

Queensland Code of Practice

Vehicle Modifications

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Table of Contents

1	Introduction	5
2	Modification Codes	6
	Section LC.....	8
	1. Scope.....	8
	2. General Requirements.....	8
	3. Australian Design Rules.....	9
	4. Non-certified modifications.....	10
	5. Certified Modifications (LC Codes).....	12
	Dual-controls for Driver Trainer Vehicles (Design)	13
	1. Scope.....	13
	2. Compliance with applicable vehicle standards.....	13
	3. Specific Requirements	14
	Checklist LC1	16
	Dual-controls for Driver Trainer Vehicles (Modification)	17
	1. Scope.....	17
	2. Compliance with applicable vehicle standards.....	17
	Checklist LC2	19
	Vehicle controls for persons with a disability (Design)	21
	1. Scope.....	21
	2. Compliance with applicable vehicle standards.....	21
	3. Specific Requirements	22
	Checklist LC3	27
	Vehicle controls for persons with a disability (Modification)	29
	1. Scope.....	29
	2. Compliance with applicable vehicle standards.....	29
	3. Specific Requirements	30
	Checklist LC4	32
	Section LH.....	33
	Street Rod Certification (Concessional)	33
	1. Scope.....	33
	2. Specific Requirements	33
	Checklist LH9	35
	Street Rod Certification (Full)	37
	1. Scope.....	37
	2. Specific Requirements	37
	Checklist LH10	39
	Section LS.....	41
	High Lift - 50mm to 125mm (Design).....	41
	1. Scope.....	41
	2. Compliance with Applicable Vehicle Standards	42
	3. Specific Requirements	43
	Checklist LS9	46
	High Lift - 50mm to 125mm (Modification).....	49
	1. Scope.....	49
	Checklist LS10	50

Gross Vehicle Mass Rating of Light Vehicles	70
1. Scope.....	70
2. General requirements.....	70
3. Specific requirements.....	71
4. Load capacity label and handbook.....	73
5. <u>Limitations</u>	75
6. <u>Additional Modifications and Category</u>	78
Checklist LS11.....	78
<u>Light Trailer Modifications</u>	70
1. Scope.....	70
2. Basic Modifications without Certification.....	61
3. Compliance with applicable vehicle standards.....	64
4. Specific requirements for modifications.....	64
Checklist LS12.....	785
<u>Section S</u>	70
Bus Life Vehicle Rating	70
1. Scope.....	70
2. General requirements.....	70
3. Specific requirements – Five year life extension.....	71
4. Specific requirements – Age zero refurbishment.....	73
Checklist s13a.....	75
Checklist s13b.....	78
List of Amendments	79

1 Introduction

The Queensland Code of Practice – Vehicle Modifications (QCOP) covers modifications which have been specifically designed for use in Queensland and is based on acceptable engineering practices. The QCOP is intended to supplement the recommendations of the original vehicle manufacturer in relation to vehicle modification techniques or standards and to provide guidelines where vehicle manufacturer's specifications do not exist.

The QCOP is divided into two distinct sections, a light vehicle section for vehicles with a Gross Vehicle Mass of 4.5 tonne or less and a heavy vehicle section for vehicles with a Gross Vehicle Mass greater than 4.5 tonne. The Light Vehicle section is intended to be used in conjunction with Vehicle Standards Bulletin 14 - National Code of Practice for Light Vehicle Construction and Modification (NCOP), while the Heavy Vehicle section is to be used in conjunction with the National Heavy Vehicle Regulator Code of Practice for the Approval of Heavy Vehicle Modifications (the Heavy Code).

It is important to note that the requirements of the Australian Design Rules and the original vehicle manufacturer's specifications take precedence over the QCOP. Approved Persons must ensure at all times that the modifications approved under the QCOP comply with all applicable Australian Design Rules and original vehicle manufacturer's recommendations when available. Vehicles modified in accordance with the QCOP must meet the administrative and technical requirements of the NCOP (for light vehicles) or the Heavy Code (for heavy vehicles).

The administrative requirements relating to the use of the approved codes of practice are found in the preface and introduction sections of the NCOP (for light vehicles) and the Heavy Code (for heavy vehicles). For modifications or general technical specifications not provided in the QCOP, vehicle owners and Approved Persons must comply with any relevant requirement in the NCOP (for light vehicles) and the Heavy Code (for heavy vehicles).

Any reference to approved codes of practice for a light vehicle refers only to the current versions of the QCOP or NCOP that are approved for use, by the Chief Executive of the Queensland Department of Transport and Main Roads, at the time the modification is certified.

Any reference to the Australian Street Rod Federation Queensland Street Rod LH9 or LH10 Guidelines, are a reference to the versions that are approved for use, by the Chief Executive of the Queensland Department of Transport and Main Roads, at the time the vehicle is certified.

Any enquiries about the Heavy Code or the *Heavy Vehicle (Vehicle Standards) National Regulation 2013* should be directed to the National Heavy Vehicle Regulator.

2 Modification Codes

Light Vehicles and Motorbikes

Code	Modification
LC1	Dual-controls for Driver Trainer Vehicles (Design)
LC2	Dual-controls for Driver Trainer Vehicles (Modification)
LC3	Vehicle controls for persons with a disability (Design)
LC4	Vehicle controls for persons with a disability (Modification)
LH9	Street Rod Certification (Concessional)
LH10	Street Rod Certification (Full)
LS9	High Lift – 50mm to 125mm (Design)
LS10	High Lift – 50mm to 125mm (Modification)
LS11	Gross Vehicle Mass Increase
LS12	Light Trailer Modifications

Heavy Vehicles

Code	Modification
S13	Bus Life Vehicle Rating

Light Vehicles

Section LC

Vehicle Controls

1. Scope

This section of the QCOP outlines the minimum design, fabrication and installation requirements for the following light vehicle modifications used in special applications.

1.1 Basic Modifications Not Requiring Certification

- Fitting of a steering wheel spinner knob for a person with a disability.
- Fitting of a Wheelchair/mobility scooter carrier to the rear of a suitable vehicle.
- Fitting of a restraint system in conjunction with the vehicle's original manufacturer's seatbelt.
- Fitting of additional grab handles to aid entry to and exit from the vehicle.

1.2 Modifications Requiring Certification under LC Codes

- Fitting dual controls for driver training vehicles
- Fitting modified driving controls for persons with a disability

NOTE: The main design installation and fabrications requirements for all of the above modifications are contained in sub-section 2 "General Requirements".

2. General Requirements

This subsection applies to all light vehicles and should be read in conjunction with the other sub-sections of the LC Code and the specific Approval Code for the modification or conversion.

The installation of dual controls under this code can only be performed on a Queensland vehicle registered for the purpose of driver training.

All decisions to modify a vehicle for the use of a person with a disability will be made in conjunction with the intended driver/operator, Approved Person and a qualified Occupational Therapist.

It is recommended that modifications be carried out using production components which themselves do not require modification.

2.1 Fabrication

All work must be performed in accordance with recognised engineering standards. Cutting, heating, welding or bending of components should be avoided by choosing unmodified production components wherever possible.

Welding

All Welding must be performed in accordance with the relevant Australian Standard. For example – mild steel must be welded in accordance with Australian Standard 1554 Part 1 – 1985 "*Welding of Steel Structures*" Category SP

Fasteners

All fasteners in highly stressed locations must be high tensile ISO Grade 8.8 (mm sizes), SAE Grade 5 (inch sizes) or equivalent as a minimum specification. All other fasteners are to be at least of similar strength and number to those in the original installation. Self-locking nuts should be used in preference to spring washers. Locking nuts with plastic inserts (“Nyloc”) must not be used in high temperature applications.

Electroplating

To prevent cracks forming in brittle chromium plating or from hydrogen embrittlement of steel components, electroplating of brake control components including bolts is not permitted.

2.2 Definitions

Generally the terms used in the LC section have the meaning given by the *Transport Operations (Road Use Management) Act 1995 (the Act)* or the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010 (the regulation)*. Specific technical terms used in this section have the following meanings:

Dual Controls mean additional controls fitted for the exclusive use for an accredited driver trainer.

Driving control mean any device, including hand controls, fitted to or intended to be fitted to a vehicle to enable the vehicle to be driven by a person with a disability.

Electromechanical type control means a device that is electrically operated and has mechanical motion, such as relays for servos.

Extension device means any device which extends the operation point of any existing control.

Hand Control means a control which enables controls of a vehicle, which are normally operated by foot to be operated by hand.

May indicates the existence of an option.

Pedal extension means any device which relocates the surface of a pedal.

Restraint System means fixed restraints which may be required in addition to original manufacturer’s seatbelts for trunk support

Shall indicates that a requirement is mandatory.

Should indicates a recommendation.

Vehicle, to removal all doubt, for this section means a motor vehicle.

3. Australian Design Rules

The Australian Design Rules (ADRs) that may be affected by modifications covered in this section are as follows:

Table LC1 ADRs that may be affected by modifications under this section

ADR	Title and Comments
ADR 3	Seat Anchorages
ADR 4	Seatbelts

ADR	Title and Comments
ADR 5	Anchorage for Seatbelts
ADR 10	Steering Columns
ADR 13	Installation of Lighting and Light Signalling Devices
ADR 21	Instrument Panel
ADR 28	Motor Vehicle Noise
ADR 31	Hydraulic Braking Systems
ADR 42	Demisting of Windscreens
ADR 69	Full Frontal Impact Occupant Protection
ADR 72	Dynamic Side Impact Occupant Protection
ADR 73	Offset Frontal Impact Protection
ADR 83	External Noise

NOTE: Each ADR usually has more than one version. The ADRs can be identified in two different formats as illustrated in the following examples:

- ADR 4, ADR 4A,.....in the Second Edition (pre-1988), and
- ADR 4/00, ADR 4/01,.....in the Third Edition (1988 on).

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

The modified vehicle must continue to comply with all ADRs applicable at the date of its manufacture. Where any system governed by an Australian Design Rule is altered, it is necessary to show that the original requirements of the rule are still met.

4. Non-certified modifications

The following modifications may be carried out after consultation with a qualified health practitioner and provided they do not affect compliance with ADRs and they meet the following general safety requirements.

4.1 Steering wheel spinner knobs

The spinner must be robustly built, and operate smoothly. The handle (gripped component) should be designed to be easily removable without affecting the security of the mounting block which can remain affixed to the wheel. The assembly must not have any dangerous or sharp projections which may increase the risk of injury or accident. The spinner knob must be mounted in a position which is comfortable to the driver, and must not restrict access to or the operation of other controls such as the indicator stalk.

Seek advice from an Approved Person (Engineer) if the knob affects vehicle compliance to the ADR's, eg; ADR 21/..., ADR/42/... and ADR 10/...

4.2 Rear mounted wheelchair/mobility scooter carrier

The installation of a rear mounted wheelchair/mobility scooter carrier to a vehicle is considered to be a modification that does not require certification, provided the following requirements are met:

- Use of the wheelchair/mobility scooter carrier is restricted to the carriage of a wheelchair/mobility scooter (only) for a person with a disability.
- The weight of the loaded wheelchair/mobility scooter carrier must not exceed 200kg, or the manufacturers' rear axle mass limit or the towbar's ball weight, whichever is the lesser.

Please note: While the mass of the loaded wheelchair/mobility carrier may be within the above limits, additional consideration must be given to the higher loads imposed due to the overhanging mass of the carrier.

- Any wheelchair/mobility scooter carried on the scooter carrier must be adequately restrained and meet requirements of the "Load Restraint Guide".
- The wheelchair/mobility scooter carrier and associated towbar components must be removed from the vehicle when not in use. Alternatively, if the wheelchair/mobility scooter carrier is transported in a folded position it may remain attached to the vehicle provided no dangerous projections exist and rear overhang requirements are complied with.
- The vehicle's rear overhang with the wheelchair/mobility scooter attached must not exceed 80% of the wheel base or 3.70m, whichever is the lesser.
- The wheelchair/mobility scooter carrier must not be more than 2.5m wide or the maximum width of the vehicle to which it is attached, excluding side rear view mirrors.
- An adequately rated safety chain between the wheelchair/mobility scooter carrier and the vehicle must be attached.
- Reflectors must be fitted to each corner of the wheelchair/mobility scooter with yellow reflectors visible to the sides and red reflectors visible to the rear
- If the wheelchair/mobility scooter carrier obscures the vehicle's number plate or any compulsory lighting, additional lamps complying with the regulation, and an accessories number plate must be attached.

4.3 Additional grab handles

The installation of additional grab handles to a vehicle is considered to be a modification that does not require certification, provided the following requirements are met:

- Additional grab handles must not be fitted in an airbag deployment area.
- Grab handles must be mounted a sufficient distance from seatbelt anchorage points as to not weaken the structural integrity of the seatbelt anchorage. The Department of Transport and Main Roads (TMR) recommends speaking to an Approved Person (Engineer) if you have any concerns.
- The position of any additional grab handles must not impede on the driver's normal operating position or restrict the driver's field of view in any way.

4.4 Additional Restraint System

The installation of an additional restraint system to a vehicle is considered to be a modification that does not require certification, provided the following requirements are met:

- The additional restraint system must be fitted in addition to the vehicle's original manufacturers' seatbelts.
- The mounting points of the additional restraint system must be mounted a sufficient distance from seatbelt anchorage points as to not weaken the structural integrity of the seatbelt anchorage. TMR recommends speaking to an Approved Person (Engineer) if you have any concerns.
- If any part of the additional restraint system impedes on another seating position (generally the rear seats) the impeded seating position is not to be used until the additional restraint system has been removed.

Note: The above non-certified modifications should only be fitted after consultation with an installer and occupational therapist, doctor or other medical professional.

5. Certified Modifications (LC Codes)

This section specifies particular requirements and covers limitations on certifications carried out under individual LC Approval Codes.

Each Code is supplemented with a checklist (refer to Table LC2)

Table LC2 LC Code Directory

LC Codes		Page
LC1	Dual-controls for Driver Trainer Vehicles (Design)	14
	LC1 Checklist	
LC2	Dual-controls for Driver Trainer Vehicles (Modification)	
	LC2 Checklist	
LC3	Vehicle controls for persons with a disability (Design)	
	LC3 Checklist	
LC4	Vehicle controls for persons with a disability (Modification)	
	LC4 Checklist	

Dual-controls for Driver Trainer Vehicles (Design)

Code LC1

1. Scope

Section LC1 outlines the minimum design, specifications and fabrication requirements for the following light vehicle modifications involving controls for driver training.

1.1 Designs allowed under Code LC1

The following is a summary of the designs that may be prepared under Code LC1:

- Design of Dual-controls systems for use in driver trainer vehicles.

1.2 Designs not allowed under Code LC1:

The following is a summary of designs and certifications that cannot be performed under Code LC1:

- Left to right hand steering conversions
- Modifications for persons with a disability
- Installation of a dual-control system.

2. Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the *Regulation*. These modified vehicles must also comply with the applicable in-service requirements of the regulation.

Modified pre-ADR vehicles must continue to comply with the regulation.

Outlined below in Table LC3 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle. This is not an exhaustive list and other modifications may also affect ADR compliance.

Table LC3 Summary of items that, if modified or altered, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Brake Lights	ADR 49 ADR 60
Brake Hoses	ADR 42/04
Hydraulic Brake Systems	ADR 31
Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010</i>

To determine the ADRs that apply to the vehicle in question, refer to the Applicability Tables in Section LO. Vehicles manufactured from 1 January 1969 but prior to 1 July 1988 need to comply with the Second Edition ADRs, whilst vehicles manufactured from 1 July 1988 need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport (Road vehicle Certification Scheme) *RVCS* website at the following address and under the section titled ADR Applicability tables:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

3. Specific Requirements

The following are specific requirements that need to be met to enable certifications to be issued for vehicle controls.

All work must also comply with the general guidelines contained in sub-section 2 General Requirements of the NCOP.

3.1 Dual-Control Vehicles for Driver Training

Driver training vehicles are usually standard production vehicles which are modified to provide the driving instructor with brake, clutch, accelerator and/or steering controls operated from the left hand side passengers' front seating position. The fitting of left hand side brake, clutch or accelerator control does not contravene State road traffic regulations or ADRs providing that the work undertaken is carried out to acceptable engineering practices and does not degrade the design strength or operation of the original systems.

All components must be durable in service and designed so as not to create any dangerous or sharp projections.

3.2 Signage

A sign must be permanently mounted on the dashboard adjacent to the operator of the auxiliary controls. This sign must not have any sharp edges, must not have a reflective surface finish and must be of similar hardness to the existing dashboard material. This sign must display the following statement:

CAUTION

THIS VEHICLE IS FITTED WITH AUXILIARY DRIVER CONTROLS. ONLY TO BE USED FOR DRIVER TRAINING PURPOSES BY AN ACCREDITED DRIVER TRAINER.

This sign must be printed in bold black letters, 5 mm high, on a yellow background.

3.3 Steering

Certification can only be granted by Approved Person (Engineer) after they have been able to demonstrate compliance to any relevant requirements, including:

- No component of the original steering system is heated or welded unless a report is presented by an Approved Person (Engineer).
- The work undertaken is carried out to accepted engineering practices and it does not degrade the design strength or operation of the original steering system.

- If the vehicle to be modified was originally built to comply with ADRs 10A, 10B, 10/... the donor steering column assembly and steering wheel must be from a vehicle built to comply with the equivalent or more stringent ADR. Vehicles originally designed to comply with ADR 69/.. or ADR 73/.. must not be fitted with an additional steering column.
- The steering mechanism fitted to the left hand side is of equivalent strength and durability compared to the original steering system.
- The additional steering system must be capable of being disabled when not in use.
- The additional steering system requires a similar input force to manoeuvre the vehicle and does not restrict the vehicle's original steering in any way.

3.4 Brakes

The brake lamps must be connected so as to operate from both brake pedals.

The additional brake pedal must provide similar grip to the original manufacturer's brake pedal and allow full travel

- Mechanically Coupled

Brake controls which are coupled directly to the original brake actuation mechanisms would not contravene vehicle standard regulations or ADRs providing that the work undertaken is carried out to acceptable engineering practices and does not degrade the design strength or operation of the original braking system.

- Hydraulically Coupled

Brake controls which are interconnected into the hydraulic brake system, depending on the date of manufacture of the vehicle, may contravene the requirements of the ADRs. Therefore, an engineering report from an Approved Person (Engineer) must provide the installer with an Engineering Report stating the additional system does not affect the vehicle's compliance with the regulation and ADRs.

Checklist LC1
Dual-controls for Driver Trainer Vehicles (Design)
CODE LC1

Form No: LL7
 (Y=Yes, N=No)

Modification Certificate Number :				
1	Components			
1.1	Do all the components and fittings used in the dual-control system design meet the 'General Requirements' list in this section?		Y	N
2	Mounting Brackets			
2.1	Have all the brackets, mountings and pedal assemblies been designed to adequately cope with the forces generated during operation (including emergency application)?		Y	N
3	Pedals			
3.1	Will the additional pedals be fitted with anti-slip material as required under the ADR's?		Y	N
4	Workmanship			
4.1	Has all the mounting and fitting instructions been included in the design plans?		Y	N
5	Testing			
5.1	Has a test procedure been developed for the installer to follow once the controls have been fitted?		Y	N
6	ADR Compliance			
6.1	Will the modified vehicle continue to comply with the ADRs that applied to it at its first supply to market in Australia?		Y	N
7	Records			
7.1	Have complete records of the design been retained in a manner suitable for auditing by TMR?		Y	N

Note: If the answer to any question is **N (No)** the design cannot be certified under Code LC1.

Dual-controls for Driver Trainer Vehicles (Modification)

Modification Code LC2

1. Scope

Section LC2 outlines the installation and testing requirements for the following light vehicle modifications involving controls for driver training.

1.1 Modifications covered under code LC2:

The following is a summary of the modifications that may be performed under Code LC2:

- Dual-control vehicles for driver training

1.2 Modifications not covered under code LC2:

The following is a summary of the modifications that may not be performed under Code LC2:

- Left to right hand steering conversions
- Controls for persons with a disability.

2. Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the regulation. These modified vehicles must also comply with the applicable in-service requirements of the regulation.

Modified pre-ADR vehicles must continue to comply with the regulation.

Outlined below in Table LC4 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle. This is not an exhaustive list and other modifications may also affect ADR compliance.

Table LC4 Summary of items that, if modified or altered, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Brake Lights	ADR 49 ADR 60
Brake Hoses	ADR 42/04
Hydraulic Brake Systems	ADR 31
Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010</i>

To determine the ADRs that apply to the vehicle in question, refer to the Applicability Tables in Section LO. Vehicles manufactured from 1 January 1969 but prior to 1 July 1988 need to comply with the Second Edition ADRs, whilst vehicles manufactured from 1 July 1988 need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport *RVCS* website at the following address and under the section titled ADR Applicability tables:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

Checklist LC2

Dual-controls for Driver Trainer Vehicles (Modification)

CODE LC2

Form No: LC2
(Y=Yes, N=No)

Modification Certificate Number :				
1	Design			
1.1	Has the vehicle been modified in accordance with the plans and specifications issued under: Design Approval No.....or Type Approval Number.....		Y	N
2	Workmanship			
2.1	Has all the work including the mounting been performed in accordance with recognised engineering standards?		Y	N
3	Pedals			
3.1	Are the pedals ergonomically positioned as per recognised automotive standards?		Y	N
3.2	Do the additional pedals allow full travel of the original vehicle's pedal assembly		Y	N
4	Signage			
4.1	Has a sign been permanently mounted on the dashboard adjacent to the operator of the auxiliary controls?		Y	N
5	ADR Compliance			
5.1	Does the modified vehicle continue to comply with the ADRs that applied to it at its first supply to market in Australia?		Y	N
6	Final Inspection			
6.1	Has a final inspection of the installation been carried out and found to be satisfactory?		Y	N
7	Testing			
7.1	Has the modified vehicle been road tested utilising all pedal controls and found satisfactory?		Y	N
7.2	Has the modified vehicle been tested in accordance with the post-installation test procedure provided as part of the design approval?		Y	N
8	Records			
8.1	Have complete records of the design, installation and testing been retained in a manner suitable for auditing?		Y	N

Note: If the answer to any question is **N (No)** the conversion cannot be certified under Code LC2.

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Vehicle controls for persons with a disability (Design)

CODE LC3

1. Scope

Section LC3 outlines the minimum design, specifications and fabrication requirements for the following light vehicle modifications involving controls for driver training.

1.1 Designs covered by the Code LC3

The following is a summary of the designs that may be prepared under Code LC3:

- Vehicle control modification (design) for persons with a disability, which are not covered by *Australian Standard (AS) AS3954.1. Motor vehicle controls- Adaptive systems for people with disabilities- General requirements* and *AS3954.2. Motor vehicle controls- Adaptive systems for people with disabilities- Hand controls- Product requirements*.
- Vehicle control modification (design) for persons with a disability, which are not covered by an existing individual Department of Transport and Main Roads (TMR) Type Approval.

1.2 Designs not covered by the Code LC3

The following is a summary of the designs that are not covered under Code LC3:

- Vehicle controls conversion/modification for other than for persons with a disability.
- Dual-Control for driver training

2. Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the regulation. These modified vehicles must also comply with the applicable in-service requirements of the regulation. This is not an exhaustive list and other modifications may also affect ADR compliance.

Modified pre-ADR vehicles must continue to comply with the regulation.

Outlined below in Table LC5 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle.

Table LC5 Summary of items that if modified, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Brake Lights	ADR 13 ADR 60
Brake Hoses	ADR 7
Hydraulic Brake Systems	ADR 31 ADR 33

	ADR 35
Supplementary Restraint Systems	ADR 69 ADR 72 ADR 73
Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010</i>

To determine the ADRs that apply to the vehicle in question, refer to the applicability tables in Section LO. Vehicles manufactured on or after 1 January 1969 and prior to 1 July 1988 need to comply with the Second Edition ADRs whilst vehicles manufactured after this date need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport *RVCS* website at the following address and under the section titled *ADR Applicability Tables*:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

3. Specific Requirements

3.1 Disabling Airbags

Airbags are part of the Supplementary Restraint System (SRS) fitted by new vehicle manufacturers as part of their approval process to comply with ADRs including ADR 69/00 (Full Frontal Impact Occupant Protection) ADR 72/00 (Dynamic Side Impact Occupant Protection) and/or ADR 73/00 (Offset Frontal Occupant Protection). The introduction of SRSs has been a major advance in protecting people from death or injury in road crashes and the majority of vehicle manufacturers do not endorse the disabling of SRS components such as airbags.

As the use of SRSs has proven to be so successful, TMR does not readily support the reduction of occupant safety if other options are available. However, TMR will approve the disabling of the airbags (knee airbags) where it can be demonstrated by the Approved Person (Engineer) that:

- there currently is no readily available alternative design hand controls which could be used which would not require the driver's airbag to be disabled or modified, and
- the disabling of the driver's airbag will not interfere with any other parts of the SRS fitted to the vehicle such as seatbelt pre-tensioners or other airbags.

This provision will only remain in force for a period up to and including 31 December 2016 or unless otherwise withdrawn.

3.2 Strength Testing (Normative)

3.2.1 Scope

This section sets out a method for testing a fully assembled hand control for strength.

3.2.2 Principle

The test specimen is fully assembled and fitted to a test rig. A force is applied to the handle of the brake control and left in place for a specified period. The hand control system is then inspected.

3.2.3 Apparatus

The following apparatus is required:

- (a) A suitable test rig to which the hand control under test can be fixed at its designed mounting points. The part of the rig that simulates the brake pedal shall be an immovable fixture.

Note: The test rig could be a vehicle with the brake pedal blocked as in the test for strength of hand control in brake operation in AS 3954.1

- (b) A means of applying a force of 670 N to the handle of the control lever which is designed to activate the brake.

3.2.4 Procedure

The procedure shall be as follows:

- (a) Fix the fully assembled hand control to the test rig at its designed mounting points in accordance with the AP Engineer/Manufacturer's instructions for installation.
- (b) Apply a force of 670 N to the handle of the control lever in the direction in which the control is intended to be operated for a period of 30 seconds.
- (c) Release the force and note any failure, changes in alignment, loosening of parts, or permanent deformation of any part of the hand control.

3.2.5 Report

The following shall be reported:

- (a) The identity of the hand control.
- (b) Any failure, change in alignment, parts which became loose, or permanent deformation of any part of the hand control.
- (c) A reference to this test method.

3.3 Dynamic testing for determining fatigue resistance (Normative)

3.3.1 Scope

This section sets out a method for testing a hand control for a resistance to fatigue.

3.3.2 Principle

The test specimen is fully assembled and fitted to a test rig. A force is applied to actuate the brake and accelerator controls which are operated for specified number of cycles prior to inspection taking place. If no specified indicators of fatigue are noted, the test continues for a total of 250 000 cycles.

3.3.3 Apparatus

The following apparatus is required:

A suitable test rig with:

- (a) A simulated accelerator pedal capable of adjustment to provide a load of not less than 50 N at full stroke of the hand control/accelerator linkage;
- (b) Simulated clutch and brake pedals which are capable of adjustment to provide a load not less than 200 N at the maximum travel of the clutch and brake linkages respectively; and
- (c) A means of moving the hand control repeatedly throughout its full range of movement within a time period of not more than 2 seconds.

3.3.4 Procedure

The procedure shall be as follows:

- (a) Fix the fully assembled hand control to the test rig according to the Approved Person (Engineer)/manufacturer's instructions, and adjust to the configuration representing the minimum mechanical advantage, and with the maximum offset specified by the Approved Person (Engineer)/Manufacturer.
- (b) Apply a force which moves the hand control through its complete design cycle in a period not greater than 2 seconds. It is permissible to perform the operation of more than one pedal in one cycle of movement.
- (c) After 50 000 cycles stop and inspect the hand control and observe and note if any failure, change in alignment that would be likely to affect normal operation, or loosening of fasteners has occurred. If any failure, change in alignment that would be likely to affect normal operation, or loosening of fasteners is observed, the test shall not proceed.
- (d) Replace any worn parts other than structural components and lubricate as necessary.
- (e) Repeat steps (b) to (d) four (4) times so that 250 000 cycles are completed.

3.3.5 Report

The following shall be reported:

- (a) The identity of the hand control
- (b) Any failure, change in alignment that would be likely to affect normal operation, appreciable wear of structural components, or loosening of fasteners.
- (c) A reference to the test method, ie. AS 3954.2

3.4 Fastener Vibration Resistance Testing (Normative)

3.4.1 Scope

This section sets out a method for testing a hand control for retention of torque on fasteners.

3.4.2 Principle

The test specimen is fully assembled and fixed to a shaker table. The table is subjected to vibration for a specified period. The torque of each fastener used in the construction of the hand control is measured and recorded.

3.4.3 Apparatus

The following apparatus is required:

- (a) A shaker table.
- (b) An accelerometer.
- (c) A vibration meter.
- (d) A torque-measuring device.

3.4.4 Procedure

The procedure shall be as follows:

- (a) Secure the fully assembled hand control to the shaker table only at the designed mounting points according to the Approved Person (Engineer)/manufacturer's instructions for installation. The hand control shall be mounted so that the axial direction of vibrations approximates the axial direction of the hand control. Where the axial direction of the hand control is not obvious, the axial direction shall be taken to be parallel to the axis of the steering column of the vehicle for which the hand control was designed, when installed.

- (b) Apply the torque specified by the manufacturer to all fasteners of components of the hand control.
- (c) Mount the accelerator onto the shaker table (For method of mounting see AS 2775). All connections between the accelerometer and the vibration meter and any auxiliary equipment shall be in accordance with the requirements of AS 2679.
- (d) Subject the shaker table to vibratory motion producing a peak table acceleration of not less than 46 m/s² and a peak-to-peak displacement of not less than 2.5 mm at 30 + or – 3 Hz in the axial and transverse directions of the assembly for a period of 30 minutes in each direction.
- (e) Measure and record the torque necessary to initiate tightening of each fastener, in Newton Metres.
- (f) Repeat steps (a) to (e) with the hand control mounted so that the direction of vibration is approximately transverse to the axial direction of the hand control.

3.4.5 Report

The following shall be reported:

- (a) The identity of the hand control.
- (b) For each fastener, any variance in torque applied in Step (b) and measured in Step (e) in 3.4.4 above.
- (c) A reference to this test method, ie. AS 3954.2.

3.5 Additional Requirements

- Where an additional accelerator pedal is fitted to the left of the existing brake or clutch pedals (or both), both the left-hand and the right-hand pedals shall be independently capable of being rendered inoperative.
- The driving controls shall be able to be operated through its full range of travel.
- Those components susceptible to wear and tear, eg. pins, shafts and connections etc., shall be accessible for replacement.
- All metal parts shall be resistant to corrosion.
- The surface finish of all parts of the driver controls in the driver's view shall be dull non-reflective to avoid undue glare to the driver.

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Checklist LC3
Vehicle controls for persons with a disability (Design)
CODE LC3

Form No: LC3
(Y=Yes, N=No)

Modification Certificate Number :				
1	Components			
1.1	Are the components designed with sufficient strength to prevent any permanent deformation occurring during use (including emergency application)?		Y	N
2	Seats and Seat Belts			
2.1	Do seats, seat and seat belt mountings and seat belts comply with relevant ADR 4 and 5 requirements?		Y	N
3	Controls			
3.1	Have the controls been designed to require distinctly different motions for acceleration, brake actuation or clutch application where applicable.		Y	N
3.2	Have the hand controls been designed so that when released, controls shall revert to the neutral or off position.		Y	N
3.3	The hand controls do not permit actuation of the accelerator by forward inertial movement of the driver.		Y	N
3.4	Have all the requirements in '3.5 Additional Requirements' been met?		Y	N
4	Performance Requirements			
4.1	Strength			
	When tested in accordance with '3.2 Strength Testing', there shall be no failure, no changes in alignment, no loosening of parts, or no permanent deformation of any part of the hand controls.		Y	N
4.2	Fatigue Resistance			
	When tested in accordance with '3.3 Dynamic testing for determining fatigue resistance' there shall be no failure, no changes in alignment that would be likely to affect normal operation, no appreciable wear of structural components or no loosening of fasteners.		Y	N
4.3	Vibration Resistance of Fasteners			
	When tested in accordance with '3.4 Fastener Vibration Resistance Testing', any variance in torque of each fastener of the fully assembled hand control shall be not more than 15% of the torque specified by the manufacturer.		Y	N

5	ADR Compliance			
5.1	Does the modified vehicle continue to comply with the ADRs that applied to it at its first supply to market in Australia?		Y	N
5.2	Has the SRS system (knee airbag) fitted to this vehicle been modified, if so has it been confirmed that the remaining SRS components and systems operate as per original vehicle manufacturer's specifications,	N/A	Y	N
6	Workmanship			
6.1	Does the installation and fabrication design meet the requirements specified by the Occupational Therapist/Doctor?		Y	N
6.2	Does the installation and fabrication design meet recognised engineering standards?		Y	N
7	Records			
7.1	Have complete records of the design been retained in a manner suitable for auditing by TMR?		Y	N

Note: If the answer to any question is **N (No)** the conversion cannot be certified under Design Code LC3.

Vehicle controls for persons with a disability (Modification)

Code LC4

1. Scope

Section LC4 outlines the minimum installation and testing requirements for the following light vehicle modifications involving controls for persons with a disability.

1.1 Modifications covered under Code LC4

The following is a summary of modification that may be performed under Code LC4:

- Installation of driver controls for persons with a disability.

1.2 Modifications not covered under Code LC4

The following is a summary of modification that may not be performed under Code LC4:

- Vehicle controls conversion/modification for other than for a person with a disability.
- Installation of a Wheelchair lifter

2. Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the regulation. These modified vehicles must also comply with the applicable in-service requirements of the regulation. This is not an exhaustive list and other modifications may also affect ADR compliance.

Modified pre-ADR vehicles must continue to comply with the regulation.

Outlined below in Table LC6 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle.

Table LC6 Summary of items that if modified, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Brake Lights	ADR 13 ADR 60
Brake Hoses	ADR 7
Hydraulic Brake Systems	ADR 31 ADR 33 ADR 35
Supplementary Restraint Systems	ADR 69 ADR 72 ADR 73

Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010</i>
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To determine the ADRs that apply to the vehicle in question, refer to the applicability tables in Section LO. Vehicles manufactured on or after 1 January 1969 and prior to 1 July 1988 need to comply with the Second Edition ADRs whilst vehicles manufactured after this date need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport *RVCS* website at the following address and under the section titled *ADR Applicability Tables*:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

3. Specific Requirements

The following are specific requirements to enable certification to be issued for vehicle driver controls conversions under Code LC4.

All work must also comply with the general guidelines contained in sub-section 2 *General Requirements* of the NCOP.

3.1 Installation of Vehicle Controls for persons with a disability.

3.1.1 Hand Controls

The fitment of hand controls is restricted to automatic transmission vehicles.

3.1.2 Accelerator to Left of Foot Brake

The fitment of a left of foot brake accelerator pedal is restricted to automatic transmission vehicles.

While there are no requirements which specifically cover the location of a left foot brake or accelerator pedal, attention should be paid to the operator's needs. Due care should also be taken to ensure there is sufficient clearance from the brake pedal, to reduce the risk of the driver accidentally depressing the incorrect pedal.

Where a vehicle is fitted with an additional accelerator pedal, the accelerator pedal not in use must be able to be:

- fitted with a cover; or
- folded away; or
- disconnected/rendered inoperative.

3.1.3 Signage

A permanent, securely attached label shall be provided in a position in the vehicle which is conspicuous to the driver, stating the following:

CAUTION

THE DRIVER CONTROLS OF THIS VEHICLE HAVE BEEN MODIFIED TO PROVIDE FOR THE PARTICULAR REQUIREMENTS OF THE DRIVER. THE VEHICLE MAY NOT BE AS SAFE AS ORIGINALLY MANUFACTURED.

This sign must be printed in bold black letters, 5 mm high, on a yellow background.

3.2 After Installation

The following points must be observed:

- The car should be fully test driven to establish that all controls operate correctly.
- The user shall be taken for a test drive and any necessary adjustments made.
- The user should be made familiar with the driving controls and their functions. A recommendation that the user seeks ongoing instruction where necessary should be made.
- The user should only accept the vehicle once they are satisfied with all aspects of the vehicle's controls.
- The user shall receive all manufacturers' operating instructions for the driving control.
- The user shall be made aware of any maintenance schedules required for the controls.
- It is important the user ensures all driving controls are returned to their operating position after servicing.

Checklist LC4
Vehicle controls for persons with a disability (Modification)
CODE LC4

Form No: LC4
(Y=Yes, N=No)

Modification Certificate Number :				
1	Modification			
1.1	Has the vehicle been modified in accordance with the plans and specifications issued under: Design Approval No.....or do the controls meet the General and Product Requirements outlined in AS3954.1-1991 and AS3954.2-1991?		Y	N
2	Signage			
2.1	Has a label been permanently and securely attached to the dashboard in a position conspicuous to the driver?		Y	N
3	Installation			
3.1	Has the installation been carried out in accordance with instructions and plans supplied?		Y	N
4	ADR Compliance			
4.1	Does the modified vehicle continue to comply with the ADRs that applied to it at its first supply to market in Australia?		Y	N
5	Workmanship			
5.1	Does the installation and fabrication comply with the requirements specified in the design?		Y	N
6	Road-Test			
6.1	Has a road test been carried out and the user been made familiar with the driver controls and there function?		Y	N
7	Records			
7.1	Have complete records of the modification been retained in a manner suitable for auditing?		Y	N

Note: If the answer to any question is **N (No)** the conversion cannot be certified under modification Code LC4.

Street Rod Certification (Concessional)

CODE LH9

1. Scope

The following is a summary of the certifications that may be certified under Code LH9 – Street Rod Certification

1.1 Certifications covered under code LH9

The following certifications may be performed under Code LH9:

- Conversion of a passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM), built before 1 January 1949, to a street rod configuration.
- Construction of a street rod.

1.2 Certifications not covered under code LH9

The following is a summary of certifications that may not be performed under Code LH9:

- Conversion of a vehicle built from 1 January 1949.
- Construction of a vehicle not in accordance with the *Australian Street Rod Federation Queensland Street Rod LH9 Guidelines*, as approved by the Chief Executive.

2. Specific requirements

The following are specific requirements for certification of Street Rod vehicles which can be approved by approved persons under the code LH9.

2.1 Conversion of a pre-1949 vehicle

- Any passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM) may be converted to a street rod configuration.
- The vehicle must comply with all the requirements specified in the *Australian Street Road Federation Queensland Street Rod LH9 Guidelines*.
- The vehicle is not required to comply with the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010* or the Australian Design Rules unless specified in the *Australian Street Rod Federation Queensland Street Rod LH9 Guidelines*.

2.2 Construction of a new vehicle

- A vehicle newly constructed as a passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM) may be approved as a street rod.
- The vehicle must comply with all the requirements specified in the *Australian Street Road Federation Queensland Street Rod LH9 Guidelines*.
- The vehicle is not required to comply with the *Transport Operations (Road Use Management—*

Vehicle Standards and Safety) Regulation 2010 or the Australian Design Rules unless specified in the Australian Street Road Federation Queensland Street Rod LH9 Guidelines.

2.3 Inspection

- The approved person must conduct at least three inspections of the vehicle as described in the *Australian Street Road Federation Queensland Street Rod LH9 Guidelines*.
- A previously modified vehicle must be inspected thoroughly to ensure it complies with all the requirements of the Australian Street Road Federation Queensland Street Rod LH9 Guidelines. It would normally be necessary to remove trim, carpets etc. to allow a through inspection.

2.4 Records

The approved person must hold a completed copy of each of the following:

- Proposal to build or modify a street rod; and
- Technical Advisory Committee Inspection Certificate; and
- Inspection Report; and
- Checklist LH9

Checklist LH9
Street Rod Certification (Concessional)
CODE LH9

Form No: LH9

(N/A= Not Applicable, Y=Yes, N=No)

Modification Certificate Number :				
1	ASRF Classification			
1.1	Does the vehicle comply with the definition of a street rod specified in the introduction of the Australian Street Road Federation Queensland Street Rod LH9 Guidelines?		Y	N
2	Design			
2.1	Has the vehicle been built to comply with all technical specifications of the Australian Street Road Federation Queensland Street Rod LH9 Guidelines?		Y	N
3	Welding			
3.1	Has all welding been performed by a qualified tradesperson?		Y	N
4	Workmanship			
4.1	Is all work performed in accordance with recognised engineering standards and to the satisfaction of the Approved Person?		Y	N
5	Inspection			
5.1	Has the vehicle undergone all inspections specified in the introduction of the Australian Street Road Federation Queensland Street Rod LH9 Guidelines?		Y	N
6	Records			
6.1	Are copies of the Proposal to build or modify a street rod, Technical Advisory Committee Inspection Certificate and Inspection Report attached?		Y	N

Note: If the answer to any question is **N (No)**, the modification cannot be approved under Code LH9.

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Street Rod Certification (Full)

CODE LH10

1. Scope

The following is a summary of the certifications that may be certified under Code LH10 – Street Rod Certification

1.1 Certifications covered under code LH10

The following certifications may be performed under Code LH10:

- Conversion of a passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM), built before 1 January 1949, to a street rod configuration.
- Construction of a street rod.

1.2 Certifications not covered under code LH10

The following is a summary of certifications that may not be performed under Code LH10:

- Conversion of a vehicle built from 1 January 1949.
- Construction of a vehicle not in accordance with the Australian Street Rod Federation Queensland Street Rod LH10 Guidelines, as approved by the Chief Executive.

2. Specific requirements

The following are specific requirements for certification of Street Rod vehicles which can be approved by approved persons under the code LH10.

2.1 Conversion of a pre-1949 vehicle

- Any passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM) may be converted to a street rod configuration.
- The vehicle must comply with all the requirements specified in the Australian Street Road Federation Queensland Street Rod LH10 Guidelines.
- The vehicle is not required to comply with the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010* or the Australian Design Rules unless specified in the Australian Street Road Federation Queensland Street Rod LH10 Guidelines.

2.2 Construction of a new vehicle

- A vehicle newly constructed as a passenger car, passenger car derivative or light goods vehicle (up to 4.5t GVM) may be approved as a street rod.
- The vehicle must comply with all the requirements specified in the Australian Street Road

Federation Queensland Street Rod LH10 Guidelines.

- The vehicle is not required to comply with the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010* or the Australian Design Rules unless specified in the Australian Street Road Federation Queensland Street Rod LH10 Guidelines.

2.3 Inspection

- The approved person must conduct at least three inspections of the vehicle as described in the Australian Street Road Federation Queensland Street Rod LH10 Guidelines.
- A previously modified vehicle must be inspected thoroughly to ensure it complies with all the requirements of the Australian Street Road Federation Queensland Street Rod LH10 Guidelines. It would normally be necessary to remove trim, carpets etc. to allow a through inspection.

2.4 Records

The approved person must hold a completed copy of each of the following:

- Proposal to build or modify a street rod; and
- Technical Advisory Committee Inspection Certificate; and
- Inspection Report; and
- Checklist LH10

Checklist LH10
Street Rod Certification (Full)
CODE LH10

Form No: LH10

(N/A= Not Applicable, Y=Yes, N=No)

Modification Certificate Number :				
1	ASRF Classification			
1.1	Does the vehicle comply with the definition of a street rod specified in the introduction of the Australian Street Road Federation Queensland Street Rod LH10 Guidelines?		Y	N
2	Design			
2.1	Has the vehicle been built to comply with all technical specifications of the Australian Street Road Federation Queensland Street Rod LH10 Guidelines?		Y	N
3	Welding			
3.1	Has all welding been performed by a qualified tradesperson?		Y	N
4	Workmanship			
4.1	Is all work performed in accordance with recognised engineering standards and to the satisfaction of the Approved Person?		Y	N
5	Inspection			
5.1	Has the vehicle undergone all inspections specified in the introduction of the Australian Street Road Federation Queensland Street Rod LH10 Guidelines?		Y	N
6	Records			
6.1	Are copies of the Proposal to build or modify a street rod, Technical Advisory Committee Inspection Certificate and Inspection Report attached?		Y	N

Note: If the answer to any question is **N (No)**, the modification cannot be approved under Code LH10.

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High Lift - 50mm to 125mm (Design)

CODE LS9

1. Scope

Code LS9 provides for the preparation of designs that may be approved by Registration Authorities for use by other signatories or modifiers. The designs under Code LS9 cover the design of vehicle lifts in excess of 50mm but not more than 125mm.

Vehicle lifts that do not exceed 75mm, and are achieved by modification of the suspension and fitting of alternate tyres and rims only (do not include a body lift) do not require certification under the LS9 code. Any person performing this type of modification must ensure the modified vehicle meets all the technical requirements of the LS9 and LS10 sections of this code, however no formal certification or lane change test is required.

Code LS9 does not apply to ADR category L-group vehicles, including motor cycles.

1.1 Designs covered by the Code LS9

The following is a summary of the designs that may be prepared under Code LS9:

- Design of modifications that combined result in the vehicle being raised by more than 50mm but less than 125mm from the original as manufactured height;
- Design of front suspension modifications using different struts or uprights;
- Design of independent rear suspension modifications using different struts, trailing arms or uprights;
- Design of a conversion using a complete suspension assembly from a different vehicle model;
- Design of a complete rear suspension assembly using components from different vehicle model(s); and
- Alternative wheel and tyre specifications for vehicles with modified axles or suspension.

1.2 Designs not covered by Code LS9

Designs that are not covered under Code LS9 are listed below:

- Design for vehicles originally equipped with ESC that have not been approved by the vehicle manufacturer or proven through testing;
- Certification of the actual physical modification of particular vehicles (this is covered by Code LS10);
- Design for modifications that raise the vehicle body more than 125mm from the original as manufactured height (lifting vehicles beyond 125mm is outside of the scope of the QCOP); and

- Design for modifications that raise the vehicle body more than 50mm from the original as manufactured height on vehicles that have had the wheel track reduced from the as manufactured width. Modifications to these vehicles will only be considered on an individual application basis.

2. Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010* (the regulation). These modified vehicles must also comply with the applicable in-service requirements of the regulation. This is not an exhaustive list and other modifications may also affect ADR compliance.

Modified pre-ADR vehicles must continue to comply with the regulation.

Outlined below in Table LS7 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle.

Table LS7 Summary of items that if modified, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Installation of Lighting	ADR 13/..
Braking System	ADR7, 7/.., 31, 31/.., 35x, 35/..
Speedometer	ADR18x, 18/..
Tyre Speed Rating	ADR24x, 24/..
Ground Clearance	ADR 43/..

To determine the ADRs that apply to the vehicle in question, refer to the applicability tables in Section LO. Vehicles manufactured on or after 1 January 1969 and prior to 1 July 1988 need to comply with the Second Edition ADRs whilst vehicles manufactured after this date need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport *RVCS* website at the following address and under the section titled *ADR Applicability Tables*:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

3. Specific Requirements

3.1 Body lifts between 50mm and 125mm

The following requirements must be met for all vehicle body *high lift* modifications. Where a modification involves a change to the suspension system *design*, the basic functional requirements for suspension modifications/conversions are provided as a guide to suitably qualified and experienced signatories when designing or certifying such modifications or conversions.

The design should also comply with the general guidelines contained in sub-section 2 *General Requirements, Specific Requirements* in Code LS3 *Front Suspension and Steering Conversion – Design* and *Specific Requirements* in Code LS5 *Rear Suspension Modification – Design*, in the NCOP.

Each design should be fully documented, with drawings, calculations, procedural details, test results, wheel alignment specifications and any other data necessary to fully describe the vehicle modifications and should have a unique design number. The design document should contain:

- Details of all drawings needed to fully describe the full extent of the modification;
- Details of any special modification techniques, procedures or adjustments; and
- Details of any testing of components and performance (e.g. bump steer plots) with related acceptance criteria.

3.2 Suspension Modifications

The available suspension travel in either direction must remain at least equivalent to two thirds of that originally available prior to modifying the system.

The available suspension rebound following the addition of increased length coil springs and longer travel shock absorbers must be at least equivalent to two thirds of the original rebound travel.

The rebound must be limited by either the shock absorber maximum travel (providing the component is designed for this type of loading), the technique used by the original manufacturer's design or by the addition of adequately sized straps.

At full rebound the coil springs must still be securely attached to the vehicle by not having reached their free length.

All linkages and brake lines etc. must be adequately designed for the increased movement.

The maximum increase in vehicle height due to suspension modifications alone is limited to 50mm.

3.3 Body Blocks

Body blocks between the vehicle body and the chassis must comply with the following:

- The material must be of similar strength and durability as the original components;
- All assemblies and piping that spans between the body and the chassis must be suitable for the increased distance; and
- The increase in height due to body block modifications alone is limited to 50mm.

3.4 Wheels and Tyres

The overall tyre diameter can be increased to allow an increase of 7.5mm in vehicle height for passenger vehicles and no more than 25mm in vehicle height for four wheel drive vehicles (typically MC ADR category).

Tyres fitted to off-road passenger and light goods vehicles (MC, NA, NB ADR category) must not be more than 50% wider than the vehicle manufacturer's widest optional tyre. Tyres fitted to passenger vehicles must not be more than 30% wider than the vehicle manufacturer's widest optional tyre.

The rim width must match the recommendations for the tyre fitted.

The tables of original tyres with the maximum allowable tyre and rim sizes in Clause 4.2 *Non-Standard Tyres and Rims* in the NCOP are applicable.

The wheel track of off-road and four wheel drive vehicles (MC, NA, NB ADR category) must not be increased by more than 50mm beyond the maximum specified by the vehicle manufacturer for the particular model. The wheel track of passenger vehicles, including four wheel drives or all wheel drive vehicles certified as MA ADR category must not be increased by more than 25mm beyond the maximum specified by the vehicle manufacturer for the particular model.

The wheels must be contained within the bodywork or mudguards (including flares) when the wheels are in the straight-ahead position. Adequate clearance must be available between the tyres and the vehicle bodywork.

Speedometer accuracy must be maintained for the selected tyre and rim combination to within the degree of accuracy specified in ADR 18 where applicable.

3.5 Brakes

Modifications to any of the brake circuitry should meet the requirements of Section LG *Brakes* in the NCOP.

The braking performance of the vehicle should also meet the requirements of Section LG *Brakes* in the NCOP.

3.6 Vehicle Dynamics

These modifications, where the height of the centre of mass (centre of gravity) of an existing vehicle is increased, can have a significant influence on the handling/rollover characteristics of the completed vehicle. The height that a particular vehicle can be raised is governed by the ability to safely negotiate and fully comply with the *Lane Change Test* as outlined in Section LT *Test Procedures* (Code LT2) in the NCOP. Lane change tests are required for vehicles that have been raised by more than 50mm.

While Code LS9 allows for an overall vehicle height increase of 125mm maximum, this will be limited by the vehicle's ability to safely negotiate the lane change test as mentioned above.

3.7 Vehicle Lighting

The headlights must comply with the ADR requirements with respect to position and illuminated pattern. For vehicles complying with ADR 13/00 the top of the headlamp lens must not be greater than 1200mm from the ground when measured on a level surface.

3.8 Mudguards

After all modifications are completed the mudguards must continue to comply with the provisions of ADR 42/.. .

3.9 Components

Both general and specific requirements specified in any codes of the LS Section of the NCOP that are applicable to individual steering and suspension components continue to apply. Important items such as spline engagement, operating angles of drive shaft joints and in the case of CV joints, the

range of axial movement, must remain within design limits for the full range of suspension travel. Also other components such as gear levers, brake hoses etc. may need to be extended depending on the nature of the lift.

Steering linkages must continue to operate efficiently and sufficient spline contact surface must be retained for the full range of suspension travel to ensure the safe operation of the vehicle.

Otherwise an appropriate steering shaft extension must be used.

Following the completion of modifications the vehicle attitude must remain as per original specifications – i.e. the original relationship between the front and rear suspension heights must not be changed and therefore the front and rear suspensions must be both raised by a proportionate amount.

Checklist LS9
High Lift – 50mm to 125mm (Design)
CODE LS9

Form No: LS9
(N/A=Not Applicable, Y=Yes, N=No)

Modification Certificate Number :				
1	Suspension Modifications			
1.1	Front Suspension and Steering			
	Do the front suspension system modifications comply with all of the relevant requirements of Code LS3 in the NCOP?	N/A	Y	N
1.2	Rear Suspension			
	Do the rear suspension system modifications comply with all of the relevant requirements of Code LS5 in the NCOP?	N/A	Y	N
1.3	Suspension travel			
	Is the designed suspension travel at least two thirds of the original in all directions?	N/A	Y	N
	Has adequate rebound limiting been provided?	N/A	Y	N
	At full rebound do the coil springs remain securely attached to the vehicle by not having reached their free length?	N/A	Y	N
	Have all linkages and brake lines been designed to accommodate the increased suspension travel?	N/A	Y	N
2	Body Blocks			
2.1	Mounting			
	Are the replacement body blocks suitably designed to carry the load as per the vehicle's GVM?	N/A	Y	N
	When fitted, will the blocks lift the body 50mm or less?	N/A	Y	N
2.2	Design			
	Are all assemblies spanning the body and chassis suitably designed to allow for the increased distance?	N/A	Y	N
	Are the body lift blocks suitably braced to the chassis or bodywork so as to prevent excess bending loads being placed on components?		Y	N

3	Wheels and Tyres			
	Tyres and Rims			
3.1	Are all selected tyres and rims in accordance with Section LS?	N/A	Y	N
	Is the increase in overall diameter less than 50mm for 4 wheel drive vehicles or 15mm for passenger vehicles?	N/A	Y	N
3.2	Speedometer			
	Has the speedometer accuracy been taken into account?	N/A	Y	N
4	Vehicle Dynamics			
	Lane Change Test			
4.1	Has a vehicle undergone and passed a Lane Change Test as required by Code LT2 in the NCOP?	N/A	Y	N
	Was the driver satisfied that the vehicle was safe to drive?	N/A	Y	N
5	High Lift			
	Maximum Increase in Vehicle Height			
5.1	Is the design total increase in vehicle height less than 125mm?		Y	N
	Is the design top of the dipped beam headlight height less than 1200mm?		Y	N
	Will the dipped beam headlight pattern and position comply?		Y	N
5.2	Will the mudguards still continue to comply with ADR 42?		Y	N
6	Brakes			
6.1	Do the intended brake modifications comply with Section LG in the NCOP?	N/A	Y	N
6.2	Will the brakes meet the Section LG performance requirements in the NCOP?	N/A	Y	N
7	Fasteners			
7.1	Are high tensile bolts specified for all new critical mountings?		Y	N
7.2	Are self-locking nuts specified for all new critical mountings?		Y	N

7.3	Do all fasteners specified comply with the applicable requirements of Section LZ Appendices - Appendix A Fasteners in the NCOP?		Y	N
8	Design			
8.1	Does the design of the modification comply with all of the requirements outlined in Code LS9?		Y	N
8.2	Has all work, including welding, that has been specified in the certification of the LS9 design, been determined in accordance with recognised engineering standards and the relevant Appendices of Section LZ Appendices?		Y	N
8.3	Have all components affected by the lift such as gear levers, brake hoses etc. been modified to comply with Code LS9?	N/A	Y	N
8.4	Have all items affected by the lift such as drive shaft joint operating angles, spline engagement and axial movement of CV\ joints been checked or designed to be within design limits over the entire suspension travel?	N/A	Y	N
8.5	If the vehicle was originally equipped with ESC, and if the modification affects the ESC, has the ESC system been adjusted and tested and found to operate satisfactorily?	N/A	Y	N

Note: If the answer to any question is **N (No)**, the design cannot be certified under Code LS9.

High Lift - 50mm to 125mm (Modification)

CODE LS10

1. Scope

Code LS10 covers modifications that result in a vehicle lift of more than 50mm but not more than 125mm.

The conversions may be carried out in conformity with designs approved by a Registration Authority under Code LS9.

Vehicle lifts that do not exceed 75mm, and are achieved by modification of the suspension and fitting of alternate tyres and rims only (do not include a body lift) do not require certification under the LS9 code. Any person performing this type of modification must ensure the modified vehicle meets all the technical requirements of the LS9 and LS10 sections of this code, however no formal certification or lane change test is required.

Code LS10 does not apply to ADR category L-group vehicles, including motor cycles.

1.1 Modification covered under code LS10

The following is a summary of the modifications that may be performed under Code LS10:

- Modifications that result in the vehicle being raised by more than 50mm from the original as manufactured height;
- Front suspension modifications using different struts or uprights;
- Independent rear suspension modifications using different struts, trailing arms or uprights;
- Conversion using a complete suspension assembly from a different vehicle model;
- Fitment of a complete rear suspension assembly using components from different vehicle model(s);
- Installation of body lift kits; and
- Fitting of alternative wheel and tyre specifications for vehicles with modified axles or suspension.

1.2 Modifications not covered under code LS10

The following is a summary of the modifications that may not be performed under Code LS10:

- Modifications to vehicles originally equipped with ESC that have not been approved by the vehicle manufacturer or proven through testing;
- Design of the modification of particular vehicles (this is covered by Code LS9);
- Modifications that do not have a design in accordance with the requirements of Code LS9;
- Modifications that raise the vehicle body more than 125mm from the original as manufactured height (lifting vehicles beyond 125mm is outside of the scope of the QCOP); and
- Modifications that raise the vehicle body more than 50mm from the original as manufactured height on vehicles that have had the wheel track reduced from the a manufactured width. Modifications to these vehicles will only be considered on an individual application basis.

Checklist LS10
High Lift – 50mm to 125mm (Modification)
CODE LS10

Form No: LS10
(N/A=Not Applicable, Y=Yes, N=No)

Modification Certificate Number :				
1	Design			
1.1	Insert LS9 Design Number.....(the Design)			
1.2	Has the vehicle been modified exactly in accordance with the plans and specifications issued under the LS9 Design Number given above?	N/A	Y	N
1.3	If the vehicle was originally equipped with ESC, and if the modification affects the ESC, has the ESC system been adjusted and tested and found to operate satisfactorily?	N/A	Y	N
2	Vehicle condition prior to modification			
2.1	Is the front suspension serviceable?		Y	N
2.2	Is the steering box serviceable?		Y	N
2.3	Is the steering linkage serviceable?		Y	N
2.4	Is the chassis serviceable?		Y	N
3	Workmanship			
3.1	Is all work, including welding, of satisfactory quality and has all work been performed in accordance with recognised engineering standards?	N/A	Y	N
3.2	Do all new or replaced fasteners comply with the applicable requirements of Section LZ Appendices, Appendix A Fasteners in the NCOP?		Y	N
3.3	Are high tensile bolts and self-locking nuts used on all critical joints and mountings?		Y	N
4	Modification Details			
4.1	What was the original height of the vehicle body prior to any modification?			
4.2	What is the height of the vehicle body following completion of all lift modifications			
4.3	Is the difference in height less than 125mm?		Y	N
4.4	What is the maximum size tyre offered by the manufacturer for this vehicle?			

4.5	What size tyre has been fitted?			
4.6	Is the difference in diameter 50mm or less?		Y	N
4.7	If the vehicle body has been lifted relative to the chassis, is the overall body lift 50mm or less?	N/A	Y	N
4.8	If the suspension has been modified to provide an increase in vehicle body height, is this increase 50mm or less?	N/A	Y	N
5	Lane Change Test			
5.1	Has the vehicle undergone a Lane Change Test as per Code LT2 in the NCOP?	N/A	Y	N
5.2	Did the vehicle pass the test satisfactorily?	N/A	Y	N
5.3	Was the driver satisfied that the vehicle was safe to drive?	N/A	Y	N
5.4	Is a copy of the lane change test results form attached as required by Code LT2 in the NCOP?	N/A	Y	N
6	Vehicle condition after modification			
6.1	Is the front suspension serviceable?		Y	N
6.2	Is the steering box serviceable?		Y	N
6.3	Is the steering linkage serviceable?		Y	N
6.4	Is the chassis serviceable?		Y	N
6.5	Is the dipped beam headlight height less than 1200mm?		Y	N
6.6	Have the headlights been adjusted?		Y	N
6.7	Have all brake tests been satisfactorily completed?	N/A	Y	N
6.8	Is the combined height increase 125mm or less?		Y	N
6.9	Do the mudguards continue to comply as with ADR 42?		Y	N
6.10	Have all components affected by the lift such as gear levers, brake hoses etc. been modified and fitted to comply with Code LS9?	N/A	Y	N
6.11	Have all items affected by the lift such as drive shaft joint operating angles, spline engagement and axial movement of CV joints been checked and found to be within design limits over the entire suspension travel?	N/A	Y	N

Note: If the answer to any question is **N (No)**, the modification cannot be certified under Code LS10.

Gross Vehicle Mass Rating of Light Vehicles

Code LS11

1.0 Scope

The LS11 Modification Code specifies requirements for rerating of the gross vehicle mass (GVM) of a light vehicle that is, vehicle having current GVM rating not exceeding 4 500 kg.

Rerating of GVM under code LS11 is permissible only on a light vehicle that is constructed on a ladder type chassis frame on which a cabin and/or body is mounted. Vehicles with integrated frame and body are not eligible.

For the purpose of this code, the original vehicle manufacturer refers to the first stage manufacturer. Second Stage Manufacturers (SSM) such as SSM Approval or RAWs Approval Holders are **not** considered as original vehicle manufacturer.

In cases where a vehicle manufacturer does not specify an original GVM rating for a vehicle \ the maximum laden mass permitted by the original vehicle manufacturer for ADR compliance is to be taken as the GVM rating. This information must be obtained from a reliable and traceable source.

1.1 Modifications allowed under Code LS11

Modifications that may be certified under Code LS11 are:

- Increase in GVM rating of an in-service vehicle that is modified in accordance with a SSM Approval for the same make/model/variant/chassis series (where the SSM Approval holder has permitted use of that SSM Approval as the basis)
- Increase in GVM where an additional axle has been installed
- Alteration of a vehicle's GVM rating to match a manufacturer's alternative rating for a particular variant of that vehicle's make/model
- Up to 10% increase in GVM outside of a manufacturer's GVM rating

1.2 Modifications not allowed under Code LS11

Modifications that must not be certified under Code LS11 are:

- Increase in GVM greater than 10% of a manufacturer's rating (except where an additional axle has been fitted or modified in accordance with an SSM approval)
- Increase in GVM rating of vehicles having unitary/monocoque construction
- Increase in GVM rating where no physical modifications (i.e. reinforced suspension, frame, brakes, etc) are performed (replacement tyres and rims alone, with different ratings are not deemed as physical modification).

Please note, this does not apply when upgrading to a manufacturer's optional GVM where the vehicle specifications of both GVM options are identical.

- Reduction in GVM rating (apart the re-rating a vehicle's GVM to a manufacturer's optional GVM for that particular make/model of vehicle).

- GVM increase to a vehicle which has previously received a GVM increase (i.e. SSM, Code of Practice)
- Increase in GVM rating of an in-service vehicle that is modified in accordance with a SSM Approval where the SSM Approval holder has NOT provided approval to use the SSM Approval as the basis.
- Increase in GVM rating of an in-service vehicle that is modified in accordance with a Low Volume SSM Approval but where the number of vehicles exceeded the SSM Approval limit.
- Increase in Gross Combination Mass (GCM) rating (unless in accordance with an SSM approval)
- Increase in the maximum towing mass rating. (unless in accordance with an SSM approval)
- Increase in vehicle's rated towing capacity (unless in accordance with an SSM approval)
- Re-rating of vehicle components or sub systems beyond the original vehicle manufacturer's rating.

2.0 General Requirements

For a vehicle to qualify for an increase in GVM, the vehicle must be able to safely operate at the increased GVM. The chassis, drive-train, axles, suspension, brakes, steering, wheels and tyres are all critical components which must be assessed individually to ensure that each is suitable to operate under the increased loads resulting from increased GVM.

All work must also comply with the requirements contained in sub-section 2 General Requirements of the NCOP.

Increased GVM has the potential to affect eligibility of warranty claims with the vehicle manufacturer in some cases. It is the responsibility of the vehicle operator and Approved Person to consider any effect on warranty that the modification may have.

2.1 Compliance with applicable vehicle standards

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010 (the Regulation)*. Modified vehicles must also comply with the applicable in-service requirements of the regulation.

Modified pre-ADR vehicles must continue to comply with the Regulation.

Outlined below in Table LS11 are areas of the vehicle that may be affected by the modifications and may require re-certification, testing and/or data to show compliance of the modified vehicle. This is not an exhaustive list and other modifications may also affect ADR compliance.

Table LS11 Summary of items that, if modified or altered, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Tyre and Rim Selection	ADR 42/..
Hydraulic Brake Systems	ADR 31/...or ADR 35/...
Brake Performance	<i>Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010</i>

To determine the ADRs that apply to the vehicle in question, refer to the Applicability Tables in Section LO of VSB-14. Vehicles manufactured between 1 January 1969 and 1 July 1988 (both inclusive) need to comply with the Second Edition ADRs, whilst vehicles manufactured after 1 July 1988 need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the website of Road Vehicle Certification System (RVCS) of the Commonwealth Department of Infrastructure and Regional Development (DIRD).

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

Sections 2.2 to 2.5 relate to the different option of upgrading the vehicle's GVM.

2.2 GVM alteration based on Manufacturer's Option

The change to the vehicle's GVM must replicate the manufacturer's optional GVM for that particular make, model and variant of vehicle. Additionally, all components, including suspension, transmission, engine, brakes, tyre and rims, and so on must be fitted and identical to those specified for that particular vehicle's rated variant.

2.3 GVM Upgrade based on SSM Approval

The increase in vehicle GVM must be the same as the SSM approved vehicle. All upgraded components, including suspension, brakes, tyres and rims, etc must be fitted and be identical to those specified on the SSM approved vehicle.

In addition to the physical modification replicating the SSM approval, all the administrative requirements specified under the SSM must also be met. These requirements can include but are not limited to the following:

- The vehicle's first Identification Plate Approval number must be identical to that mentioned in the SSM Approval.
- If the SSM approval limits the number of vehicles to be supplied under it each year, (for example, Low Volume 25 or 100 per annum), the same restriction applies to the number of vehicles permitted to be modified under this code.

When upgrading GVM in accordance with an SSM approval the certifier must ensure the SSM Approval holder has provided written permission for use of the SSM design as the basis. Additionally, if upgrading a GVM in accordance with a Low Volume SSM a statutory declaration must be obtained from the SSM holder stating no more approvals than the limit stipulated on the SSM have been provided. For example, if the Low Volume SSM restricts the number of vehicles to 25 per annum then the SSM holder cannot provide permission for more than 25 in-service vehicles to be modified in that year (in addition to the 25 vehicles certified in accordance with their SSM approval).

Note: both the written permission and statutory declaration from the SSM holder must be retained by the Approved Person as evidence for certifying GVM upgrade under this code.

2.4 GVM Upgrade by installation of an additional axle

If an additional axle is fitted to a vehicle (i.e. lazy axle or additional drive axle) the vehicle's GVM may be increased by a maximum of 10% above the original vehicle manufacturer's GVM. However, if the additional axle is load sharing with adjacent axle in the group then the 10% limit on increase in GVM increase may be exceeded. The fitment of an additional axle is permitted in Queensland under the LB2 modification code.

2.5 GVM Upgrade Outside of Manufacturer's Option

An increase in GVM is permitted on a vehicle even if it is not an option by the vehicle manufacturer. In these cases the maximum allowable increase to the vehicle's GVM is 10% above the vehicle's original manufacturer's GVM. However, the actual increase in GVM (not exceeding 10%) is limited by various factors including chassis, drive-train, axles, suspension, brakes, steering, wheels and tyres.

3.0 Specific Requirements

The GVM upgrade must address the compatibility of the entire vehicle for the revised GVM; in particular it must be checked that the chassis, suspension, axles and drive train components are used within their manufacturer's rated capacities. Where a component manufacturer has published information stating that reduced ratings apply for safety reasons, the reduced rating must apply.

Typical modifications involved with increasing a vehicle's GVM include:

- single axle to tandem axle configuration
- combination of replacement engine, transmission, axles or suspension components and upgraded brake components

The following specific requirements must be met to receive a GVM increase on a light vehicle in accordance with this code.

3.1 Chassis

Chassis modifications must be performed in accordance with section H of Vehicle Standards Bulletin 6 – Heavy Vehicle Modification, as far as possible and appropriate.

When modifications such as fitting of additional or replacement axles with higher load rating are carried out, the vehicle frame must be analysed to ensure that it has sufficient strength to accommodate the increased GVM. As Vehicle Standards Bulletin 14 – National Code of Practice for Light Vehicle Construction and Modification does not provide information regarding calculating chassis strength, Vehicle Standards Bulletin 6 – Heavy Vehicle Modification may be consulted.

A simplified way to look at the frame requirements for GVM upgrade, is to associate the bending strength of the chassis with the load carrying capacity (i.e. GVM).

3.2 Engine/Transmission

The GVM rating assigned must not exceed the engine and transmission manufacturer's recommendations, or the limit set by vehicle manufacturers for a vehicle using the engine and transmission models being assessed. Where certification is by comparison with a manufacturer's reference vehicle, the engine and transmission fitted to the modified vehicle must be identical to those fitted by the manufacturer to the reference vehicle.

3.3 Axle Ratings

With increase in GVM, additional loads are placed on axles. Vehicle's axle ratings must not only be adequate for the revised GVM but must also be able to accommodate the axle loads resulting from normal and practical loading patterns.

Where certification is by comparison with a manufacturer's reference vehicle, the axle and suspension assemblies fitted to the modified vehicle must be identical to those fitted by the manufacturer to the reference vehicle with the higher GVM rating.

In cases where a component manufacturer has published information reducing the rating capacity of a component for safety reasons, the reduced rating must apply.

3.4 Tailshaft

Modifications associated with increasing a vehicle's GVM can place greater demands on a vehicle's tailshaft. These may include but are not limited to the following:

- changes to vehicle ride height which may alter the tailshaft and pinion angles;
- alterations to a vehicle's wheelbase may result in change in tailshaft length;
- changes to engine and/or transmissions may impose increased torsional loading on the tailshaft.

The vehicle's tailshaft strength and its installation must be suitable for the vehicle's increased GVM.

3.5 Suspension

With increase in GVM, additional loads are placed on suspension. Vehicle's suspension ratings must not only be adequate for the revised GVM but must be able to accommodate the axle loads resulting from normal and practical loading patterns. Effects of changes in ride height must be carefully considered. FOR EXAMPLE, bump and rebound travel, hydraulic brake hose length, handling & roll stability.

3.6 Brakes

A vehicle's braking performance is directly affected by changes to the vehicle's GVM. Therefore, the vehicle's braking system must be tested to determine if the original system is adequate for the proposed GVM or if it requires to be upgraded.

3.7 Steering

The entire steering system must be identical to that fitted by the manufacturer to the original or reference vehicle as appropriate. If the steering system is modified or a new steering system is fitted it must be approved under the LS section of Vehicle Standards Bulletin 14 – National Code of Practice for Light Vehicle Construction and Modification.

3.8 Tyres and Rims

The sum of the load carrying capacities of the tyres fitted must be at least equal to the GVM. The same applies to load carrying capacities of the rims. Moreover the load capacity of the tyres (and rims) on each axle must be adequate to support the load imposed on that axle.

The load carrying capacity of any tyre or rim must not be exceeded when the vehicle is loaded to the revised GVM rating.

The tyres and rims must be selected to comply with the requirements of the relevant ADR (ADR 24/... or ADR 42/04) at the revised GVM rating.

If required, an amending tyre placard must be fitted to indicate the correct tyre specifications for the vehicle at the revised GVM rating. The revised tyre size and load rating must also appear on the modification plate.

4.0 Load Capacity Label and Handbook

To ensure the vehicle operator is adequately informed of the vehicle's towing capacity the vehicle's handbook must be updated. The update must provide specific details of the towing capacity and if applicable, any variation in towing capacity due to vehicle loading conditions and/or vertical load on tow ball (ball weight).

If the vehicle's handbook is not available this information must be provided in written form to the owner of the vehicle owner. Optionally this information may be included on the load capacity label discussed below.

A label containing important information about the vehicle's load capacity must also be fitted. The label must be identical to the example below and must be fitted to the vehicle, as close as practicable to the vehicle's tyre placard.

Ratings Item	Rating Information
SSM Approval # (if applicable)	
Upgraded GVM	kg
Maximum Towing Mass*	kg
Maximum Allowed Front Axle/s Weight	kg
Maximum Allowed Rear Axle/s Weight	kg
Total Vehicle Load Capacity	kg
*Warning: The maximum mass the vehicle can safely tow may depend on vehicle loading and/or trailer ball weight. For further information regarding towing capacities please refer to the vehicle's handbook.	

5.0 Limitations

For modifications not permitted under Code LS11 see Section 1.2. In addition, the following limitations stipulated in sections 5.1 and 5.2 apply.

5.1 Electronic Stability Control

Changes to a vehicle's GVM can have a direct effect on electronic stability control (ESC) performance. Therefore, for vehicles fitted with ESC the system must be tested to ensure it continues to comply with the relevant ADR or manufacturer's specifications. However, this is not required where a vehicle's GVM is being related to a manufacturer's alternative variant or by SSM approval such that the system's compliance has been demonstrated.

5.2 Gross Combination Mass Rating & Towing Capacity

This code does not permit an increase in rated towing capacity or GCM rating (unless in accordance with an SSM approval). For some light vehicles rated towing capacity or GCM rating may not be specified. In such cases please note that the maximum towing mass at GVM must be proportionately reduced to ensure that the sum of GVM and maximum towing mass at GVM before and after GVM upgrade remains unchanged.

6.0 Additional Modifications and Category Changes

Where additional modifications have been performed or a change in vehicle category has occurred due to the increase in GVM the appropriate codes must be used.

Checklist LS11
Gross Vehicle Mass Increase
CODE LS11

Form No: LS11
(Y=Yes, N=No, N/A= Not Applicable)

1	Suspension			
1.1	Is the vehicle's suspension suitable for the increased GVM?		Y	N
2	Chassis			
2.1	Is the chassis suitable for the increased GVM?		Y	N
3	Axles			
3.1	Are the axle ratings suitable for the increased GVM?		Y	N
4	Engine/Transmission			
4.1	Is the engine/transmission suitable for the increased GVM?		Y	N
5	Braking System			
5.1	Has a brake test been carried out on the modified vehicle to ensure compliance with ADR 31/.. or 35/.., whichever is applicable? (applicable in all cases apart from upgrading to an SSM approval or original vehicle manufacturer's optional GVM)	N/A	Y	N
5.2	Is the vehicle's brake system suitable for the increased GVM?		Y	N
6	Tyres and Rims			
6.1	Does the Modification Plate record the correct tyre and rim sizes and load ratings for the modified vehicle?		Y	N
6.2	Has an updated tyre placard been fitted to the vehicle?		Y	N
6.3	Do tyres and rims fitted conform to the modification plate and the tyre placard?		Y	N
6.4	Are load ratings of the tyres and rims adequate for the vehicle's new GVM?		Y	N
7	Electronic Stability Control			
7.1	Has the vehicle's ESC system been tested to confirm that the system continues to meet the relevant ADR or manufacturer's specifications?	N/A	Y	N
8	Load Capacity Information			
8.1	Is the Load Capacity Label attached to the vehicle?		Y	N
8.2	Has the vehicle's handbook been amended or additional information been included on the Load Capacity Label?		Y	N
9	Manufacturer's Optional GVM			

9.1	Does the re-rated GVM match an alternative option for the same make, model and variant produced by the vehicle manufacturer?	N/A	Y	N
9.2	Are all components relevant to the GVM rerating (brake, engine, transmission, suspension, tyres and rims etc) identical to the original vehicle manufacturer's alternative specification?	N/A	Y	N
10	Second Stage of Manufacturer GVM/GCM			
10.1	Has the SSM Approval holder provided written approval to use their SSM design?	N/A	Y	N
10.2	If certifying the GVM/GCM upgrade using a Low Volume SSM Approval, has a statutory declaration been obtained?	N/A	Y	N
10.3	Does the rerated GVM/GCM match that of the SSM approval?	N/A	Y	N
10.4	Are all components relevant to the GVM/GCM rerating (brake, suspension, tyres and rims, etc) identical to the SSM design?	N/A	Y	N
11	Fitment of an additional axle			
11.1	If the vehicle's GVM has been increase more than 10% is the additional axle load sharing?	N/A	Y	N

Note: If the answer to any question is **N (No)** the design cannot be certified under Code LS11.

CERTIFICATION DETAILS																	
Make						Model						Year of Manufacture					
VIN																	
Chassis Number (If applicable)																	
Brief Description of Modification/s																	
Vehicle Modified By																	
Certificate Number (If applicable)																	
Vehicle Certified By (<i>Print</i>)																	
Signatory's Employer (If applicable)																	
Signatory's Signature												Date					

LIGHT TRAILER MODIFICATIONS

Modification Code LS12

1. Scope

The LS12 code specifies requirements for a suitably qualified Approved Person to certify modifications to trailers with an aggregate trailer mass (ATM) of 4500 kg or less. The modified trailer must continue to comply with the relevant requirements of Vehicle Standards Bulletin 1 – *Building Small Trailers* (VSB1).

Modifications that can be certified under this code are explained in Section 1.1

Simple changes to the trailer such as, the fitting of a spare wheel carrier, bolting on a storage box or adding a cage to a box trailer do not require certification. However, when making these changes be aware that the trailer's dimensions may change or lights/number plates may be obscured. It is essential to ensure the trailer remains compliant to VSB-1 after any changes.

1.3 Modifications covered by this Code LS12

- Modifications to suspension, brakes, tow couplings, drawbars, wheels (rims & tyres) and trailer chassis such that the trailer continues to comply with VSB-1
- Rerating of the trailer's ATM such that the trailer continues to comply with VSB-1 and revised ATM does not exceed 4500 kg.

1.4 Modifications not covered by this Code LS12

- Changes resulting in a trailer that does not comply with VSB-1.
- Modifications to a trailer with an ATM greater than 4500 kg.
- Modifications resulting in a change to the trailer's category as defined in Administrator's Circular 0-7-5 (semi, pig, dog etc)*
- A change to a trailer's registration category (box trailer, boat trailer, caravan)
- Increase in ATM such that the revised ATM exceeds 4500 kg.

***Note:** If modifications result in a change of the trailer's category as defined in Circular 0-7-5, or registration type (e.g. pig trailer to dog trailer, semi-trailer to dog trailer, box trailer to boat trailer, caravan to box trailer, and so on) they are regarded as newly manufactured and must be constructed to meet VSB-1 and issued with a new Vehicle Identification Number (VIN) and trailer plate.

2. Basic Modifications without Certification

The following modifications may be carried out provided they do not affect compliance with VSB-1 and meet the general safety requirements specified below for each modification:

2.1 Replacement Tyres and Rims

A trailer with an ATM of 4.5 tonnes or less may be equipped with tyres other than those listed for that particular variant provided that:

- the load rating of the tyres is not less than the lowest load rating listed on the tyre placard of the vehicle or equivalent variant of that model vehicle; and
- the speed rating is of at least 120 km/h; and
- all requirements specified in sections 2.2 - 2.5 are met.

2.2 Wheel Attachment

Replacement wheels must be designed for the particular hub/axle and have the same bolt/stud pitch circle diameter and the same centre location method. The wheel nuts or bolts must have the same tapers as the wheel. Wheels with slotted bolt/stud holes must not be used.

Replacement aluminium alloy rims should be located on the hub/axle by the same diameter centre spigot as the original wheel, using suitable adaptor rings where necessary.

Wheel nuts and bolts must have a thread engagement length at least equal to the thread diameter, except where specified otherwise by the vehicle manufacturer.

Wheel spacers (or adaptors for dual wheel conversions) between the wheel mounting face and the road wheel must not be used unless fitted as original equipment by the vehicle manufacturer.

Modifications to disc brake calipers, hubs and suspension and steering components to enable the fitting of replacement wheels must not be undertaken.

2.3 Clearance

No part of the wheel must touch any part of the body, chassis, braking system or suspension under any operating condition. To check this, the vehicle must be fully laden and capable of negotiating raised obstacles that would normally be encountered whilst driving such as speed humps and driveway entries. The wheels must be contained within the bodywork, or mudguards (including *flares*).

Suspension stops must not be modified to provide clearance for wheels.

2.4 Overall Nominal Diameter

The overall diameter of any tyre fitted to a braked on-road trailer originally fitted with passenger car tyres must not be more than 15mm larger or 26mm smaller than that of any tyre designated on the trailer plate.

The overall diameter of any tyre fitted to a trailer specifically designed for off-road use and originally fitted with 4WD tyres or light truck tyres must not be more than 50mm larger or 26mm smaller than that of any tyre designated on the trailer plate.

Note: Increases in tyre diameter are subject to compliance with all other requirements specified under this clause and may therefore be limited by other factors such as insufficient clearance.

2.5 Tyre and Rim Sizes

Tyres and rims fitted to each axle of a trailer must be of the same diameter, offset, width and mounting configuration (except for spare wheels used in an emergency situation).

Tyres fitted to an on-road trailer originally fitted with passenger car tyres must not be more than 30% wider than vehicle manufacturer's widest optional tyre.

Tyres fitted to a trailer specifically designed for off-road use (and originally fitted with 4WD tyres or light truck tyres) must not be more than 50% wider than vehicle manufacturer's widest optional tyre.

Note: The rim width must not exceed the recommendations for the tyre fitted.

2.6 Wheel Track

The wheel track of trailer must not be increased by more than 25mm beyond the maximum specified by the trailer manufacturer for the particular model. This means that the rim offset must not be changed by more than 12.5mm.

The wheel track of a trailer specifically designed for off-road use (and originally fitted with 4WD tyres or light truck tyres) must not be increased by more than 50mm beyond the maximum specified by the trailer manufacturer for the particular model.

Note: A reduction in wheel track is not permitted on any trailer.

3. Coupling

A coupling fitted to a trailer with an ATM of 3500kg or less may be replaced provided the following conditions are met:

- The replacement coupling's mounting position/points are identical to the original coupling; and
- The replacement coupling meets the appropriate standard and is marked accordingly;
- The replacement coupling does not result in an increase in the effective length of the drawbar.

Note: Information relating to the relevant standards and markings for couplings are provided in VSB-1. When replacing a trailer's coupling it is essential that this information is followed.

When replacing the coupling on a trailer with an ATM greater than 3500kg and/or if the replacement coupling's mounting position differs from the original the modification will be required to be certified by an Approved Person under the LS12 code.

4. Safety Chains

A trailer's safety chains can be extended or shortened provided the replacement chain/s (including joiners such as hammerlocks):

- Are marked in accordance with the relevant Australian Standard;
- For trailers with an ATM not exceeding 2500kg have at least one safety chain meeting Australian Standard AS 4177.4-1994 or AS 4177.4-2004;
- For trailers with an ATM over 2500kg but not exceeding 3500kg have at least two safety chains meeting Australian Standard AS 4177.4-1994 or AS 4177.4-2004;
- For trailers with an ATM over 3500kg ATM have at least two safety chains made from steel of a minimum 800MPa breaking stress which conforms to Grade T chain as specified in Australian Standard AS 2321-1979 or AS 2321-2006.

Note: Each chain must be sized such that the minimum breaking load exceeds the trailer's ATM.

In some cases the safety chain attachment point/s may be modified or new attachment point/s fitted. In such circumstances testing must be conducted to ensure they are capable of withstanding minimum loads specified in VSB-1 and will be required to be certified by an Approved Person under the LS12 code.

5. Body Modifications

Storage boxes, cages, carriage racks and so on may be modified or fitted to a trailer provided:

- The trailer's dimensions remain compliant;
- They are fitted securely;
- They are designed and fitted in a way which minimises the risk of injury to vulnerable road users.

Note: When fitting storage boxes, carriage racks, and so on it is important to consider how much weight they will impose on the trailer when loaded.

6. Compliance with applicable vehicle standards

Trailers modified under this code LS12 must continue to comply with VSB-1 and the applicable requirements of the Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010.

VSB-1 establishes a set of design and construction standards for road trailers (with an ATM of 4.5 tonnes or less) that operate as an alternative to the ADRs.

The standards in VSB-1 are based on the ADRs – but are simpler and more practical to use. They offer a low-cost alternative, by eliminating the need for some of the more expensive forms of vehicle testing and evidence that are required under the ADRs.

VSB1 is available at the following address:

http://www.infrastructure.gov.au/roads/vehicle_regulation/bulletin/vsb1/pdf/vsb01_June2009.pdf

7. Specific requirements for modifications

Modifications to a trailer must meet the standards set out in VSB1.

Changes to trailer ratings must address necessary changes to all other affected parts. FOR EXAMPLE, increasing ATM rating may involve changes to suspension, tow coupling, brakes, safety chains and chassis rails.

Checklist LS12
Light Trailer Modifications
Code LS12

Form No: LS12
(Y=Yes, N=No)

1	General			
1.1	Does the modified trailer comply with VSB-1?		Y	N
2	Trailer ATM Before Modification _____ kg After Modification _____ kg			
2.1	Was the trailer's original ATM 4500kg or less?		Y	N
2.2	Is the trailer's revised ATM 4500kg or less?	N/A	Y	N
3	Chassis			
3.1	Is the trailer's chassis suitable for the trailer's revised ATM?	N/A	Y	N
3.2	Does the trailer's drawbar meet the VSB1 minimum strength requirements at its revised ATM?			
4	Dimensions			
4.1	Are the trailer dimensions within the limits permitted in VSB-1 and ADR 43/04?		Y	N
5	Braking System			
5.1	Does the trailer's braking system comply with the requirements of VSB-1?		Y	N
6	Tyres and Rims			
6.1	Does the Modification Plate show the tyre and rim sizes and load ratings that are suitable for trailer's rating?		Y	N
6.1	Are tyres and rims fitted in conformance to the modification plate?		Y	N
7	Tow Coupling			
7.1	Does the tow coupling, tow coupling mounting and drawbar (if applicable) meet the requirements of ADR 62/..?		Y	N
8	Safety Chains (Please note: N/A is only an option when certifying a dog trailer or fifth wheeler trailer)			
8.1	Are the correct number of safety chains fitted?	N/A	Y	N
8.2	Does/Do the safety chain/s comply with the applicable Australian Standard?	N/A	Y	N
9	Lighting System			
9.1	Do the lights and the reflectors comply with VSB-1?		Y	N

10	Axles and Suspension			
10.1	Is the trailer's suspension type fit for the purpose?		Y	N
10.2	Are all suspension components adequately rated?		Y	N
10.3	Are all axles adequately rated?		Y	N
11	Caravan Requirements			
11.1	Have all caravan requirements of VSB-1 been met?	N/A	Y	N

Note: If the answer to any question is **N (No)** the ATM rerating cannot be certified under Code LS12.

CERTIFICATION DETAILS																
Make						Model						Year of Manufacture				
VIN																
Chassis Number (If applicable)																
Brief Description of Modification/s																
Vehicle Modified By																
Certificate Number (If applicable)																
Vehicle Certified By (<i>Print</i>)																
Signatory's Employer (If applicable)																
Signatory's Signature											Date					

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Heavy Vehicles

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Bus Life Vehicle Rating

CODE S13

1. Scope

This section outlines the minimum standard required for the inspection and issue of a life extension for a heavy bus.

As an alternative to the replacement of an aging bus, owners may wish to consider refurbishing it. Three options are available. However, each will require a commercial decision by the owner to determine if the bus should be replaced, or to upgrade, refurbish and extend its life.

The definition of a heavy bus is a passenger vehicle with a GVM exceeding 5t and having more than 9 seating positions, including the driver.

2. General requirements

- The guidelines contained in this code apply to all heavy buses used for public passenger services. These guidelines, referred to in Section 25(2) of the *Transport Operations (Passenger Transport) Standard 2010*, are also contained in Department of Transport and Main Roads information bulletins.
- This code and the information bulletins outline the requirements for either refurbishing a heavy bus to meet the Age Zero requirements, or for carrying out a partial refurbishment to achieve a five year extension to the 15 or 25 year maximum age standards.
- Five Year Life Extension for Open Classification Buses (Age 10)- Requires refurbishment of the bus, including engineer's certification of the structural integrity and serviceability of chassis, body, suspension, steering and brake components and certification that it complies at the time of approval with all Australian Design Rules (ADRs) applicable five years after the bus was first registered. A five year life extension can only be performed once in the life of any bus.
- Five Year Life Extension for Regional Classification Buses (Age 20)- Requires refurbishment of the bus, including the engineer's certification of the structural integrity and serviceability of chassis, body, suspension, steering and brake components and certification that it complies at the time of approval with all ADRs applicable five years after it was first registered. A five year life extension can only be performed once in the life of any bus.
- Age Zero- Requires a new body and the complete refurbishment of the bus including an engineer's certification of structural integrity and serviceability of chassis, body, suspension, steering and brake components and certification that it complies, when completed, with all ADR's applicable to a new bus at that time.
- Any certification work that would amount to a 'Professional Engineering Service' (as defined in *Professional Engineers Act 2002*) must only be provided by a person who is;
 - Registered as a Registered Professional Engineer Queensland (RPEQ); or
 - Under the direct supervision of an RPEQ who is registered in that area of engineering and responsible for the service being certified.
- Vehicle systems and components, which have been recently refurbished or replaced, will not be required to be dismantled or refurbished provided documentary evidence or proof of replacement or refurbishment is made available to the certifying engineer.
- All modifications completed as part of the refurbishment process, or those which have been done in the past, must be in accordance with the standards prescribed in VSB 6, and must be certified by an Approved Person.

- Each bus, prior to reintroduction into service, must undergo a full evaluation and rating by an Approved Person under the requirements of the heavy code sections S4 or S5, and S6 to validate the passenger carrying capacity and compliance with Queensland Transport safety standards.
- For the purposes of this code, bus age is calculated from the date of first registration. If this information is not available, the date of manufacture of the original body is to be used.
- On completion of the refurbishment to the required standard, a modification plate must be attached to the plate in a position adjacent to the original manufacturer's plate or compliance plate. The plate must be marked as follows:
 - Five Year Extension- S13/5/ * / **** (where *=month and ****=year of withdrawal from service) ie. An extension of 5 years in November 2001 for a November 1976 vehicle would be displayed as S135/11/2006).
 - Age Zero- S13/0/*/** (where *=month and **=year of withdrawal from service) ie. An age zero extension in November 2001 would be displayed as S13/0/11/2026).

3. Specific requirements – Five year life extension

- A heavy bus may have its service life extended an extra five years subject to the vehicle undergoing a basic refurbishment, ADR upgrade and certification by the Approved Person, in a number of key areas.
- It should be noted that this five year life extension is not considered a complete refurbishment. The bus will retain its original year of manufacture for the purposes of registration.
- For practical implementation of the five year life extension, once an Open Classification bus reaches 13 years of age, but before it reaches 15 years of age, this life extension can be applied for. Similarly, this life extension can be applied for once a Regional or Local Classification bus reaches 23 years of age but before it reaches 25 years of age.
- Once granted, an Open Classification bus will have its service life in Open Classification use extended to 20 years. After this time, it may be used in either Regional or Local Classifications for a further 10 years. A Regional or Local Classification bus will have its service life in Regional or Local Classification use, as applicable, extended to 30 years.

3.1 Conditions of refurbishment

3.1.1 ADRs

The bus must be upgraded to comply with the ADRs applicable five years after the bus was first registered.

The only ADRs which are exempted from this requirement are those related to control of exhaust emissions. Therefore, an engine does not require upgrading to a later exhaust emissions ADR. Owners should carefully consider the potential cost of ADR upgrading before committing to a bus life extension, particularly with regard to ADRs for roll over strength and seat belts as they become applicable. No exemptions will be given from safety related ADRs.

Note: While upgrading to later ADRs for exhaust emissions (eg ADR 30 Diesel Engine Smoke Emissions) is not required, the vehicle must continue to comply with in-service regulations. Therefore, the engine must continue to comply with the ADR for exhaust emissions it was originally built to and must not emit smoke for 10 seconds or more. Refer to *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010*.

3.1.2 Body

- The body must be in good structural condition.
- If the body shows signs of structural damage, or rusting of the frame (eg: rust stains, loose rivets, loose or rusted panels), or if the bus has not passed a frame inspection within the previous five years, a full panel removal and frame inspection is required. See information bulletin titled “Guidelines for the structural inspection and repair of buses” for the requirements for a frame inspection.
- All interior trim material must be free from damage and in good serviceable condition.
- All side facing seats must be removed and replaced with forward or rearward facing seats on buses in the Regional Classification. Open Classification buses must have forward or rearward facing, coach style, high back seats.
- Exposed handrails, seats and partitions must be padded where specified in information bulletin titled “Guidelines for safety padding for bus handrails, seats and partitions”.
- All interior or damaged floor coverings must be replaced with approved non-slip style material.
- Windows and window seating must be in good condition.
- Paintwork must be in good condition.

3.1.3 Chassis and Suspension

All components to be cleaned, inspected and crack tested where necessary, to ensure they are rust free, structurally sound and within service wear limits.

3.1.4 Steering

- Power steering components must be free of leaks. Cracked or oil affected hydraulic hoses must be replaced.
- Stub axles and all steering arms (including pitman arms and drag links) are to be crack tested. Defective components must be replaced. No repairs using heating or welding processes are considered acceptable.

3.1.5 Brakes

- Complete overhaul and refurbishment of the braking system must be carried out.
- Replacement of flexible air or hydraulic lines, valve seals, diaphragms etc is required. All components must comply with acceptable national or SAE standards.
- Physical testing of vehicle braking performance to meet the *Transport Operations (Road Use Management—Vehicle Standards and Safety) Regulation 2010* performance requirements for both service and parking brakes is required. (Minimum service brake efficiency 50%, parking brake to hold on a 12% gradient).

3.1.6 Electrical

- All electrical fittings, lights, reflectors, lenses and wiring must be in serviceable condition.
- Light and reflector lenses must be free from cracks and have serviceable and reflective surfaces. Discoloured or cracked lenses must be replaced.
- All electrical wiring and electrical conduit must be secure, shielded from the effects of excessive heat, and in serviceable condition.
- Voltage under load with the engine running at each lamp must not be more than 10% below nominal voltage. Eg. 10.8 volts for a 12 volt system.

3.1.7 Engine and Driveline

- All components will require visual and physical inspection and may require dismantling, if necessary, to ensure reliability and mechanical integrity.
- The engine must have adequate power output.
- All components must be free of oil, water, air and vacuum leaks.
- The vehicle shall be free of exhaust leakage, excessive noise and smoke emission (Vehicle should be operated under load and not emit visible smoke continuously for more than 10 seconds).
- Transmission and driveline components must be secure. All components must be free of oil leaks, excessive wear or backlash in the drive line.
- Rubber mounts and dampers are to be free of oil impregnation, cracking and deterioration.
- All axle hub assemblies must be removed, dismantled and inspected. All hub oil seals and gaskets must be replaced. Replace wheel bearings where necessary.

4. Specific requirements – Age zero refurbishment

A service bus may have its service life returned to age zero subject to the vehicle undergoing a complete refurbishment, ADR upgrade and certification by the Approved Person, in a number of key areas.

Age Zero refurbishment is the complete refurbishment of the rolling chassis, the fitting of a new body and the upgrading of the bus to meet the safety and emission standards applicable to a new heavy bus at the time of refurbishment.

Buses which are completely refurbished in accordance with the following conditions will be considered by Queensland Transport to qualify as Age Zero, for the purposes of the *Transport Operations (Passenger Transport) Standard 2010*.

It should be noted that these buses will retain their original year of manufacture for the purpose of registration.

4.1 Conditions of refurbishment

4.1.1 ADRs

The refurbished bus must comply with all ADRs applicable at the date of completion of remanufacture. Buses intended for Open or Regional Classifications must comply with all ADR's applicable to Non Route Service Buses.

4.1.2 Body

A completely new body (including all interior and exterior fittings and equipment) is required.

4.1.3 Chassis and Suspension

Structural components (chassis, spring hangers etc.) must be dismantled, visually inspected and crack tested if necessary. All components must then be replaced or refurbished as necessary.

4.1.4 Mechanical

All mechanical components (engine, gearbox, steering, suspension and axles etc.) must be rebuilt, including the replacement of all seals, gaskets, bearings and wearing components.

4.1.5 Brakes

The complete braking system must be fully rebuilt including replacement or refurbishment of all wearing components, Replacement of all flexible air or hydraulic lines, valve seals, diaphragms, springs etc. All components must comply with the appropriate national or SAE standards.

Checklist s13a
Bus Life Vehicle Rating -
5 Year Life Extension
CODE S13

Form No: S13a
(Y=Yes, N=No)

Modification Certificate Number :			
1	ADRs		
1.1	Has the bus been upgraded to comply with all ADRs applicable (except exhaust emissions) five years after it was first registered (or manufactured if registration details are not available)?	Y	N
2	Body		
2.1	Is the body in good structural condition?	Y	N
2.2	Is the body free of structural damage, rusting, loose rivets, rusted panels etc?	Y	N
2.3	Has the bus passed a full frame inspection within the previous five years (a copy of the Department of Transport and Main Roads frame inspection certificate must be sighted) or has a full frame inspection been carried out?	Y	N
2.4	Is all interior trim free from damage and in good serviceable condition?	Y	N
2.5	Are all floor coverings approved non-slip type material and in good condition?	Y	N
2.6	Are all window seals and windows in good condition?	Y	N
2.7	Is all paintwork in good condition	Y	N
2.8	Are all applicable areas padded as required in information bulletin "Guidelines for safety padding for bus handrails, seats and partitions"?	Y	N
2.9	If the bus is to be operated under Regional Classification, are all seats forward or rear facing, coach style, high back seats?	Y	N
2.10	If the bus is to be operated in Open Classification, are all seats forward or rear facing, coach style, high back seats?	Y	N

3	Chassis and Suspension		
3.1	Have all components been cleaned, inspected and crack tested, if necessary, to ensure they are rust free, structurally sound and within serviceable wear limits?	Y	N
4	Steering		
4.1	Are all power steering components free from leaks, and have all oil affected hoses been replaced?	Y	N
4.2	Have all stub axles, steering arms, pitman arms and drag links been crack tested? <i>Note: All defective components must be replaced. Repairs using heat or welding processes are NOT acceptable.</i>	Y	N
5	Brakes		
5.1	Has the complete braking system been fully overhauled and refurbished?	Y	N
5.2	Have all flexible air or hydraulic lines, valve seals, diaphragms, wheel cylinder seals etc been replaced? <i>Note: All components must comply with acceptable national or SAE standards.</i>	Y	N
5.3	Has the service brake been tested to show an efficiency not less than 50%?	Y	N
5.4	Has the parking brake been tested to hold the vehicle on a gradient of at least 12%?	Y	N
6	Electrical		
6.1	Are all electrical fittings, lights, reflectors, lenses and wiring in a serviceable condition?	Y	N
6.2	Are all lenses free from cracks and have serviceable reflective surfaces?	Y	N
6.3	Is all electrical wiring secure, shielded from the effects of excessive heat, and in a serviceable condition?	Y	N
6.4	Is the voltage under load at each lamp not more than 10% below nominal system voltage?	Y	N
7	Engine and Driveline		
7.1	Have all components been physically inspected and dismantled, where necessary, to ensure mechanical integrity and reliability?	Y	N
7.2	Does the engine have adequate power output?	Y	N
7.3	Is the vehicle free from oil, water, air and vacuum leaks?	Y	N
7.4	Is the vehicle free from exhaust leakage, excessive noise and smoke emission? <i>Note: Vehicle should be operated under load and not emit smoke continuously for 10 seconds or more.</i>	Y	N
7.5	Is the transmission and driveline secure, free of leaks, excessive wear and backlash?	Y	N
7.6	Are all rubber mounts and dampers free of oil impregnation and cracking?	Y	N
7.7	Have all hub and axle assemblies been dismantled, cleaned and have all seals and defective bearings been replaced?	Y	N

8	Vehicle Life Details		
8.1	Date of first Registration (Month and Year)		
8.2	Life extension current up to and including (Month and Year)		
9	General		
9.1	Has the vehicle undergone a full evaluation and rating under the requirements of the Commercial Motor Vehicle Code of Practice modification codes S4 or S5, and S6 to validate the passenger carrying capacity and compliance with Queensland Transport Safety Requirements?	Y	N

Note: If the answer to any question is **N (No)**, the five year life extension will not be granted

Checklist s13b
Bus Life Vehicle Rating -
Age Zero Refurbishment
CODE S13

Form No: S13b
(Y=Yes, N=No)

Modification Certificate Number :			
1	ADRs		
1.1	Does the refurbished bus comply with all ADRs applicable at the date of completion of remanufacture?	Y	N
1.2	Has the vehicle been upgraded to meet the safety and emission standards applicable to a heavy bus at the date of completion of remanufacture?	Y	N
1.3	If the bus is intended for Open or Regional Classification, does it comply with all ADRs applicable to Non Route Service Buses?	Y	N
2	Body		
2.1	Has a new body been fitted (including all interior and exterior fittings and equipment)?	Y	N
3	Chassis		
3.1	Has a complete refurbishment of the rolling chassis been carried out?	Y	N
3.2	Have all structural components (chassis, spring hangers etc.) been dismantled, visually inspected, crack tested, replaced or refurbished as necessary?	Y	N
4	Mechanical		
4.1	Have all mechanical components (engine, gearbox, steering, suspension and axles etc.) been rebuilt, including the replacement of all seats, gaskets, bearings and wearing components?	Y	N
5	Brakes		
5.1	Has the complete braking system been fully rebuilt including replacement or refurbishment of all wearing components, replacement of all flexible or hydraulic lines, valve seals, diaphragms, springs etc?	Y	N
6	Vehicle Life Details		
6.1	Date of first Registration (Month and Year)		
6.2	Life extension current up to and including (Month and Year)		
7	General		
6.1	Has the vehicle undergone a full evaluation and rating under the requirements of the Commercial Motor Vehicle Code of Practice modification codes S4 or S5, and S6 to validate the passenger carrying capacity and compliance with Queensland Transport safety requirements?	Y	N

Note: If the answer to any question is **N (No)**, the five year life extension will not be granted

List of Amendments

1. Introduction of section LC – Vehicle Controls [Version 2.0]

Commenced 1 January 2014

- General Change The template this code of practice is published on was updated to comply with the Queensland Government corporate identity.
- New Section Inclusion of new Vehicle Controls section (LC), including two design codes (LC1 and LC3) and two modification codes (LC2 and LC4). This section is included in this version as pages 8-34.

2. Changes due to the commencement of the *National Heavy Vehicle Law Act 2012* (Queensland [Version 2.1])

Commenced 10 February 2014

(page references cited are pages as in version 2 of this document)

- Table of Contents (pp.3-4) Updates to reflect changes made by this package.
- Introduction (p.5) Minor changes made to reference the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications and *Heavy Vehicle (Vehicle Standards) National Regulation 2013*.
- Modification Codes (p.6) Table of heavy vehicle modification codes updated to reflect modification codes removed by this change.
- Section K6 (pp.66-77) Section removed as this section is now included as part of the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications.
- Note: The section is available from the heavy vehicle modification section of the Transport and Main Roads website at www.tmr.qld.gov.au*
- Section S4 (pp.78-105) Section repealed as this section is now included as part of the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications.
- Note: The section is available from the heavy vehicle modification section of the Transport and Main Roads website at www.tmr.qld.gov.au*
- Section S5 (pp.106-137) Section repealed as this section is now included as part of the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications.
- Note: The section is available from the heavy vehicle modification section of the Transport and Main Roads website at www.tmr.qld.gov.au*
- Section S6 (pp.138-159) Section repealed as this section is now included as part of the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications.
- Note: The section is available from the heavy vehicle modification section of the Transport and Main Roads website at www.tmr.qld.gov.au*
- Section S10 (pp.160-224) Section repealed as this section is now included as part of the National Heavy Vehicle Regulator (NHVR) Code of Practice for the Approval of Heavy Vehicle Modifications.

3. Changes to the LO8 section [Version 2.2]

Commenced 1 June 2014

Section LO8 (p.49) Requirements about seat belts in this section updated.

4. Removal of the LL7 section [Version 2.3]

Commenced 1 July 2014

Table of Contents (pp.3) Table of Contents updated to reflect modification code removed by this change.

Modification Codes (p.6) Table of modification codes updated to reflect modification code removed by this change.

Section LL7 (pp. 40-46) Section removed. This modification is now considered a basic modification. Requirements for this modification can be found in the LL section of the NCOP.

Note: page references cited are as in version 2.2.

5. Removal of the LO8 section [Version 2.4]

Commenced 1 October 2014

Table of Contents (pp.3) Table of Contents updated to reflect modification code removed by this change.

Modification Codes (p.6) Table of modification codes updated to reflect modification code removed by this change.

Section LO8 (pp. 42-46) Section removed.

Note: page references cited are as in version 2.3.

6. Minor amendment to the S13 section [Version 2.4.1]

Commenced 18 November 2014

Section S13 (p.56) 6th and 7th dot points under section 'General Requirements' combined and updated to reflect the Department of Transport and Main Roads' policy position about professional engineering services.

9th dot point under section 'General Requirements' has been updated to refer to the heavy code.

Note: Changes have resulted in text on pages 56-60 moving. If updating this Code of Practice from version 2.4, this can be done by replacing pages 56-60 and 67-68 with those from this version.

7. Removal of certification details [Version 2.5]

Commenced 16 March 2015

Section LC, LH, LS and S The 'certification details' tables have been removed from each section as this information is captured on the Modification Certificate. An additional row has been included in each checklist to capture the Modification Certificate number.

8. Introduction of LS11 and LS12 Modification Codes [Version 2.8]
Commenced 1 March 2017

General Change The template this code of practice is published on was updated to comply with the Queensland Government corporate identity.

New Sections Inclusion of new LS11 - Gross Vehicle Mass Increase and LS12 - Light Trailer Modifications

LS11 and LS12 sections are included in this version as pages 52-66.