towing vehicle to the rear of the combination.

Repair means to restore a damaged or worn vehicle, its structure, systems, components or equipment; and includes the replacement of damaged or worn structures, systems, components and equipment with equivalent undamaged or new structures, systems, components and equipment.

Retractable axle means an axle that has a convenient adjustment to allow the axle load distribution of the axle set to be varied substantially. An axle that is retracted is not considered to be part of the axle set

Rigid vehicle means a vehicle with motive power, driver's position and steering system, that does not have any pivot points to allow any part of the chassis of the vehicle to move or rotate in relation to any other part of the chassis of the vehicle; but includes a pivot steer vehicle

Road has the meaning given in *section 2* of the *Land Transport Act 1998*

Road controlling authority, in relation to a road, means the authority, body or person having control of the road; and includes a person acting under and within the terms of a delegation or authorisation given by the controlling authority

Roadway means that portion of the road used or reasonably usable for the time being for vehicular traffic in general

Rubbish truck means a vehicle designed and constructed for the collection and transport of rubbish and to which is fitted a compactor

Semi-trailer means a trailer with only one axle set where the point of attachment to the towing vehicle or leading trailer:

(a) is no further rearward than the rearmost axle of the towing vehicle or rearmost axle of the leading trailer; or

(b) if the towing vehicle is a rigid vehicle and has more than one axle in its rear axle set, is no more than 300 mm rearward of the rear axis of the towing vehicle.

Side lamp means a vehicle lamp of lower power than the head lamps used for the purpose of indicating the presence of the vehicle when seen from a distance and also of indicating the approximate width of the vehicle; and includes:

(a) a forward-facing side lamp, being a lamp indicating primarily the front end of the vehicle;

(b) a rearward-facing side lamp (rear lamp, red tail-lamp), being a lamp emitting a red light indicating primarily the rear end of the vehicle;

(c) a sideways-facing side lamp, being a lamp mounted between the front and rear extremities on the side to indicate primarily the side of the vehicle.

Simple trailer means a trailer (other than a semi-trailer) that has only one axle set

Single-tyred axle means any axle fitted with two or more wheels, but which is neither an oscillating axle nor a twin-tyred axle

Single axle set means either one axle or two axles having their centres spaced less than 1 m apart

Single large-tyred axle means a single-tyred axle where the manufacturer's designated tyre section width is more than 355 mm but less than 444 mm

Single mega-tyred axle means a single-tyred axle where the manufacturer's designated tyre section width is 444 mm or more

Single standard-tyred axle means a single-tyred axle where the manufacturer's designated tyre section width is less than 355 mm

Specialist overdimension motor vehicle means a motor vehicle that is designed for a primary purpose of carrying out a specialist function that requires overdimension equipment and is not primarily designed to transport overdimension or overweight loads

Standard load means a load that will fit on a motor vehicle within the dimension limits in *Table 1* and within the mass limits in *section 3*

Standard motor vehicle means a motor vehicle whose dimension limits comply with *Table 1* and mass limits comply with *section 3*

Static Roll Threshold (SRT) means the maximum level of steady turning lateral acceleration a vehicle can tolerate without rolling over, which is expressed as a proportion of "g" where "g" is the acceleration constant due to gravity (9.81 m/s/s)

Swept path means the maximum road width required by a vehicle when it negotiates a turn

Tandem axle set means an axle set comprising two axles having their centres spaced not less than 1 m and not more than 2 m apart

Towing vehicle means a rigid vehicle that tows a trailer or other motor vehicle

Tractor means a motor vehicle (not being a traction engine) designed exclusively for traction at speeds not exceeding 50 km/h

Traffic control device means a device used on a road for the purpose of traffic control; and includes any:

(a) sign, signal, or notice; or

(b) traffic calming device; or

(c) marking or road surface treatment

Trailer means a vehicle without motive power that is capable of being drawn or propelled by a motor vehicle from which it is readily detachable; but does not include:

(a) a side-car attached to a motor cycle; or

(b) a vehicle normally propelled by mechanical power while it is being temporarily towed without the use of its own power

Tri-axle set means a set of three axles, where—

(a) the centres of the first and third axles are spaced not less than 2 m and not more than 3 m apart; and

(b) all axles contain an equal number of tyres; and

(c) none of the axles is a single standard-tyred axle

Twin-steer axle set means an axle set of two axles with single tyres, where both axles are connected to the same mechanism in order to steer similarly

Twin-tyred axle means any axle, not being an oscillating axle, that has a wheel track of 1.3 m or more and is equipped with four or more tyres

Vehicle has the meaning given in the *Land Transport Act 1998*

Vehicle axle index (VAI) means a system for indicating the extent to which the axles of a motor vehicle are loaded, so that the effect of the axle weights on roads and bridges can be determined, and that is established by a road controlling authority when the vehicle is issued with an overweight permit under *section 4*

Vehicle inspector or inspecting organisation has the meaning given in *Land Transport Rule: Vehicle Standards Compliance 2002*

Vehicle recovery service vehicle means a vehicle used in a vehicle recovery service for towing or transporting on a road any motor vehicle; but does not include a vehicle that is not designed or adapted for the purpose of towing or carrying motor vehicles

Visible means visible under normal atmospheric conditions to a driver of normal vision

Wheelbase means the distance from a vehicle's rear axis to its front axis.

Table A: Vehicle classes

Note: The motor vehicle register contains additional classes to those listed in this Table.

Class	Description
AA (Pedal cycle)	A vehicle designed to be propelled through a mechanism solely by human power.
AB (Power-assisted pedal cycle)	A pedal cycle to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 300 watts.
LA (Moped with two wheels)	A motor vehicle (other than a power-assisted pedal cycle) that: (a) has two wheels; and (b) either: (i) has an engine cylinder capacity not exceeding 50 ml and a maximum speed not exceeding 50 km/h; or (ii) has a power source other than a piston engine and a maximum speed not exceeding 50 km/h.
LB (Moped with three wheels)	A motor vehicle (other than a power-assisted pedal cycle) that: (a) has three wheels; and (b) either: (i) has an engine cylinder capacity not exceeding 50 ml and a maximum speed not exceeding 50 km/h; or (ii) has a power source other than a piston engine and a maximum speed not exceeding 50 km/h.
LB 1	A Class LB motor vehicle that has one wheel at the front and two wheels at the rear.
LB 2	A Class LB motor vehicle that has two wheels at the front and one wheel at the rear.
LC (Motor cycle)	A motor vehicle that: (a) has two wheels; and (b) either: (i) has an engine cylinder capacity exceeding 50 ml; or (ii) has a maximum speed exceeding 50 km/h.
LD (Motor cycle and side-car)	A motor vehicle that: (a) has three wheels asymmetrically arranged in relation to the longitudinal median axis; and (b) either: (i) has an engine cylinder capacity exceeding 50 ml; or (ii) has a maximum speed exceeding 50 km/h.
Side-car	A car, box, or other receptacle attached to the side of a motor cycle and supported by a wheel.

Class	**Description**
LE (Motor tri-cycle)	A motor vehicle that: (a) has three wheels symmetrically arranged in relation to the longitudinal median axis; and (b) has a gross vehicle mass not exceeding one tonne; and (c) either: (i) has an engine cylinder capacity exceeding 50 ml; or (ii) has a maximum speed exceeding 50 km/h.
LE 1	A Class LE motor vehicle that has one wheel at the front and two wheels at the rear.
LE 2	A Class LE motor vehicle that has two wheels at the front and one wheel at the rear.
Passenger vehicle	A motor vehicle that: (a) is constructed primarily for the carriage of passengers; and (b) either: (i) has at least four wheels; or (ii) has three wheels and a gross vehicle mass exceeding one tonne.
MA (Passenger car)	A passenger vehicle (other than a Class MB or Class MC vehicle) that has not more than nine seating positions (including the driver's seating position).
MB (Forward control passenger vehicle)	A passenger vehicle (other than a Class MC vehicle): (a) that has not more than nine seating positions (including the driver's seating position); and (b) in which the centre of the steering wheel is in the forward quarter of the vehicle's total length.
MC (Off-road passenger vehicle)	A passenger vehicle, designed with special features for off-road operation, that has not more than nine seating positions (including the driver's seating position), and that: (a) has four-wheel drive; and (b) has at least four of the following characteristics when the vehicle is unladen on a level surface and the front wheels are parallel to the vehicle's longitudinal centre-line and the tyres are inflated to the vehicle manufacturer's recommended pressure: (i) an approach angle of not less than 28 degrees; (ii) a breakover angle of not less than 14 degrees; (iii) a departure angle of not less than 20 degrees; (iv) a running clearance of not less than 200 mm; (v) a front-axle clearance, rear-axle clearance, or suspension clearance of not less than 175 mm.
Omnibus	A passenger vehicle that has more than nine seating positions (including the driver's seating position). An omnibus comprising two or more non-separable but articulated units shall be considered as a single vehicle.
MD (Light omnibus)	An omnibus that has a gross vehicle mass not exceeding 5 tonnes.

Class	**Description**
MD 1	An omnibus that has a gross vehicle mass not exceeding 3.5 tonnes and not more than 12 seats.
MD 2	An omnibus that has a gross vehicle mass not exceeding 3.5 tonnes and more than 12 seats.
MD 3	An omnibus that has a gross vehicle mass exceeding 3.5 tonnes but not exceeding 4.5 tonnes.
MD 4	An omnibus that has a gross vehicle mass exceeding 4.5 tonnes but not exceeding 5 tonnes.
ME (Heavy omnibus)	An omnibus that has a gross vehicle mass exceeding 5 tonnes.
Goods vehicle	A motor vehicle that: (a) is constructed primarily for the carriage of goods; and (b) either: (i) has at least four wheels; or (ii) has three wheels and a gross vehicle mass exceeding one tonne. For the purpose of this description: (a) a vehicle that is constructed for both the carriage of goods and passengers shall be considered primarily for the carriage of goods if the number of seating positions multiplied by 68 kg is less than 50% of the difference between the gross vehicle mass and the unladen mass; (b) the equipment and installations carried on special purpose vehicles not designed for the carriage of passengers shall be considered to be goods; (c) a goods vehicle that has two or more non-separable but articulated units shall be considered to be a single vehicle.
NA (Light goods vehicle)	A goods vehicle that has a gross vehicle mass not exceeding 3.5 tonnes.
NB (Medium goods vehicle)	A goods vehicle that has a gross vehicle mass exceeding 3.5 tonnes but not exceeding 12 tonnes.
NC (Heavy goods vehicle)	A goods vehicle that has a gross vehicle mass exceeding 12 tonnes.
Trailer	A vehicle without motive power that is constructed for the purpose of being drawn behind a motor vehicle.
TA (Very light trailer)	A single-axled trailer that has a gross vehicle mass not exceeding 0.75 tonnes.
TB (Light trailer)	A trailer (other than a Class TA trailer) that has a gross vehicle mass not exceeding 3.5 tonnes.
TC (Medium trailer)	A trailer that has a gross vehicle mass exceeding 3.5 tonnes but not

Class	**Description**
	exceeding 10 tonnes.
TD (Heavy trailer)	A trailer that has a gross vehicle mass exceeding 10 tonnes.

Part 3
Schedules

Schedule 1
Dimension and mass limits

Table 1
Dimension requirements

Dimension	**Distance** (metres except where indicated otherwise) (Note 1)
Width (Note 2)	
Two-wheeled vehicles of Classes AA, AB, LA, and LC	1.0
All other vehicles	2.55, or 1.275 from each side of the longitudinal centre-line of the vehicle
Overall length	
Towing vehicle, full trailer, pole trailer (excluding load)	11.5
Simple trailer	12.5
Rigid vehicle (not towing)	12.6
Rigid bus with three axles where the rearmost axle is a single-tyred steering axle that is— (a) either positively and continuously linked to the front steer axle (except may be locked for reverse or high-speed operations); or (b) automatically locked at a speed of 30 km/h in the straight-ahead position or for reverse operations.	13.5
Articulated bus	18
Towing vehicle and semi-trailer with—	
(a) A quad-axle set with one steering axle	19
(b) Any other axle set	19
Towing vehicle and full trailer— (a) excluding load; (b) Including load if load overhanging the rear of the trailer does not exceed 2.3 m in width, or 1.15 m from the longitudinal centre-line of the vehicle	20 22
Towing vehicle and simple trailer	22

Dimension	**Distance** (metres except where indicated otherwise) (Note 1)
Any other combination of vehicles	20
Height (Note 3) All vehicles	 4.3
Forward distance Rigid vehicle	 8.5 if fitted with tow coupling; 9.5 otherwise
Full trailer, simple trailer, pole trailer with drawbar at full extension, articulated bus (both front and rear sections)	8.5
Semi-trailer	9.2
Rear overhang Heavy rigid vehicle whose rearmost axle is a steering axle	 4.0 or 70% of wheelbase (whichever is less)
Heavy rigid vehicle whose rearmost axle is a steering axle	4.3 or 70% of wheelbase (whichever is less)
Rigid bus that exceeds 12.6 in overall length	4.5 or 72% of wheelbase (whichever is less)
Articulated bus, heavy simple trailer, heavy pole trailer with one axle set	4.0 or 50% of forward distance (whichever is less)
Heavy semi-trailer other than a Class TC caravan trailer	4.3 or 50% of forward distance (whichever is less)
Heavy full trailer, heavy pole trailer with two axle sets	4.0 or 50% of wheelbase (whichever is less)
Class TC caravan trailer that is a semi-trailer	4.0 or 65% of forward distance (whichever is less)
All other vehicles	4.0
Minimum ground clearance (Note 4) Heavy motor vehicle	 The greater of 100 mm or 6% of the distance from the nearest axle to the point where the ground clearance is measured (except when

Dimension	**Distance** (metres except where indicated otherwise) (Note 1)
	vehicle is loading or unloading)
Light motor vehicle	No requirement
Front overhang	
Semi-trailer	2.04 radius arc ahead of kingpin centre
Simple trailer	2.04 radius arc ahead of tow coupling centre
Full trailer	2.04 radius arc ahead of turntable centre
Pole trailer	2.04 radius arc ahead of turntable centre on towing vehicle
Agricultural motor vehicle	4.0
All other vehicles	3.0
Rear trailing unit distance	
A-train, B-train, towing vehicle and two trailers	14.5
Articulated vehicle point of attachment (excluding articulated buses)	No further rearward than the rearmost axle of the towing vehicle or rearmost axle of the leading trailer, and if the towing vehicle is a rigid vehicle and has more than one axle in its rear set, not more than 300 mm rearward of the rear axis of the towing vehicle
Tow coupling position (for towing heavy trailer) (Note 5)	
Full trailer	45% of wheelbase of towing vehicle
Simple trailer	At least 700 mm rearward of the rear axis of the towing vehicle and not more than a distance equal to 50% of wheelbase

Dimension	**Distance** (metres except where indicated otherwise) (Note 1)
Articulated bus	45% of wheelbase of the leading unit
Coupling point distance A-train (Note 6)	30% of forward distance of semi-trailer
Inter-vehicle spacing Between any two consecutive vehicles in a combination, except for a laden pole trailer (Note 7)	4.0
Outside turning circle in either direction for 360-degree turn (Note 8)	25.0 diameter (wall to wall, excluding collapsible mirrors)

Notes

1—Unless otherwise stated, the dimensions in *Table 1* are maximum dimensions.

2—For items not included in determining whether a vehicle complies with width restriction, see *2.2(11)*.

3—For restrictions on height, see *2.2(16)*; for items not included in determining whether a vehicle complies with height restrictions, see *2.2(17)*. Height limit is inclusive of load restraining devices.

4—For items not included in determining the ground clearance for a heavy motor vehicle, see *2.2(18)*.

5—The tow coupling position is the distance rearward from the motor vehicle's rear axis to the centre of the tow coupling.

6—The coupling point distance (for an A-train) is the distance between the rear axis of the semi-trailer and the tow coupling centre of the full trailer.

7—For other requirements relating to the inter-vehicle spacing between a towing vehicle and a full trailer, see *2.4(2)*.

8—Includes all attachments to vehicles except collapsible mirrors. For requirements relating to turning circle, see *2.3(1)*, *2.3(2)*.

Table 2
Axle mass limits—General access

Table 2.1—Maximum mass on individual axles

Type of axle		**Mass** (kg)
Single standard tyres—		
(a)	in a twin-steer axle set, or in a tandem axle set with a twin or single large-tyred axle; or	5,500
(b)	in any other axle set	6,000
Single large-tyred—		
(a)	in a twin-steer axle set or a quad-axle set	5,500
(b)	in a tandem axle set with two single large-tyred axles or in a tandem axle set with a single standard-tyred axle or in a tri-axle set	6,600
(c)	in any other axle set	7,200
Single mega-tyred—		
(a)	in a twin-steer axle set	5,500
(b)	in a single-steer axle set	7,200
(c)	in any other axle set	7,600
Twin-tyred—		
(a)	in a quad-axle set	6,000
(b)	in a tri-axle set	7,000
(c)	in any other axle set	8,200
Oscillating axle, in any axle set		9,500

Table 2.2—Maximum sum of axle mass on two axles in a tandem axle set

Type of axles		**Mass (kg)**
Two single standard tyres		11,000
Two single large-tyred axles—		
(a)	in a twin-steer set	11,000
(b)	not in a twin-steer set	13,000

Type of axles		Mass (kg)
Two single mega-tyred axles—		
(a)	in a twin-steer axle set	11,000
(b)	not in a twin-steer axle set	14,000
Two twin-tyred axles—		
(a)	spaced less than 1.3 m from the first axle to the last axle	14,500
(b)	spaced 1.3 m or more but less than 1.8 m from the first axle to the last axle	15,000
(c)	spaced 1.8 m or more from the first axle to the last axle	15,500
Twin-tyred axle—		
(a)	for a passenger service vehicle; -with a single standard-tyred axle, single large-tyred axle, or single mega-tyred axle and load share between 60/40 and 55/45	14,500
(b)	for any other vehicle; -with a single standard-tyred axle, single large-tyred axle or single mega-tyred axle	13,600
Single standard-tyred axle with an oscillating axle		13,000
Single standard-tyred axle with a single large-tyred axle or a twin-tyred axle		12,000
Two oscillating axles		15,000

Table 2.3—Maximum sum of axle mass in a tri-axle set

Type of axles		Mass (kg)
Three oscillating axles, three twin-tyred axles, or three large-tyred axles—		
(a)	spaced 2 m or more and less than 2.4 m from the first axle to the last axle	16,000
(b)	spaced 2.4 m or more and less than 2.5 m from the first axle to the last axle	17,500
(c)	spaced 2.5 m or more from the first axle to the last axle	18,000

Table 2.4—Maximum sum of axle mass in a quad-axle set

Type of axles	Mass (kg)
Four twin-tyred axles, or four single large-tyred axles	20,000

Table 2.5—Maximum sum of mass on any two or more axles not otherwise described

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set, single tri-axle set or single quad-axle set, where the distance from the centre of the first axle to the centre of the last axle is 1.8 m or more (including maximum gross mass)

Type of axles	**Mass (kg)**
Two single standard-tyred axles	11,000
Two single large-tyred axles	12,000
A single standard-tyred axle with a single large-tyred axle, single mega-tyred axle or a twin-tyred axle	12,000
Any other two or more axles	14,500

Table 3
Total mass limits—general access

Table 3A—Maximum total mass for heavy motor vehicles

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set, single tri-axle set or single quad-axle set, where the distance from the centre of the first axle to the centre of the last axle is 1.8 m or more (including maximum gross mass).

Distance from the centre of the first axle to the centre of the last axle	**Mass (kg)**
1.8 m but less than 2.5 m	15,500
2.5 m but less than 3.0 m	17,500
3.0 m but less than 3.3 m	19,000
3.3 m but less than 3.6 m	20,000
3.6 m but less than 4.0 m	21,000
4.0 m but less than 4.4 m	22,000
4.4 m but less than 4.7 m	23,000
4.7 m but less than 5.1 m	24,000
5.1 m but less than 5.4 m	25,000
5.4 m but less than 5.8 m	26,000
5.8 m but less than 6.4 m	27,000
6.4 m but less than 7.0 m	28,000

Distance from the centre of the first axle to the centre of the last axle	**Mass (kg)**
7.0 m but less than 7.6 m	29,000
7.6 m but less than 8.2 m	30,000
8.2 m but less than 8.8 m	31,000
8.8 m but less than 9.4 m	32,000
9.4 m but less than 10.0 m	33,000
10.0 m but less than 10.8 m	34,000
10.8 m but less than 11.6 m	35,000
11.6 m but less than 12.0 m	36,000
12.0 m but less than 12.5 m	37,000
12.5 m but less than 13.2 m	38,000
13.2 m but less than 14.0 m	39,000
14.0 m but less than 14.8 m	40,000
14.8 m but less than 15.2 m	41,000
15.2 m but less than 15.6 m	42,000
15.6 m but less than 16.0 m	43,000
16.0 m or more	44,000

Table 3B—Maximum total mass for heavy motor vehicles with at least 7 axles

Distance from the centre of the first axle to the centre of the last axle	**Mass (kg)**
16.8 m or more, and a minimum 7 axles	45,000
17.4 m or more, and a minimum 8 axles	46,000

Table 4
Maximum axle masses for heavy motor vehicles operating on a permit

Table 4.1—Maximum mass on individual axles (HPMV)

Type of axle	**Mass (kg)**
Single standard tyres:	
(a) in a twin-steer axle set, or in a tandem axle set with a twin or single large-tyred axle	5,500
(b) in any other axle set	6,000
Single large-tyred—	
(a) in a twin-steer axle set or a quad-axle set	5,500
(b) in a tandem axle set with two single large-tyred axles or in a tandem axle set with a single standard-tyred axle or in a tri-axle set	6,600
(c) in any other axle set	7,200
Single mega-tyred	
(a) in a twin-steer axle set	5,500
(b) in a single-steer axle set	7,200
(c) in any other axle set	7,600
Twin-tyred	
(a) in a quad-axle set	6,000
(b) in a tri-axle set	7,000
(c) in any other axle set	8,800
Oscillating axle, in any axle set	9,500

Table 4.2—Maximum sum of axle mass on two axles in a tandem axle set (HPMV)

Type of axles	**Mass (kg)**
Two single standard tyres	11,000
Two single large-tyred axles:	
(a) in a twin-steer set	11,000

Type of axles		Mass (kg)
(b)	not in a twin-steer set	13,000
Two twin-tyred axles—		
(a)	spaced less than 1.3 m from the first axle to the last axle	15,000
(b)	spaced 1.3 m or more from the first axle to the last axle	16,000
Twin-tyred axle—		
(a)	with a single large-tyred axle and 60/40 load share	13,600
(b)	with single large-tyred axle and 55/45 load share	14,500
Single standard-tyred axle with an oscillating axle		13,000
Single standard-tyred axle with a single large-tyred axle or a twin-tyred axle		12,000
Single standard-tyred axle with a twin-tyred axle		13,300
Two oscillating axles—		
(a)	spaced less than 1.3 m from the first axle to the last axle	15,000
(b)	spaced 1.3 m or more from the first axle to the last axle	16,000

Table 4.3—Maximum sum of axle mass in a tri-axle set (HPMV)

Type of axles		Mass (kg)
Three oscillating axles, three twin-tyred axles, or three single large-tyred axles—		
(a)	spaced 2.0 m or more but less than 2.4 m from the first axle to the last axle	16,000
(b)	spaced 2.4 m or more but less than 2.5 m from the first axle to the last axle	18,000
(c)	spaced 2.5 m or more from the first axle to the last axle	19,000

Table 4.4—Maximum sum of axle mass in a quad-axle set

Type of axles	Mass (kg)
Quad-axle set with twin-tyred axles, single large-tyred axles, single mega-tyred axles or oscillating axles with at least one steering axle	22,000

Table 4.5—Maximum sum of mass on any two or more axles not otherwise described

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set, single tri-axle set, or single quad-axle set, where the distance from the centre of the first axle to the centre of the last axle is 1.0 m or more but less than 1.8 m (including maximum gross mass)

Type of axles	**Mass (kg)**
Two single standard-tyred axles	11,000
Two single large-tyred axles	12,000
Two single mega-tyred axles	13,000
A single standard-tyred axle with a single large-tyred axle or a twin-tyred axle	12,000
Any other two or more axles	14,500

Table 4.6—Maximum sum of axle mass for specialist vehicle operating on permit

Type of axle set	**Mass (kg)**
Twin-tyred axle in any axle set	12,000
Two axles in a tandem axle set comprising—	
(a) a twin-tyred axle with a single large-tyred axle and a 60/40 load share	16,000
(b) a twin-tyred axle with a single large-tyred axle and a 55/45 load share	18,000
Two twin-tyred axles—	
(a) spaced less than 1.3 m from the first axle to the last axle	17,000
(b) spaced 1.3 m or more from the first axle to the last axle	18,000

Table 5
Maximum total mass for heavy motor vehicles operating on a permit

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set, single tri-axle set, or single quad-axle set, where the distance from the centre of the first axle to the centre of the last axle is 1.8 m or more (including maximum gross mass).

Distance from the centre of the first axle to the centre of the last axle	**Mass (kg)**
1.8 m but less than 2.0 m	15,500
2.0 m but less than 2.5 m	16,000
2.5 m but less than 3.0 m	17,500
3.0 m but less than 3.3 m	19,000
3.3 m but less than 3.6 m	20,000
3.6 m but less than 4.0 m	21,000
4.0 m but less than 4.4 m	22,000
4.4 m but less than 4.5 m	23,000
4.5 m but less than 4.7 m	23,500
4.7 m but less than 5.0 m	24,000
5.0 m but less than 5.4 m	25,000
5.4 m but less than 5.5 m	26,000
5.5 m but less than 5.8 m	26,500
5.8 m but less than 6.0 m	27,000
6.0 m but less than 6.5 m	28,000
6.5 m but less than 7.0 m	29,500
7.0 m but less than 7.5 m	31,000
7.5 m but less than 8.0 m	32,500
8.0 m but less than 8.5 m	34,000
8.5 m but less than 9.0 m	35,000
9.0 m but less than 9.5 m	36,000
9.5 m but less than 10.0 m	37,000
10.0 m but less than 10.5 m	38,000

Distance from the centre of the first axle to the centre of the last axle	**Mass (kg)**
10.5 m but less than 11.0 m	39,000
11.0 m but less than 11.5 m	40,000
11.5 m but less than 12.0 m	41,000
12.0 m but less than 12.5 m	42,000
12.5 m but less than 13.0 m	43,000
13.0 m but less than 13.5 m	44,000
13.5 m but less than 14.0 m	45,000
14.0 m but less than 14.5 m	46,000
14.5 m but less than 15.0 m	47,000
15.0 m but less than 15.5 m	48,000
15.5 m but less than 16.0 m	49,000
16.0 m but less than 16.5 m	50,000
16.5 m but less than 17.0 m	51,000
17.0 m but less than 17.5 m	52,000
17.5 m but less than 18.0 m	53,000
18.0 m but less than 18.5 m	54,000
18.5 m but less than 19.0 m	55,000
19.0 m but less than 19.5 m	56,000
19.5 m but less than 20.0 m	57,000
20.0 m but less than 20.5 m	58,000
20.5 m but less than 21.0 m	59,000
21.0 m but less than 21.5 m	60,000
21.5 m but less than 22.0 m	61,000
22.0 m or more	62,000 or more

Schedule 2
Permit forms

Part 1: Mandatory (unless otherwise noted)

This permit is issued under section 4 of *Land Transport Rule: Vehicle Dimension and Mass 2016*.

Permit identification

(a) Name of Issuing Agency

(b) Purpose of permit

(c) Permit number

Identify the holder and vehicle(s)

Identity of operator

TSL number (if held)

Identity of individual powered vehicle(s)

Identity of trailer(s) individually or by type

Description of vehicle(s) and load

Vehicle configuration

Load description (if permit is for overweight, indivisible)

Permit limits

Maximum permitted gross mass

Axle and tyre configuration

Axle mass

VAI (if permit for overweight, indivisible)

Length (if HPMV, with length variation)

Routes

Routes

Bridge restrictions (if any)

Permit type and period

Permit type

Date permit commences

Date of expiry

Critical conditions

The vehicle must not—

1 exceed the maximum permitted gross weight stated on this permit

2 exceed design limits, such as GVM

3 breach a travel restriction or requirement for a specified bridge or culvert

Additional conditions

Conditions added by the road controlling authority, under *clause 4.2(4) or 4.6(4)*. [*For example:*

(a) This permit must be accompanied by any secondary documents describing available routes (if applicable)]

Requirement to observe permit conditions

A breach of weight limits specified on this form, or any permit condition, is an offence as provided in the *Land Transport (Offences and Penalties) Regulations 1999*.

Permit is invalid if—

(a) the vehicle is off-route, unless directed to do so by NZ Police or the road controlling authority

(b) the permit is altered without authority

(c) the vehicles or persons operating the vehicles are not those described on the permit.

Revocation

This permit can be revoked, under clause [*reference*] of the Rule

Authorised by:

Name: Position title:

Signature: Date:

On behalf of [*Issuing Authority*]

Part 2: Notes (other than permit conditions)

For example: If the vehicle is operating over width, it needs to meet the requirements of section 4 of the Vehicle Dimensions and Mass Rule, which may require obtaining an additional permit for that purpose.

Part 3: Instructions for permit content

Field	Notes
Name of Issuing Agency	Name OR Logo of Agency or road controlling authority as appropriate.
Purpose of permit	E.g. Indivisible overweight, or HPMV (mass, dimension or both)
Permit Number	Issued by road controlling authority
Identity of operator	The holder of the permit.
TSL number (Transport Service Licence number)	Must be included if the person holds a transport services licence
Identity of vehicle(s)	Must use registration no(s) if held, OR VIN no(s) if not yet held (for example, approval of over-length trailer prior to registration); Each vehicle individually OR Individual prime mover with trailer types.

Field	Notes
Vehicle configuration	Brief description: for example, B-train.
Load description	Only required if the permit is issued under *clause 4.6* (indivisible overweight). This can be either a vehicle description (for example, forage harvester) or load description (for example, large bulldozer).
Axle and tyre configuration	Use a diagram showing arrangement of axles and dimensions for the vehicle(s) AND/OR a table showing details. Must include tyre arrangements (for example, single or dual) and sizes for each axle.
Axle mass	Permitted mass can be described by reference to the relevant part of *Table 4* OR by specifying individual axle limits.
VAI (Vehicle Axle Index)	Must be stated if the permit is issued under *clause 4.6* otherwise optional.
Maximum permitted gross weight	Expressed in kg. Must be stated, even if the permit does not exceed the gross mass limits stated in the Rule (for example, allowing higher mass on one axle).
Length	Expressed in metres. Only required IF Agency has issued approval to exceed standard dimension limits for HPMV.
Routes	EITHER general access OR by specification of routes or operating areas OR by reference to an external source (such as a book of maps) OR by exclusion OR a combination of these descriptions.
Bridge Restrictions	Only required where specified structures require lower load limits or speed/ position directions. Could be expressed as a table showing each bridge and the restrictions which apply to that structure
Permit type	Options include continuous, area permit, single trip or multiple trip.
Permit dates	Must include start date (usually date of issue) AND an expiry date.

Schedule 3
Overdimension requirements

Schedule 3.1—Requirements by category

Note: see also *Figure in 3.2* for allocation of categories.

<table>
<tr><th colspan="3">Category 1</th></tr>
<tr><td>Width / forward distance[2]:</td><td colspan="2">exceeding limits in Table 1 up to and including 2.55 m/11.4 m, up to and including 3.1 m/ 10.5m and up to and including 3.7 m/8.5 m AND/OR</td></tr>
<tr><td>Length</td><td colspan="2">up to and including 25 m AND/OR</td></tr>
<tr><td>Front overhang</td><td colspan="2">up to and including 7 m AND/OR</td></tr>
<tr><td>Rear overhang</td><td colspan="2">up to and including 7 m</td></tr>
<tr><td>Hazard warning equipment[5]</td><td>Travel times</td><td>Minimum piloting requirements</td></tr>
<tr><td>Operations during daylight hours:
Excess projections delineated with flags or panels see (5.4(1) and 5.4(4))
“OVERSIZE” sign, if width exceeds 3.1 m and vehicle is piloted (see 5.4(12))
Headlights on low beam</td><td rowspan="2">Restriction Level 1 (see 5.5(2))</td><td>Operations during daylight hours:
One Class 2 pilot, required if: exceeds 3.1 m in width and exceeds 40 km/h; or if required under 5.6.</td></tr>
<tr><td>Operations during hours of darkness:
Additional lamps and amber beacon if required by 5.4(16), or 5.4(18).
Hazard panels (see 5.4(4))
“OVERSIZE” sign, if width exceeds 3.1 m</td><td>Operations during hours of darkness:
One Class 2 pilot if width exceeds 3.1 m
(Additional pilots if required under 5.6)</td></tr>
</table>

<table>
<tr><th colspan="3">Category 2 (A, B and C)</th></tr>
<tr><td>A</td><td colspan="2">Width / forward distance[2]: exceeding 2.5m/ 11.4 m, exceeding 3.1 m/10.5 m, and exceeding 3.7 m/8.5 m up to and including 2.5 m/13.3 m and up to and including 4.5 m/8.5 m AND/OR

Length[3]: exceeding 25 m, up to and including 35 m AND/OR

Front overhang: exceeding 7 m, up to and including 10 m AND

Rear overhang[4]: up to and including 7 m</td></tr>
<tr><td>B</td><td colspan="2">Category 1 vehicle (Width, forward distance, length and front overhang) AND

Rear overhang[4]: Exceeding 7 m, up to and including 10 m.</td></tr>
<tr><td>C</td><td colspan="2">Category 2A vehicle (Width, forward distance, length and front overhang) AND

Rear overhang[4]: exceeding 7 m, up to and including 10 m.</td></tr>
<tr><td>Hazard warning equipment[5]</td><td>Travel times</td><td>Minimum piloting requirements</td></tr>
<tr><td rowspan="2">Excess projections delineated with panels (see 5.4(4))
“OVERSIZE” sign, if width exceeds 3.1 m (see 5.4(12))
Amber beacon, if width exceeds 3.7 m or travelling during hours of darkness
Headlights on low beam during daylight hours (see also 5.4(16), and 5.4(18))</td><td rowspan="2">Restriction Level 2 (see 5.5(4))</td><td>Operations during daylight hours:
Cat. 2A and 2B:
One Class 2 pilot
(Additional pilots if required under 5.6)
Cat 2C:
Two Class 2 pilots
(Additional pilots if required under 5.6)</td></tr>
<tr><td>Operations during hours of darkness:
One Class 2 pilot plus one Class 1 pilot (see 5.6(9))
(Additional pilots if required under 5.6(1)</td></tr>
</table>

Category 3

Width / forward distance: exceeding 2.5 m/ 13.3 m and exceeding 4.5 m/8.5 m to and including 2.5 m/20 m, up to and including 5 m/ 20 m and up to and including 5 m/ 8.5 m. MAY ALSO INCLUDE

Length: up to and including 35 m AND/OR

Front overhang: up to and including to 10 m] **AND**

Rear overhang: exceeding 7 m, up to and including 10 m

Hazard warning equipment[5]	**Travel times**	**Minimum piloting requirements**
Excess projections delineated with panels (see *5.4(4)*) "OVERSIZE" sign (see *5.4(12)*) Amber beacon Headlights on low beam during daylight hours (see also *5.4(16), and 5.4(18)*)	Restriction Level 3 (see *5.5(7)*)	Two Class 2 pilots plus One Class 1 pilot (Additional pilots if required under *5.6*)

Category 4

A	**Width / forward distance[2]:** exceeding 5 m/20 m and exceeding 5 m/8.5 m up to and including 11 m/20 m and up to and including 11 m/8.5 m MAY ALSO INCLUDE **Length[3]:** up to and including 35 m AND/OR **Front overhang:** up to and including to 10 m AND/OR **Rear overhang4:** up to and including 10 m
B	**Width** exceeds 11 m OR **Load** uses the entire available lane width. **[Note: In addition to these requirements Category 4B must also provide an engineering assessment of the route with the permit application (see 5.2(7)).]**

Hazard warning equipment[5]	**Travel times**	**Minimum piloting requirements**
Excess projections delineated with panels (see *5.4(4)*) "OVERSIZE" sign (see *5.4(12)*) Amber beacon Headlights on low beam during daylight hours (see also *5.4(16), and 5.4(18)*)	Restriction Level 3 see *5.5(7)*)	Two Class 2 pilots plus One Class 1 pilot (Additional pilots if required under *5.6(1))*

Notes

[1]See *Figure 1*.

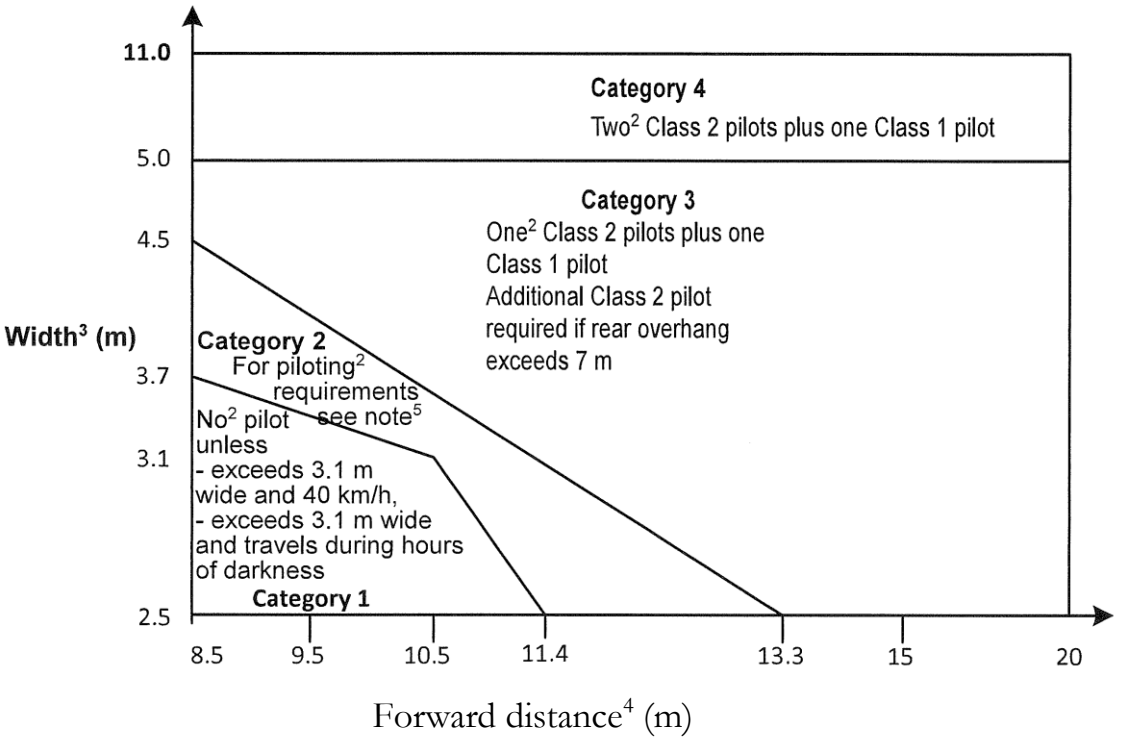
[2]Forward distance is defined in *Part 2*. However, for forward-distance requirements for vehicle combinations including a load-sharing trailer or a manned steering jinker, see *5.3(30)* and *5.3(31)*.

[3]For requirements for loads exceeding 25 m and 30 m in length, see *5.3(27)* and *5.3(28)*.

[4]Centre of gravity of the load must be forward of the rear axis. For rear overhang requirements for vehicles combinations including a manned steering jinker or pole trailer, see *5.3(29)*.

[5]For alternative requirements for mobile crane booms with excess front overhang, see *5.4(3)* and *5.4(9)*.

Schedule 3.2—Figure 1—Swept path requirements for width/forward distance thresholds



Notes

[1]Refer to *Schedule 3.1* for limits and operating requirements.

[2]The piloting requirements are minimum requirements. Sufficient pilots must be used to comply with *5.6*.

[3]For the purposes of this figure, vehicles with a width less than 2.55 m are deemed to have a width of 2.55 m.

[4]For the purposes of this figure, vehicles with a forward distance of less than 8.5 m are deemed to have a forward distance of 8.5 m.

[5]Piloting requirements for Category 2:

(a) during daylight hours, one Class 2 pilot (one additional Class 2 pilot is required if rear overhang exceeds 7m AND

width/forward distance are in Category 2) OR

(b) during the hours of darkness, one Class 2 pilot plus one Class 1 pilot.

Schedule 3.3—Overheight requirements

Height (m)	**Operating conditions**
Greater than 4.3 – up to and including 5	Written permission from the owner of an overhead obstruction. Written approval from the relevant access provider, if the vehicle travels over a level crossing that does not cross a State Highway, and the vehicle exceeds the height shown on an electrified railway safe height sign. For loads exceeding 4.8 m, a vehicle with a deck height less than 1.3 m above the road must be used.
Greater than 5 – up to and including 6.5	Written permission from the owner of an overhead obstruction. Written approval from the relevant access provider, if the vehicle travels over a level crossing that does not cross a State Highway, and the vehicle exceeds the height shown on an electrified railway safe height sign. Written permission from the owner of overhead wires or cables that the vehicle travels under. A vehicle with a deck height less than 1.3 m above the road must be used.
Greater than 6.5	Written permission from the owner of an overhead obstruction. Written approval from the relevant access provider, if the vehicle travels over a level crossing that does not cross a State Highway, and the vehicle exceeds the height shown on an electrified railway safe height sign. Written permission from the owner of overhead wires or cables that the vehicle travels under. A vehicle with a deck height less than 1.3 m above the road must be used. Written approval from the Agency must be obtained.

Schedule 4
Specifications for signs

Table 1—Specifications for signs

Wording of warning sign	Letter size and stroke width (all upper case)	Size of sign	Colour of background		Colour of wording	Size and colour of border
			Day	Night	Day or night	Day or night
"**DANGER SLOW DOWN**"	200 mm/ 28 mm 150 mm/ 21 mm	1100 mm x 600 mm	Fluorescent yellow-green	Fluorescent yellow-green retro-reflective	Matt black	None
"**WIDE LOAD FOLLOWS**" OR "**WIDE LOAD AHEAD**"	150 mm/ 21 mm 150 mm/ 21 mm	1100 mm x 520 mm	Fluorescent yellow-green	Fluorescent yellow-green retro-reflective	Matt black	Black 12 mm
"**HOUSE FOLLOWS**" OR "**HOUSE AHEAD**"	150 mm/ 21 mm 150 mm/ 21 mm	1100 mm x 520 mm	Fluorescent yellow-green	Fluorescent yellow-green retro-reflective	Matt black	Black 12 mm
"**LONG LOAD FOLLOWS**" OR "**LONG LOAD AHEAD**"	150 mm/ 21 mm 150 mm/ 21 mm	1100 mm x 520 mm	Fluorescent yellow-green	Fluorescent yellow-green retro-reflective	Matt black	Black 12 mm
"PILOT VEHICLE"[1] This face is to be displayed on the reverse side of all the above signs	150 mm/ 21 mm 150 mm/ 21 mm	1100 mm x 520/600 mm	Matt black	White If used at night white retro-reflective	White 12 mm If used at night white retro-reflective	

Table 2—Order of display of pilot signs for various size loads

	Width		
	Greater than 3.1 m and up to and including 5 m wide	Greater than 5 m wide	Less than 3.1 m wide, but requires pilot because of excess rear overhang or because it is greater than 25 m overall length
First pilot	"**WIDE LOAD FOLLOWS**"	"**DANGER SLOW DOWN**"	"**LONG LOAD FOLLOWS**"
Second pilot (if required)	"**WIDE LOAD FOLLOWS**"	"**WIDE LOAD FOLLOWS**" OR "**HOUSE FOLLOWS**" AS APPROPRIATE	"**LONG LOAD FOLLOWS**"
Load			
Rear pilot (if required)	"**WIDE LOAD AHEAD**"	"**WIDE LOAD AHEAD**" OR "**HOUSE AHEAD**" AS APPROPRIATE	"**LONG LOAD AHEAD**"

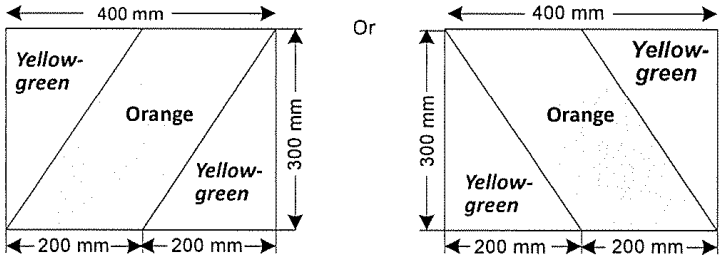


Figure 1—Minimum dimensions of hazard warning panel (Ref. *5.4(5)(a)*)

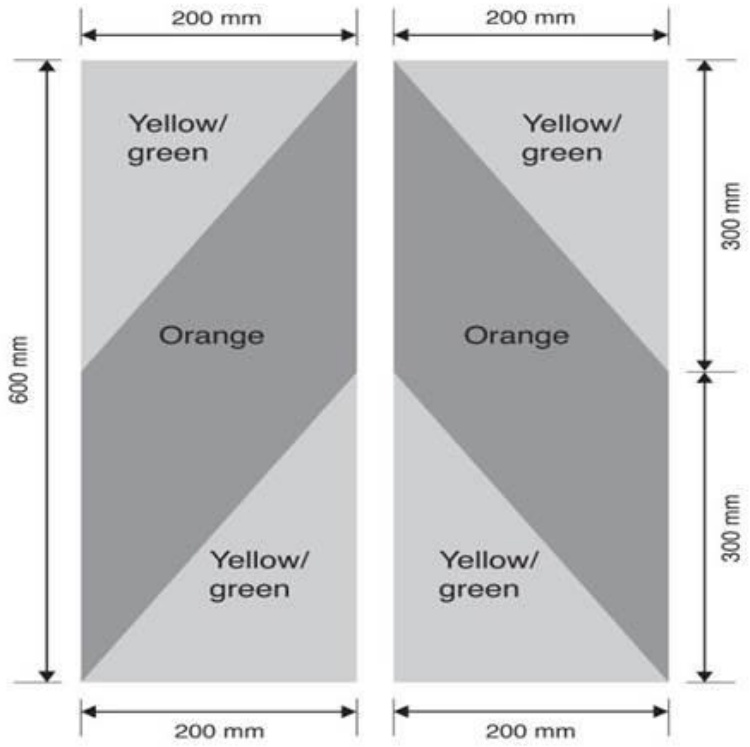


Figure 1A—Minimum dimensions of alternative hazard panel (Ref. *5.4(5)(b)*)

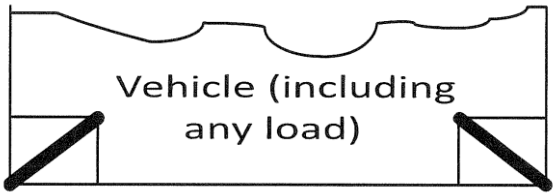


Figure 2—Orientation of hazard warning panels (Ref. *5.4(4)(a)(i)*)

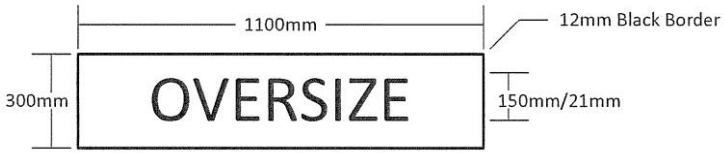


Figure 3—Dimensions of 'OVERSIZE" sign for overdimension vehicles (Ref. *5.4(13)(a)*)

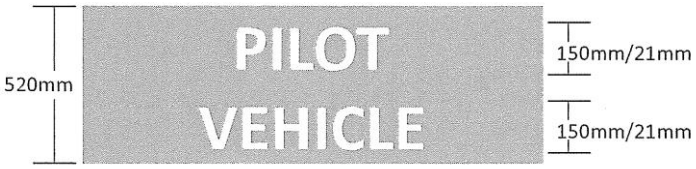


Figure 4—Warning sign for pilot vehicle (Ref. *5.7(16)*)

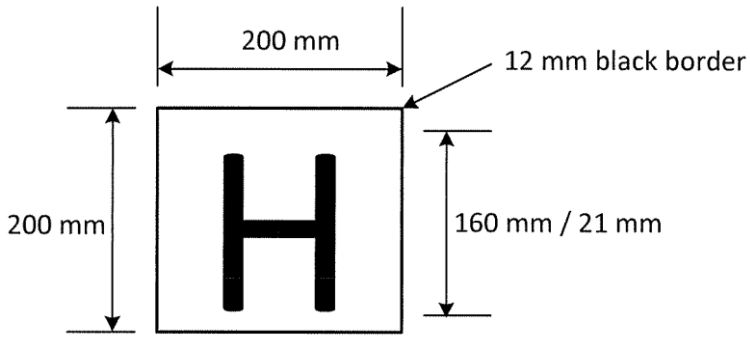


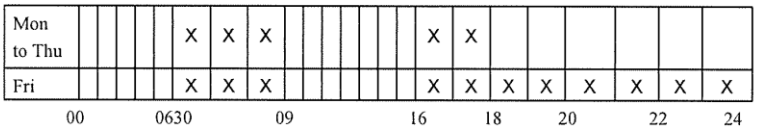
Figure 5—Dimensions of identification sign for high-productivity motor vehicle (Ref. *4.7(10)*)

Schedule 5
Travel restrictions

5.1 Prohibited travel times

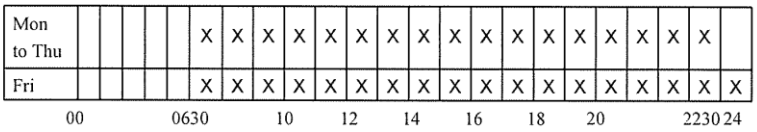
1 Prohibited travel (X) during weekdays

(1) Loads up to and including 5 m wide (Nationwide[1])

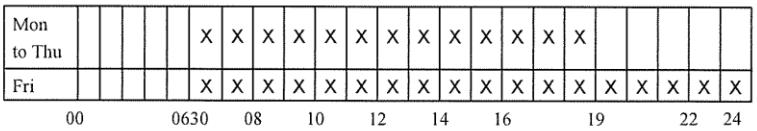


(2) Loads greater than 5 m wide

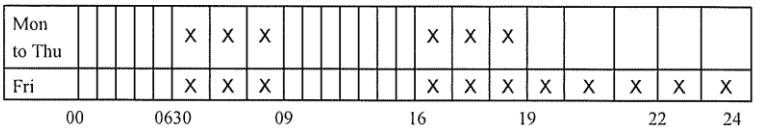
(a) Zone 1



(b) Zone 2

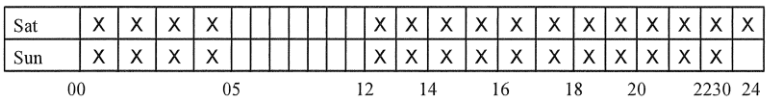


(c) Zone 3

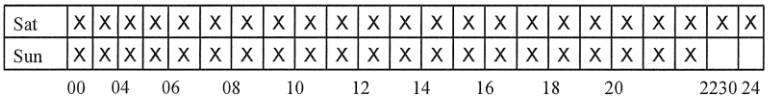


2 Prohibited travel (X) during weekend

(1) Loads up to and including 5 m wide (Nationwide[1])



(2) Loads greater than 5 m wide (Nationwide[1])



Note:

[1] The travel-period prohibitions for loads up to, and including, 5 m wide between 0630 and 0900 hours and 1600 and 1800 hours apply only to city areas as defined in *6.12(1)*.

5.2 Zones for restricted travel

Note: unless otherwise specified, zones relate to state highway routs including the designated locations.

Zone	Area	Boundary
Zone 1	Northland (southern part); Auckland; Bay of Plenty; Waikato	Kamo and south of Kamo
		Maungatapere and East of Maungatapere
		Maungaturoto and East of Maungaturoto
		North of the intersection of SH 2 and SH 33 Paengaroa
		North of the intersection of SH 5 and SH 1 Tirau
		North of the intersection of SH 3 and SH 31 Otorohanga
	Wellington	North to McKay's Crossing
		East to Te Marua including Te Marua
	Christchurch (State Highways SH)	SH 1 South from Salt Water Creek
		SH 1 North of Rolleston
		SH 73 East of West Melton
		SH 75 West of Leadley's Bridge
Zone 2	Southern Waikato; Eastern Bay of Plenty	The intersection of SH 2 and SH 33 Paengaroa and south of the intersection of SH 2 and SH 33 Paengaroa
		The intersection of SH 5 and SH 1 Tirau and south of the intersection of SH 5 and SH 1 Tirau
		The intersection of SH 3 and SH 31 Otorohanga and south of the intersection of SH 3 and SH 31 Otorohanga
		Opotiki and West of Opotiki
		Te Whaiti and north of Te Whaiti
		Rangitaiki and north of Rangitaiki
		North of Motuoapa
		North of the intersection of SH 32 and SH 41 at Kurutau, but excluding SH 41 and SH 32 (Kurutau to Tokoroa)
		North of the intersection of SH 43 and SH 4

Zone	Area	Boundary
		Taumarunui
		North of Awakino
Zone 2	South Island highways	SH1 South of Rolleston to South of Timaru (includes Timaru)
		SH1 North of Saltwater Creek to Waipara
Zone 3	Northland (Northern part)	North of Kamo
		West of Maungatapere
		West of Maungaturoto
	Southern North Island (excluding Wellington as defined in Zone 1)	South of Opotiki
		East of Opotiki
		South of Te Whaiti
		South of Rangitaiki
		Motuoapa and south of Motuoapa
		The intersection of SH 32 and SH 41 Kurutau including SH 41 and south of the intersection of SH 32 and SH 41
		SH 32 Kurutau to Tokoroa
		The intersection of SH 43 and SH 4 Taumarunui and south of the intersection of SH 43 and SH 4 Taumarunui
		Awakino and south of Awakino
		McKay's Crossing and north of McKay's Crossing
		North of Te Marua
	South Island; Stewart Island (excluding Christchurch as defined in Zone 1)	North from Waimakariri River
		SH 1 South of Timaru
		SH 73 West of West Melton

5.3 Specific route restrictions

Auckland Harbour Bridge: Maximum height 4.8 m. A vehicle exceeding 3.1 m in width must contact the Traffic Operations Centre and may travel on this route provided it is accompanied by a Class 1 Pilot Vehicle as authorised by the Traffic Operations Centre.

Auckland Motorways: No travel on Auckland Motorways if the width exceeds 3.1 m or the height exceeds 4.3 m except for the following:

(a) Loads that exceed 3.1 m in width but are less than 4.7m in height, are permitted to travel on State Highway 1 between Ramarama Interchange (Ararimu Road Underpass) and the southern end of the Auckland Southern Motorway.

(b) Loads that exceed 3.1 m in width but are less than 4.7m in height, are permitted to travel on State Highway 18 between the intersection with SH16 and the Old Albany Highway.

(c) Loads that exceed 3.1 m in width or 4.3 m in height, or both, are permitted to travel on the Auckland Northern Motorway between the Silverdale interchange and the end of the Northern Motorway.

Wellington Motorway: Maximum height 4.8 m, maximum width 3.7 m. However, an overdimension motor vehicle exceeding these dimensions may travel on the Wellington Motorway provided it complies with the Agency's conditions.

Lyttelton Tunnel: Maximum height 4.27 m, maximum width 2.6 m, towing vehicle and semi-trailer maximum length 21 m, 2 m maximum for load overhanging front or rear of vehicle. However, overdimension vehicles exceeding the above maximums may travel if the following conditions are met:

(a) the operator of the overdimension vehicle must obtain permission from the Agency (through Tunnel Control); and

(b) the operator of the overdimension vehicle must comply with any piloting or travel time restrictions required by Tunnel Control

SH 1 Rakaia Bridge: Loads that exceed 3.1 m in width must gain permission from the Agency prior to crossing. The operator of the overdimension vehicle must comply with any piloting or travel time restrictions required by the Agency.

South Island Mountain Routes: Loads that exceed 3.1m in width are not to travel in adverse winter weather on SH7 (Lewis Pass) or SH73 (Arthur's pass) without first contacting the Agency.

Toll Routes: Loads that exceed 3.1m width or 4.3m height are not permitted to travel on any toll route unless the Agency has provided explicit authority to do so. The operator of the overdimension vehicle must comply with any piloting or travel time restrictions required by the Agency.

Schedule 6:Methodologies

6.1 Calculation of SRT

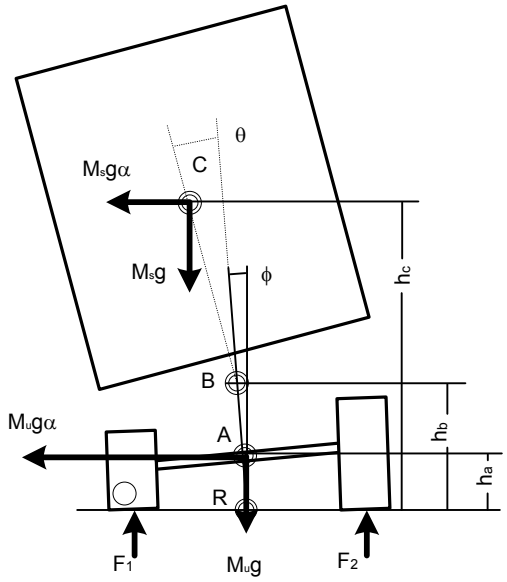


Figure 1 Vehicle Roll Notation

Notation:

M_s	Sprung Mass
M_u	Unsprung Mass
k_t	Tyre stiffness
k_r	Composite suspension roll stiffness
k_{aux}	Auxiliary roll stiffness
h_a	Axle Cg height from ground
h_b	Roll centre height from ground
h_c	Sprung Mass Cg height from ground
T	Wheel track width
φ	Axle roll angle
θ	Body roll angle relative to the axle
α	Static Roll Threshold as a proportion of Mass

Defining new variables M and H as follows

$$M = M_s + M_u \qquad \text{Total Mass}$$

$$H = \frac{M_s h_c + M_u h_a}{M_s + M_u} \qquad \text{Overall Cg height}$$

In the general case the suspension has some lash. At some value of the body roll angle, θ, the load on the right hand spring (based on the figure) becomes zero. As the vehicle body rolls through a further angle ζ, which is less than or equal to the lash divided by the spring spacing, no additional roll restoring force from the springs is generated. However, if the suspension has an antiroll device this will still apply resisting moment. Once the full extent of the lash has been taken up further increments of θ are possible. At any stage the total body roll angle is θ + ζ.

Using the graphical approach presented in Winkler et al (2000), consider the rotation of the total mass about R. Assuming small angles, after rotation the co-ordinates of the Cg of sprung mass relative to a roll centre at R are (- h_cφ - (h_c - h_b)(θ + ζ), h_c) and the co-ordinates of the Cg of the unsprung mass relative to the same roll centre R are (- h_aφ, h_a).

Thus the co-ordinates of the overall Cg are $(-H\varphi - M_s(h_c - h_b)(\theta + \zeta) / M, H)$ and the rotation of the whole mass about R is

$$\varphi T = \varphi + M_s(h_c - h_b)(\theta + \zeta) / MH \quad (1)$$

Consider the sprung mass as a free body and take moments about the roll centre B

$$k_r\theta + k_{aux}\zeta = M_sg(h_c - h_b)\alpha + M_sg(h_c - h_b)\varphi + M_sg(h_c - h_b)(\theta + \zeta) \quad (2)$$

Similarly consider the unsprung mass as a free body and take moments about B

$$k_r\theta + k_{aux}\zeta = -F_2(\frac{T}{2} + h_b\varphi) + F_1(\frac{T}{2} - h_b\varphi) + M_ug(h_b - h_a)\alpha + M_ug(h_b - h_a)\varphi + Mgh_b\alpha \quad (3)$$

but $F_1 + F_2 = Mg$ and $F_1 - F_2 = k_tT$□. Therefore substituting in (3) gives

$$k_r\theta + k_{aux}\zeta = k_t \frac{T^2}{2} \varphi - (M_sh_b + M_uh_a)g\alpha - (M_sh_b + M_uh_a)g\varphi \quad (4)$$

Equations (2) and (4) can be used to eliminate α

$$k_rMH\theta + k_{aux}MH\zeta - M_sg(h_c - h_b)(M_sh_b + M_uh_a)(\theta + \zeta) = k_r\frac{T^2}{2}M_s(h_c - h_b)\varphi \quad (5)$$

The moment balance equation Winkler et al (2000) use in their graph is

Moment due to lateral acceleration = Restoring moment from ground – Moment from the offset due to compliance. All moments taken about R.

Rollover occurs when the right hand side of this equation reaches its maximum. From Winkler et al (2000) the Static Roll Threshold (SRT) is given by

$$SRT = \frac{T}{2H} - \varphi_T \quad (6)$$

Thus all we need to do is determine φ_T at the maximum roll resistance.

Restoring moment from the ground = $k_tT^2\varphi/2$ up to a maximum of $MgT/2$ when the wheel lifts off. The offset moment = $MgH\varphi_T$.

Consider now various cases.

Case 1

Basic case – suspension has no lash, i.e. $\zeta = 0$. The maximum moment occurs when $Mg = k_tT\varphi$, i.e. $\varphi = Mg/k_tT$. Substituting this in equation (5) gives

$$\theta = \frac{MgT}{2} \frac{M_s(h_c - h_b)}{k_rMH - M_sg(h_c - h_b)(M_sh_b + M_uh_a))}$$

Substituting into equation (1) we can evaluate φ_T thus from equation (6)

$$SRT = \frac{T}{2H}\left[1 - \frac{M^2_sg(h_c - h_b)^2}{(k_rMH - M_sg(h_c - h_b)(M_sh_b + M_uh_a))}\right] - \frac{Mg}{k_tT} \quad (7)$$

Case 2

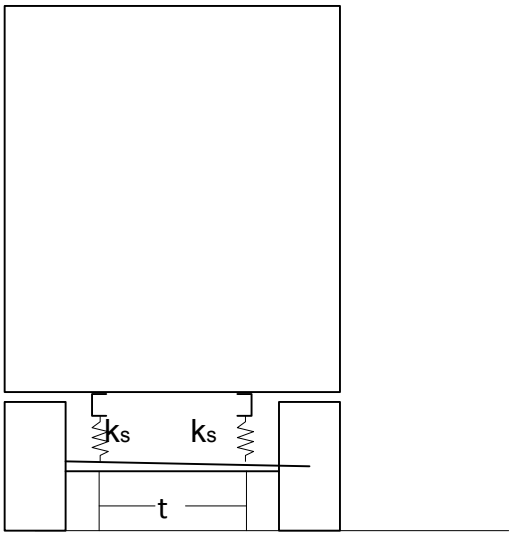


Figure 2 Suspension track width

Suspension has lash. There are two points where the resisting moment versus roll angle curve reduces slope and either of these could be the rollover point depending on which generates the highest resisting moment. The first is when the lash comes into play, i.e. when the right hand side spring (using the convention in the figure) becomes unloaded. This condition is that $M_s g = k_s t\theta$, i.e. $\theta = M_s g / k_s t$ where k_s is the spring stiffness and t is the suspension track width as shown in Figure 2. At this point $\zeta = 0$.

Substituting in equation (5) gives

$$\frac{H - M_s g(h_c - h_b)(M_s h_b + M_u h_a))2g}{k_s t k_t T^2 (h_c - h_b)} = \varphi$$

and then substituting all the angle values into equation (1) and then (6) gives

$$SRT = \frac{T}{2H} - \frac{M_s^2 g(h_c - h_b)}{k_s t MH} - \frac{2g(k_r MH - M_s g(h_c - h_b)(M_s h_b + M_u h_a))}{k_s t k_t T^2 (h_c - h_b)} \quad (8)$$

Alternatively the unsprung mass may still be sufficient to resist rollover once the lash has occurred and thus the vehicle can withstand a higher lateral acceleration before rollover. In this case the full extent of the lash is applied, i.e. $\zeta = l/t$ and wheel lift off occurs i.e. $\varphi = Mg/k_t T$. Substituting these values in equation (5) gives

$$\theta = \frac{MgTtM_s(h_c - h_b) - 2l(k_{aux} MH - M_s g(h_c - h_b)(M_s h_b + M_u h_a))}{2t(k_r MH - M_s g(h_c - h_b)(M_s h_b + M_u h_a))}$$

As before substituting all the angle values into (1) and then (6) gives

$$SRT = \frac{T}{2H}\left[1 - \frac{M_s^2 g(h_c - h_b)^2}{(k_t MH - M_s g(h_c - h_b)(M_s h_b + M_u h_a))}\right] - \frac{M}{g}\frac{g}{k_t T} \frac{M_s(h_c - h_b)/(k_r - k_{aux})}{t(k_r MH - M_s g(h_c - h_b)(M_s h_b + M_u h_a))} \quad (9)$$

If the auxiliary roll stiffness is relatively high compared to the spring stiffness it is possible that rollover will occur after the onset of lash but before the lash is fully completed. In this case $\theta = M_S g / k_s t$ and $\varphi = Mg/k_t T$ but ζ is unknown. Substituting these values in equation (5) gives

$$\zeta = \frac{MgTk_stM_s(h_c - h_b) - 2M_sg(k_rMH - M_sg)(h_c - h_b)(M_sh_b + M_uh_a))}{2k_st(k_{aux}MH - M_sg(h_c - h_b)(M_sh_b + M_uh_a))}$$

As before substituting all the angle values into (1) and then (6) gives

$$SRT = \frac{T}{2H} - \frac{Mg}{k_tT} - \frac{M_s^2g(h_c - h_b)(Tk_st(h_c - h_b) - 2(k_r - k_{aux})H)}{2Hk_st(k_{aux}MH - M_sg(h_c - h_b)(M_sh_b + M_uh_a))} \qquad (10)$$

The correct SRT value is the one that generates the greater resisting moment to rollover, although, in practice, dynamic effects will tend to favour the value given by equation (8) even if it is slightly lower

The resisting moment less the overturning moment due to the offset is given by

$$\text{Moment} = k_t \frac{T^2}{2} \varphi - MgH\varphi_T \qquad (11)$$

For each of the three conditions above φ and φ_T are known and so we can substitute in equation (11). The standard sequence of events is that as φ_T increases, first there is the onset of lash, the full extent of the lash occurs and finally there is wheel lift off. In this case the two potentially critical events are the onset of lash and wheel lift off and the one with the larger moment determines which situation is critical and gives the SRT value. With a relatively higher auxiliary roll stiffness it is possible for wheel lift off to occur before the onset of lash or alternatively after the onset of lash but before full lash. In the first instance wheel lift off is the critical condition while in the second case the event which generates the maximum moment is critical.

Case 3

If the relative roll stiffnesses of the different axles of the vehicle are significantly different an axle may lift off without vehicle rollover or a suspension may take up its lash without rollover. For the purposes of this analysis we consider only the SRT of a single vehicle with a maximum of two axle groups. Winkler et al (2000) consider a tractor-semi trailer as a combination but for the Vehicle Dimensions and Mass Rule each vehicle unit must be assessed in a stand alone mode. For a vehicle unit that is normally part of a roll-coupled combination some assumptions need to be made regarding the characteristics of typical other unit(s) that could be coupled to the vehicle.

The vehicle sprung mass is considered a rigid body. Thus the angle of the sprung mass from the roll centre is the same all the way along the body. The roll centre height is not necessarily a constant along the vehicle.

$$\theta_{front} + \zeta_{front} + \varphi_{front} = \theta_{rear} + \zeta_{rear} + \varphi_{rear} = \theta_{general} + \varphi_{general} \qquad (12)$$

Note there is no $\zeta_{general}$ term in this equation because this angle in included within the $\theta_{general}$ term. The concept of lash relates to the suspension and has no real meaning in the general position.

Consider the position of the Cg of the sprung mass along the vehicle and using the subscript s to denote this point. At this location $h_{bs} = (M_{s\_front}h_{b\_front} + M_{s\_rear}h_{b\_rear})/M_s$, and $\varphi_s = (M_{s\_front}h_{r\_front}\varphi_{front} + M_{s\_rear}h_{r\_rear}\varphi_{rear})/M_s h_{bs}$. These two equations are derived from the rigid body assumption which requires that the roll centre lie along a straight line.

Consider now a moment balance for the sprung mass about the roll centre.

$$k_{r\_rear}\theta_{rear} + k_{aux\_rear}\zeta_{rear} + k_{r\_front}\theta_{front} + k_{aux\_front}\zeta_{front} = M_s g(h_c - h_b)\alpha + M_s g(h_c - h_b)(\varphi + \theta) \qquad (13)$$

and moment balances for the unsprung masses about centreline on ground

$$k_{r\_front}\theta_{front} + k_{aux\_front}\zeta_{front} = k_{t\_front}\frac{T_{front}^2}{2}\varphi_{front} - (M_{s\_front}h_{b\_front} + M_{u\_front}h_{a\_front})g(\alpha + \varphi_{front}) \qquad (14)$$

$$k_{r\_rear}\theta_{rear} + k_{aux\_rear}\zeta_{rear} = k_{t\_rear}\frac{T_{rear}^2}{2}\varphi_{rear} - (M_{s\_rear}h_{b\_rear} + M_{u\_rear}h_{a\_rear})g(\alpha + \varphi_{rear}) \qquad (15)$$

Define new coefficients as follows

$$MF_{front} = \frac{(M_{s\_front}h_{b\_front} + M_{u\_front}h_{a\_front})}{MH}$$

$$MF_{rear} = \frac{(M_{s\_rear}h_{b\_rear} + M_{u\_rear}h_{a\_rear})}{MH}$$

(15) + (14) – (13) gives

$$\alpha = \left(k_{t\_front}\frac{T_{front}^2}{2MHg} - MF_{front}\right)\varphi_{front} + \left(k_{t\_rear}\frac{T_{rear}^2}{2MHg} - MF_{rear}\right)\varphi_{rear} - \frac{M_s(h_c - h_b)}{MH}(\varphi + \theta) \qquad (16)$$

Using (16) with (14) and (16) with (15) we can eliminate α to give a pair of simultaneous equations

$$\left[\left(k_{t\_front}\frac{T_{front}^2}{2MHg} - MF_{front}\right)\left(1 - \frac{1}{MF_{front}}\right) - \frac{k_{r\_front}}{MF_{front}MHg}\right]\varphi_{front} + \left(k_{t\_rear}\frac{T_{rear}^2}{2MHg} - MF_{rear}\right)\varphi_{rear} \qquad (17)$$

$$+ \left(\frac{k_{r\_front}}{MF_{front}MHg} - \frac{M_s(h_c - h_b)}{MH}\right)(\varphi + \theta) + \frac{k_{aux\_front} - k_{r\_front}}{MF_{front}MHg}\zeta_{front} = 0$$

$$\left(k_{t\_front}\frac{T_{front}^2}{2MHg}-MF_{front}\right)\varphi_{front}+\left[\left(k_{t\_rear}\frac{T_{rear}^2}{2MHg}-MF_{rear}\right)\left(1-\frac{1}{MF_{rear}}\right)-\frac{k_{r\_rear}}{MF_{rear}MHg}\right]\varphi_{rear}$$

$$+\left(\frac{k_{r\_rear}}{MF_{rear}MHg}-\frac{M_s(h_c-h_b)}{MH}\right)(\varphi+\theta)+\frac{k_{aux\_rear}-k_{r\_rear}}{MF_{rear}MHg}\zeta_{rear}=0$$

Note that the restoring moments from the tyres,

$$k_{t\_front}\frac{T_{front}^2}{2}\varphi_{front}$$

and the corresponding term for the rear suspension reaches a maximum at wheel lift-off i.e. when $\varphi = Mg/k_tT$ and then stay at this value for all φ greater than this critical. This maximum moment is MgT/2. Equation (17) can be rewritten as follows to take this into account.

$$\left[A_{front}\left(1-\frac{1}{MF_{front}}\right)-B_{front}\right]\varphi_{front}+A_{rear}\varphi_{rear}+(B_{front}-C_s)(\varphi+\theta)+D_{front}\zeta_{front}=-\left(1-\frac{1}{MF_{front}}\right)\frac{M_{tyre\_front}}{MHg}-\frac{M_{tyre\_rear}}{MHg}$$

$$A_{front}\varphi_{front}+\left[A_{rear}\left(1-\frac{1}{MF_{rear}}\right)-B_{rear}\right]\varphi_{rear}+(B_{rear}-C_s)(\varphi+\theta)+D_{rear}\zeta_{rear}=-\frac{M_{tyre\_front}}{MHg}-\left(1-\frac{1}{MF_{rear}}\right)\frac{M_{tyre\_rear}}{MHg}$$

where $A_{front}=\left\{\begin{array}{ll} k_{t\_front}\frac{T_{front}^2}{2MHg}-MF_{front}, & \varphi_{front}\le\frac{M_{front}g}{k_{t\_front}T_{front}} \\ -MF_{front}, & \varphi_{front}>\frac{M_{front}g}{k_{t\_front}T_{front}}\end{array}\right\}$ $M_{tyre\_front}=\left\{\begin{array}{ll} 0, & \varphi_{front}\le\frac{M_{front}g}{k_{t\_front}T_{front}} \\ -\frac{M_{front}gT_{front}}{2}, & \varphi_{front}>\frac{M_{front}g}{k_{t\_front}T_{front}}\end{array}\right\}$

$A_{rear}=\left\{\begin{array}{ll} k_{t\_rear}\frac{T_{front}^2}{2MHg}-MF_{rear}, & \varphi_{rear}\le\frac{M_{rear}g}{k_{t\_rear}T_{rear}} \\ -MF_{front}, & \varphi_{rear}>\frac{M_{rear}g}{k_{t\_rear}T_{rear}}\end{array}\right\}$ $M_{tyre\_rear}=\left\{\begin{array}{ll} 0, & \varphi_{front}\le\frac{M_{rear}g}{k_{t\_rear}T_{rear}} \\ -\frac{M_{rear}gT_{rear}}{2}, & \varphi_{rear}>\frac{M_{rear}g}{k_{t\_rear}T_{rear}}\end{array}\right\}$

$$B_{front}=\frac{k_{r\_front}}{MF_{front}MHg},\quad B_{rear}=\frac{k_{r\_rear}}{MF_{rear}MHg},\quad C_s=\frac{M_s(h_c-h_b)}{MH}$$

$$D_{front}=\frac{k_{aux\_front}-k_{r\_front}}{MF_{front}MHg},\quad D_{rear}=\frac{k_{aux\_rear}-k_{r\_rear}}{MF_{rear}MHg} \qquad (18)$$

At each of the critical points on the solution path, three of the variables can be specified. Using equations (18) and (12) it is then possible to solve for the three remaining variables. In this way all the possible vertices on the solution path can be found. However, it is necessary to check each solution point for validity. At each valid solution point the SRT value can be determined using equation (16). The maximum SRT value calculated in this way is the SRT for the vehicle.

Vehicle parameters required

The equations derived above require the following vehicle parameters:

Mass:

- Unsprung mass by axle group
- Sprung mass by axle group

Geometry:

- Centre of gravity (Cg) heights of the unsprung masses
- Cg height of the sprung mass
- Wheel track width for each axle group

- Roll centre height for each axle group
- Suspension track width for each axle group

Stiffness/Compliance:

- Tyre stiffnesses
- Suspension spring stiffness for each axle group
- Composite/Auxiliary roll stiffness for each axle group
- Suspension lash for each suspension

Some of these parameters are readily obtained while others require specialised testing, which has probably already been done by the manufacturer. In this latter case manufacturer-supplied data can be used. The approach used in the SRT calculator software is to require a minimal set of user-supplied data which can be readily obtained and to include a conservative set of default values for the data that is more difficult to obtain. Where the parameters for which default values are supplied can vary substantially and have a significant impact on the resulting SRT value, an option for user input of manufacturer-supplied data is offered. A description of the data input process and the default values used follows.

Mass

The user inputs the vehicle type, the number of axles, the tyre configuration and size and the tare and laden mass for each axle group. The unsprung mass is calculated using default values for the axle and wheel masses. Currently the mass values used are as shown in Table 1 and column 2 of Table 2.

Table 1 Default axle masses without wheels

Axle type	Mass (kg
Truck/Tractor steer axle	350
Truck/Tractor drive axle	700
Trailer axle	400

Table 2 Parameter variations for different tyre size and configuration

Tyre size and type	Mass* (kg)	Cg height (m)	Width (m)	Dual spacing (m)	Tyre stiffness† (N/m)
17.5 single	50	0.36	0.275	0.26	700508
17.5 wide single	70	0.36	0.365		980711
19.5 single	75	0.40	0.275	0.28	700508
19.5 wide single	105	0.40	0.365		980711
22.5 single	100	0.49	0.275	0.30	700508
22.5 wide single	140	0.49	0.365		980711

* For a dual tyre configuration the mass is double the single tyre mass.

† For a dual tyre configuration the tyre stiffness is double the single tyre stiffness.

The unsprung mass is equal to the sum of the axle masses and the wheel masses for the group while the sprung mass is equal to the laden mass minus these axle and wheel masses.

Geometry

The Cg heights for the unsprung masses are default values based on the tyre radius. The values used are shown in Table 2. Actual variations are relatively small and have only a minor impact because the sprung mass is generally much greater than the unsprung mass.

The Cg height of the sprung mass is calculated from the Cg height of the sprung mass component of the tare and the Cg height of the payload. Default values are used for the Cg height of sprung mass component of the tare. Currently this value is 0.56m above the unsprung mass Cg for tractors and trucks and 1.25m above the unsprung mass Cg for all trailers. While this value probably varies significantly from vehicle to vehicle, the mass involved is generally relatively small so the impact on the overall Cg is small. The payload Cg height is calculated from the load bed height, the load height and the type of load. At present all load types except general freight and containers are assumed to be uniformly distributed vertically and thus the payload Cg height is midway between the load bed and the maximum load height. For general freight and containers it is assumed that the load is not uniformly distributed and can be regarded as being equivalent to two uniformly distributed layers with the lower layer containing 70% of the mass and the upper layer 30%.

For the wheel track width, default values are used based on the tyre size and configuration. It is assumed that for all large trucks under consideration the overall width is 2.5m and hence the width to the outer edges of the tyres is approximately 2.4m.

For single tyres the track width is then set to 2.4m minus the tyre width (see Table 2), while for dual tyres the track width is set to 2.4m minus the tyre width minus the dual spacing. Because of geometric effects the centre for the reaction force on a dual tyre set is not at the midpoint of the tyre contact width but further outboard. The correction factor is (1 + (dual spacing/track width)^2).

The roll centre height and suspension track width are functions of the suspension and will be covered in the next section.

Stiffness/Compliance

Standardised tyre stiffness values are used and these are shown in Table 2. These values are typical and it is unlikely that a certifier can obtain better data. Furthermore the tyre characteristics will change over time as the tyres wear and there is no requirement for vehicles to be fitted with the same tyres when they are replaced. Thus there is a good case for using standardised realistic values.

The input of correct suspension characteristics is the most difficult aspect of using the SRT calculation algorithm. Details of the performance characteristics of the suspensions do have a significant impact on the resulting SRT value but data on these performance characteristics are not always readily available. The approach used is to incorporate default generic air and steel suspension characteristics into the calculator that are typical of the lower end of the scale so that for most vehicles using the default suspension will predict an SRT at or below its actual SRT. The certifier has the option of not using the default suspensions but instead inputting manufacturer-supplied data for the actual suspensions fitted to the vehicle.

The suspension spring stiffness, the auxiliary roll stiffness and the composite roll stiffness are related and, in theory, any two can be used to calculate the third. Typically, the manufacturer will supply the suspension spring stiffness (for each spring) and either the composite or the auxiliary roll stiffness. The inputs to the SRT calculator software are the suspension spring stiffness and the composite roll stiffness.

Referring back to Figure 1, the sprung mass has rolled through an angle, θ, about the roll centre B. The suspension will generate a resisting moment to this roll, M. The composite roll stiffness is the $M/\theta = k_r$. The value to be input to the software is per axle and units used are Nm/radian. If the values provided by the manufacturer are in any other units a conversion is required.

Part of this roll stiffness is generated by the vertical compression of the suspension. The spring stiffness value, k_S, required for input to the software is the value for one side of the axle (i.e. per spring) and is in N/m. Any other units require conversion.

If the suspension track width is t, then the restoring moment generated by vertical compression of the suspension is $k_S t^2\theta/2$ and hence the roll stiffness associated with vertical compression of the suspension is $k_S t^2/2$. All other roll stiffness generated by the suspension through anti-roll bars and other mechanisms is called the auxiliary roll stiffness, k_{aux}. Thus,

$$k_r = k_{aux} + \frac{k_s t^2}{2} \tag{19}$$

Given the spring stiffness, suspension track and auxiliary roll stiffness we can calculate the composite roll stiffness.

The suspension track width is measured in metres and is the centre-to-centre distance between the connections of the suspension to the axle.

Steel suspensions typically have some "lash" in the suspension where, when the spring load changes from compression to tension, the axle moves through a small deflection with minimal resisting force. For the input to the software this lash is the distance moved by the axle measured in millimetres, which, often, will be smaller than the lash at the spring slipper. Figure 3 illustrates a steel leaf spring configuration with suspension lash at both ends of the spring. Other designs have one end of the spring attached with a pin joint and only have lash at the other end.

To determine the lash it will usually be simpler to measure the free play of the spring at the slipper mount(s) and then to calculate the lash at the axle from the geometry of the suspension. For example, if the axle is mounted halfway between the spring hanger and the slipper, the lash at the axle will be the average of the suspension lash at the two ends of the spring. If one end of the spring has no lash the axle lash will be half the suspension lash. For an air suspension the suspension generates very little restoring force in tension and so the system can be regarded as having a large lash value. Air suspensions always have substantial auxiliary roll stiffness so this does not mean that there is no additional resistance to roll once the suspension becomes unloaded.

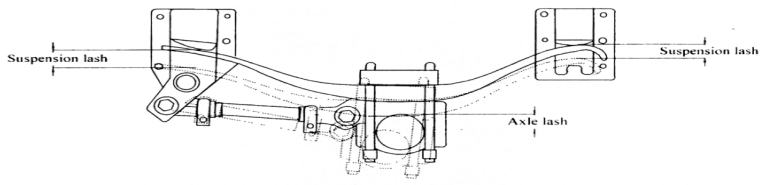


Figure 3 Illustration of suspension and axle lash

The other suspension parameter needed for the calculator is the roll centre height. For the purposes of the calculator this is measured in metres upwards from the axle centre. Thus if the roll centre is below the axle the value will be negative. Note that in the derivation of the equations the roll centre height was measured from the ground.

Generic steel and generic air suspensions with suitable parameters are included in the calculator. The values of those parameters are shown in Table 3.

Table 3 Suspension parameters used by SRT calculator

Suspension Name and Model Number	Suspension spring stiffness (N/m)	Suspension track width (m)	Auxiliary roll stiffness* per axle (Nm/ radian)	Composite roll stiffness per axle (Nm/ radian)	Axle lash (mm)	Roll centre height from axle (m)
Generic steer axle	185000	0.8		130000	1.5	-0.02
Generic steel	1000000	0.97		520000	30	0.2
Generic air	350000	0.97		780000	300	0.2

* Not needed if composite roll stiffness is known

To use a user-specified suspension, values for each of the parameter columns in Table 3 except auxiliary roll stiffness need to be provided by the manufacturer. If auxiliary stiffness is given instead of composite roll stiffness, equation (19) can be used to calculate the composite roll stiffness.

Schedule 6.2 Swept path performance measures for maximum-sized standard vehicle

Low-speed Offtracking (LSO)

This manoeuvre is a right-angle turn, similar to an urban intersection turn and illustrated in *Figure 1* below. The vehicle travels at 8 km/h and the centre point of the first axle tracks a path describing a 90-degree arc of 9.8 m radius. This corresponds to an outside front wheel radius of approximately 11 m. LSO is the maximum lateral offset between the paths tracked by the rear axis of the rearmost trailer and the path tracked by the steer axle.

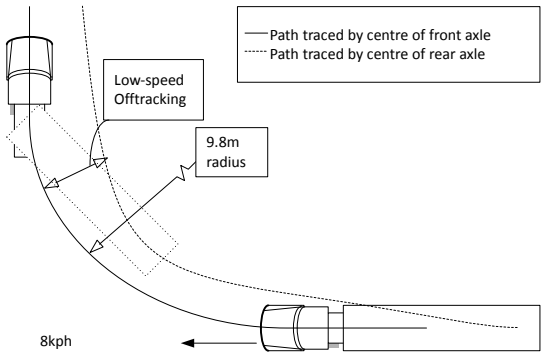


Figure 1 Low-speed Offtracking

Low-speed tracking measures

1. The vehicle must be able to turn through 360 degrees while staying within a circle of 25 m diameter (wall to wall) for both left and right turns. Alternatively, if the vehicle is an overdimension vehicle it must be able to turn through 90 degrees to the left or right within an outside radius of 15 m and without any part of the vehicle, except for collapsible mirrors, encroaching within a concentric internal radius of 9.5 m.
2. Outswing of the front corners of the trailer must not be more than 350 mm beyond the path of the front of the towing vehicle when driven through a 180-degree turn of 12.5 m radius (scribed by the outside front of the vehicle) for both left and right turns. (See *Figure 2*)
3. Tailswing measured from the centre of the rear axis to the centre of the rear of the vehicle, for each vehicle in a combination, must not exceed 500 mm through a 90-degree turn of 12.5 m radius (scribed by the outside front of the vehicle) for both left and right turns. (See *Figure 3*)
4. The inter-vehicle spacing must not fall below 400 mm through a 270-degree turn of 12.5 m radius for both left and right turns. The 400-mm spacing may be reduced to 300 mm in the case of a conventional log truck and log full trailer.

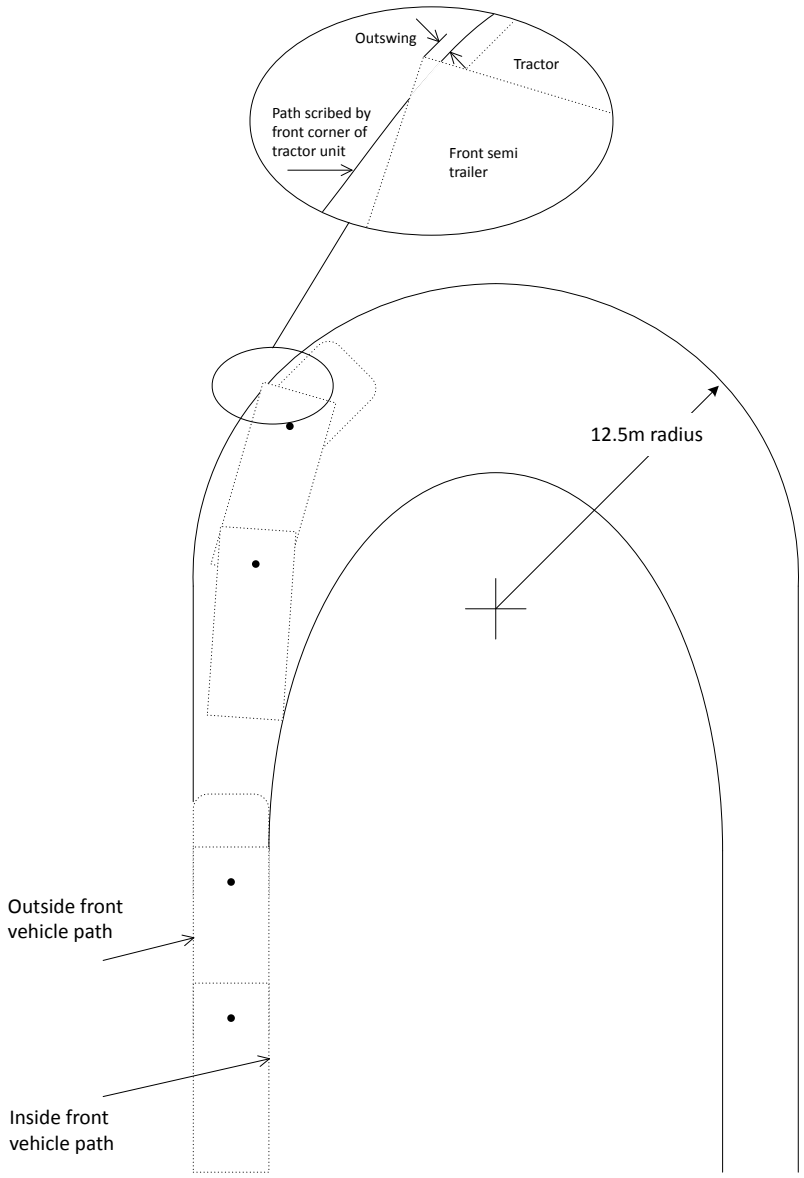


Figure 2 Outswing of front semi-trailer of B-train combination in 12.5 m radius turn

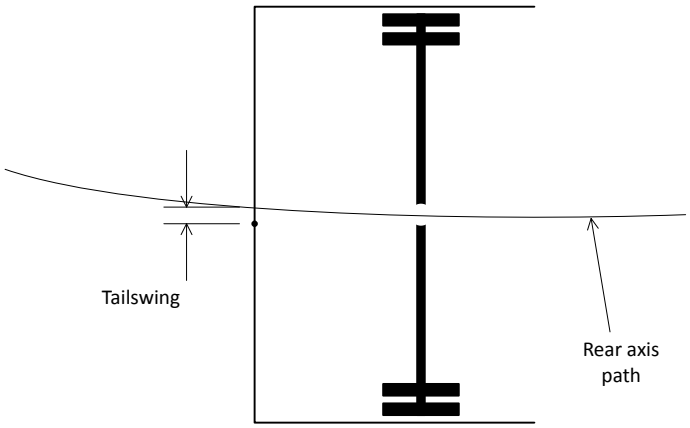


Figure 3 Tailswing of vehicle during 12.5 m radius turn

Schedule 6.3—Swept path performance measure for maximum Category 1 overdimension vehicle

The "maximum swept path" for a Category 1 overdimension vehicle has been derived from the following combination:

Tractor: 4.35 m wheelbase, 5.5 m forward distance

Semi-trailer: tri-axle: 2.5 m, 11.4 m forward distance and travelling in steady state through a 90-degree turn inside a 50 m radius wall. The inside of the path is measured at the rear axis of the semi-trailer. The maximum width of this path must not exceed 4.7 m.

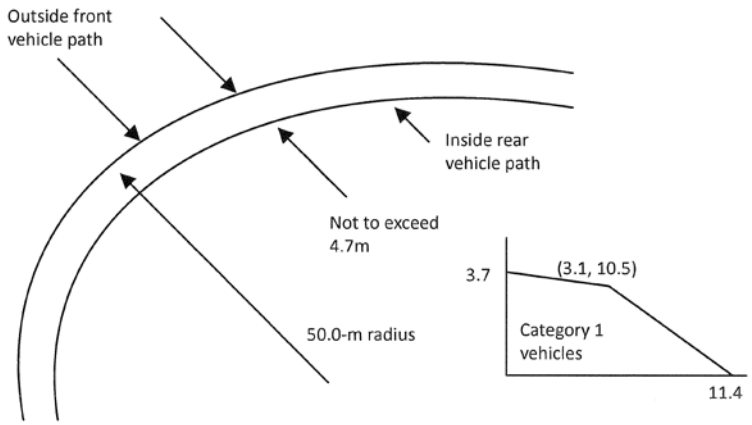


Figure 1 Swept path 50 m radius