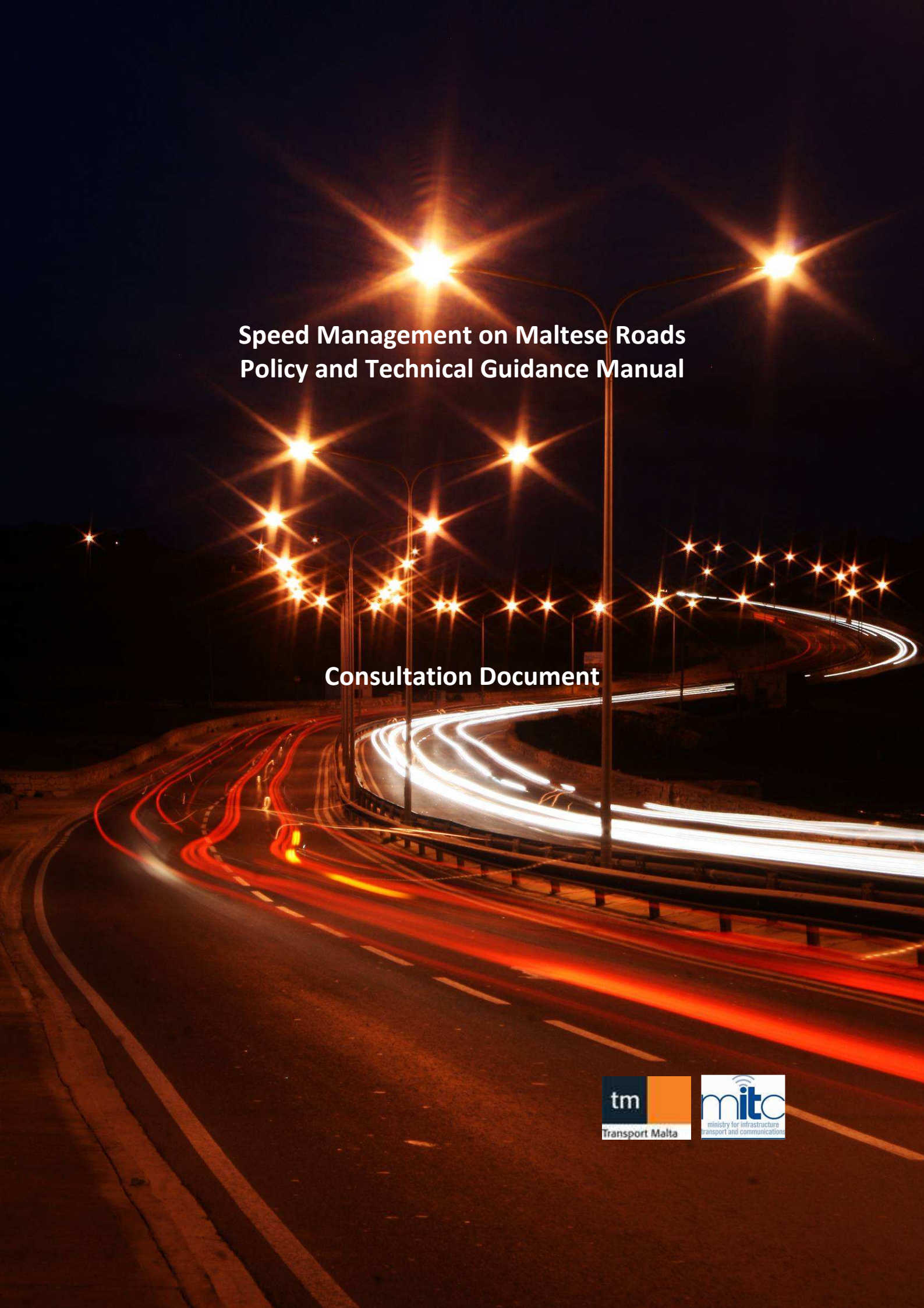

Speed Management on Maltese Roads
Policy and Technical Guidance Manual

Consultation Document

Transport Malta

ministry for infrastructure transport and communications

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Front cover photograph courtesy of P.P. Barbara

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Executive Summary

The "need for speed"

The current road network links all the towns and villages and covers more than 2,300km (with nearly 800km of major roads) and our desire for increase mobility has changed both lifestyle and travel behaviour in Malta. As a nation, Malta has radically transformed from having one of the lowest per capita car ownership level in Europe in the 1970s to having one of the highest levels by 2008. Malta also has one of the highest car dependency rates in Europe.

There are many factors which contribute to excessive or inappropriate use of speed, ranging from pressure on commercial drivers by fleet managers and employers to be more productive, lack of awareness of speed limits and in some cases since speed is a source of adrenalin rush for some drivers. Many drivers overestimate their driving skills and believe that it is possible to travel above the speed limit without placing themselves or others at risk.

With an average of one road traffic accident every 30 minutes, albeit with minor damage to vehicle or roadside infrastructure, an average of three people are hospitalised every day. Excessive or inappropriate use of speed is identified as a key risk factor in road traffic injuries and this policy attempts to scientifically analyse and explain possible measures to improve road safety though better speed management.

Road functions

The functions of roads and their structures differ considerably in built-up and rural areas. The classification of each road by its particular function reflects use in most cases and provides a basis for the consistent application of a speed management policy. Classification of roads for flow, distributory and access functions will dictate their design construction and use and therefore impact the ultimate intended user speed.

While national speed limits can be indicated as a factor that influences road design and their ultimate marked speed limits, local scale issues dictate the need for localised speed limits to be used in certain cases. As a start however, this policy seeks to clearly define the different road functions including new road functions of "linking" and "TEN-T" roads while reclassifying roads where their function has clearly changed over time.

National Speed Limit regimes

National speed limits are widely used to define acceptable speeds and to indicate the maximum speed for vehicles to travel so as to be compliant with the law. Set correctly, speed limits can help reinforce road users' assessments of a safe speed and can act as an indicator for drivers as to the nature and risk level associated with the road.

Across Europe, national speed limits are set for roads with particular functions and environments, but also for particular vehicle types. Introduced 16 years ago, the national speed limit regime in Malta contains many of the essential elements which are considered to be European best practice.

Most major roads in Malta were built at a time where the national speed limit, and hence their design speed was lower than the current national speed limit of 80km/h. Spatial competition between road network and building construction often limits the ability of roads to be designed to provide optimum conditions.

The policy seeks to determine the need to update these limits to take changes in traffic mix, road construction and vehicle technology into consideration. In this respect, the policy seeks to recommend a rationalisation of the speed limits applicable to vehicle types as well as to redefine some grey areas in function and environment factors to be taken into consideration when defining

national limits. Further rationalisation of road use such as the prohibition of certain slow moving vehicles on certain roads and lane discipline are also contemplated by the policy.

Local Speed Limit regimes

No two roads are alike and there will always be situations where discrepancies between national speed limits for the road type, drivers' perceptions of the safe travelling speed and the appropriate speed for that road, as established by theoretical analysis occur.

At minimum, speed limits should reflect an appropriate balance between safety and mobility. On a road without marked speed limits, a driver will rely on his judgement of risk and perception of hazard in order to determine his safe operating speed. Some hazards may be obvious while others less obvious. Changes to the road environment will inevitably occur after the construction of the road often resulting in a wide discrepancy between the speed at which a road was originally designed and the speed at which vehicles on the road are observed to operate.

Operating speed of vehicles on a section of road is an important factor in establishing safe speed limits for that road and a variety of theoretical best-of-breed measures are used to determine local speed limits that are then indicated by signs. Transition zones between different speed limit zones encourage gradual adjustment of speed in a safe manner.

The policy proposes that a rationalisation process of speed limits be implemented to streamline local speed limits, including setting up of a structured methodology to determine local speed limits. Also ongoing monitoring of the road network is proposed, to ensure that the local speed limits are appropriate for the conditions of the respective road.

Proposed speed limits for the arterial and distributory road network are annexed to the policy.

Communicating these limits to the road user

Generally speaking, drivers are well educated about their the national speed limits during the training and testing associated with obtaining the driving licence, and this is reinforced by information concerning national speed limits at ports and airports as well as by the of Posted Speed Limit signs on the road network.

Road sign construction, location and clarity are all important factors if the road user is to heed the limits that they seek to convey. Furthermore road markings, illuminated or variable signage and other physical measures contribute to the understanding of the speed that a road user will apply.

The policy recommends the replacement of all "national speed limit" signs to actual speed signs since they appear to be least understood by road users. It also recommends the introduction of new vehicle activated signs that indicate vehicle speed so as to increase awareness of actual speed that vehicles travel at. Further improvements to the quality of road markings and traffic management by introducing better accountability by entities supplying these measures will be complimented by road infrastructure safety audits.

Educating the wider public

The success of the speed management policy depends overwhelmingly on the acceptability of the community and community decision makers. Although there is clear evidence that speed and speeding are problematic, it is vital that speed management policies, which by their nature necessarily restrict driving behaviour and driving choices, are well managed and so as not to be ignored.

Education, training and information are key to the success of a comprehensive speed management policy as well as being a pre-requisite for effective implementation of other measures such as infrastructure, signage, road makings, enforcement and vehicle technology. Starting at school with

road safety awareness for children, effective use of the road network by various users is reinforced by driver training, testing and follow-up enforcement.

The policy proposes that Road Safety could be established as part of the national learning curriculum. Further education on road safety and the driving test could be developed for pre-driver licence post-secondary level students as well as further investment in road safety educational materials and tools. The introduction of continued ability test for existing Driving instructors would ensure that driver training remains at its peak. Introducing a safe driving course model for Government employees would serve as a pilot with potential to be transferred to the private sector. The policy also indicates that continued media attention to speed policies by introducing a long-term media programme relating to speed management and other road safety issues would reinforce lifelong training and education to all road users.

Enforcement for better road safety

In a perfect world, speed limits on roads would be credible, self explanatory and motorists would adhere to safe driving speeds at all times and in all conditions. However, in the real world motorists regularly exceed the posted speed limits either inadvertently or deliberately. Enforcement can be both an effective educational tool and also be a powerful measure contributing directly to the reduction of speeding and associated traffic accidents, injuries and fatalities.

Based on the psychological premise that most people will try and avoid penalties for not complying with the rules, the driver's assessment of risk of apprehension is based on the likelihood of being caught and prosecuted. In itself, this is an effective deterrent and ensures that most drivers comply with the rules. The subjective risk of apprehension can be increased by the use of publicity campaigns and increase media awareness.

Until the time when compliance with the speed limits is enforced via on-board instruments, speed enforcement using roadside equipment or by mobile enforcement personnel will continue to be main process. Roads with a poor safety record or a perceived risk of danger from motorists are targeted for speed enforcement and the policy looks at the where, when and how the most effective enforcement tools can be deployed with the aim of tangible safety improvements. This includes accreditation of current enforcement tools, studies for the possible implementation of new tools such as dummy cameras and average speed cameras, as well as clearer definition of the enforcement tolerance limits along with a third tier of speed fines to further discourage abuse.

Implementation and Monitoring

No policy would be complete without regular review of the policy implementation and the monitoring of the effectiveness of the policy. This policy therefore considers the continual review process at the various stages of speed management implementation including at local, regional and national level as well as at regional and international policy level.

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Section 1

Debate on Speed – The Facts

Over the past forty years, our society has benefited greatly from improved mobility. Today's traveller has a much wider choice of modes of transport available for his personal mobility such as private car, motor cycle, bus, coach and minibus in addition to walking and cycling. The current road network links all the towns and villages and covers more than 2,300km (with nearly 800km of major roads). Inevitably our desire for increase mobility has changed both our lifestyles and our travel behaviour. Malta as a nation, has radically transformed from having one of the lowest per capita car ownership level in Europe in the 1970s to having the seventh highest in level in 2008[1] and, with over 74% of all trips by Maltese citizens being made by car[2], Malta also has one of the highest car dependency rates in Europe too.

Motorisation world-wide has often been perceived as an indicator of efficiency, a facilitator to employment, goods, services and amenities and as a tool for progress. As a result, the technological advances introduced in the automobile industry have constantly been designed to meet our demands for greater mobility and shorter journey times. Today however, unlike 30 years ago, the majority of passenger cars being manufactured are capable of travelling in excess of 150 km/h.

There are many factors which contribute to excessive or inappropriate use of speed. These may range from individuals trying to reach destinations on time, to pressure on commercial drivers by fleet managers and employers to be more productive, or lack of awareness of speed limits. Speed may also be a source of pleasure for some drivers who relish the adrenalin and excitement of travelling at high velocities. Many drivers consider themselves above average in terms of skill and very often they believe they can travel above the speed limit and without placing themselves or others at risk.

While, on the one hand, increased speed and perceived reduction in our travel times is seen by many to positively contribute to our increasingly busy lifestyles; on the other, travelling on roads at higher speeds has known adverse effects, principally in terms of road accidents and consequent death or injury and material damage, but also in terms of stress levels resulting in road rage contributing at the same time to environmental issues such as noise and pollution from exhaust emissions.

Road Crashes and Injuries involving Speed

In Malta, there is an average of one road traffic accident every 30 minutes. Although the vast majority of these traffic accidents only involve minor damage to the vehicles or to roadside infrastructure, each day an average of three people are brought into our hospitals and poly-clinics to receive medical attention, as a result of road traffic accidents.

Excessive or inappropriate use of speed has long been identified as a key risk factor in road traffic injuries, influencing both the risk of road traffic crashes and the severity of injuries. As speed increases so does the distance travelled during the driver's reaction time and the distance needed to stop.

Vehicle stopping distances at different speeds

Pedestrians are a vulnerable road user. A pedestrian hit by a vehicle travelling at the national speed limit of 50km/h within towns and villages incurs an 80% risk of being killed. In Malta and Gozo, four pedestrians were killed in road traffic accidents in 2009 alone, while 52 were grievously injured[3].

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[1] European Environment Agency *Term 22 Passenger Car Ownership* (2008)

[2] Transport Malta *National Household Travel Survey* (2010)

[3] National Statistics Office *Transport Statistics* (2010)

Take for example a motorist travelling in dry conditions at the national speed limit of 80km/h (outside towns and villages); a typical, well maintained vehicle would take around 22 metres (1 second driver reaction time) and a total distance of 57 metres for the vehicle to reach a complete standstill when seeing a potential hazard ahead. If a child runs onto the road 36 metres ahead the driver, due to the short distance, would most likely run over and probably kill that child at a decelerating speed of 62km/h. Driver reaction times and braking distances are invariably increased when the road surface is wet, making this even more likely.

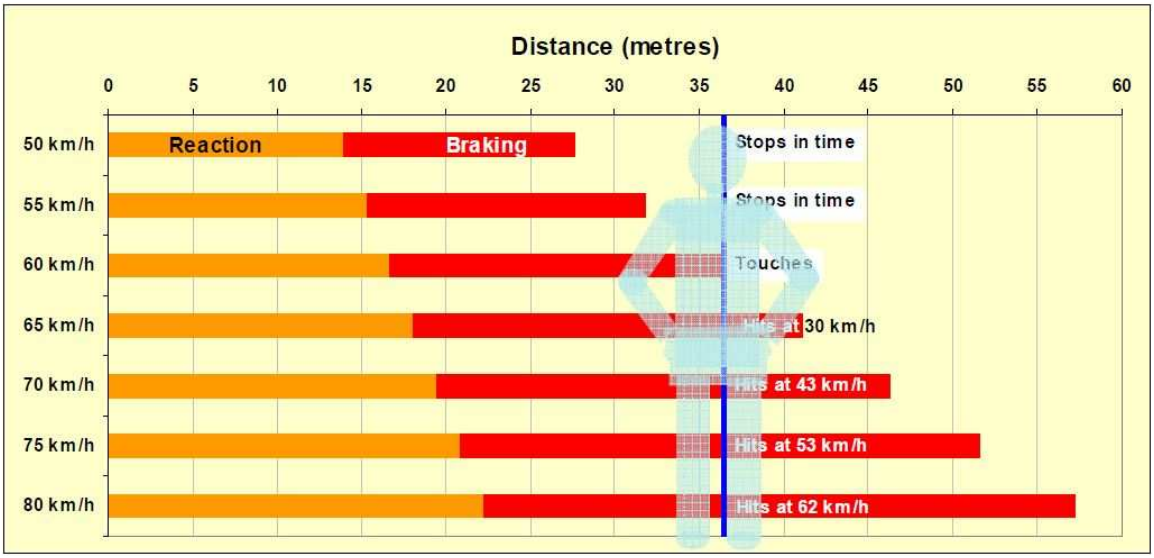

Figure 1: Vehicle stopping distances at different speeds
Source: *Impact Speed (Road Safety Education Resource)* Australian Road Safety Bureau (no date)

Vehicle Protection Devices

In recent years, vehicle manufacturers have spent more energy developing vehicle design technologies aimed at improving safety for vehicle occupants and other road users. Through the European New Car Assessment Programme (EuroNCAP) each new model of vehicle now undergoes an independent speed crash test analysis and consumers are made aware of the safety rating of the vehicle. Tests include frontal impact at 64 km/h and side impact at 50 km/h, including the protection afforded to children, pedestrians and whiplash prevention.

Whereas car occupants are not generally considered to be vulnerable road users even modern, well-equipped cars with a high EuroNCAP rating can in reality only provide protection up to certain speeds; for example car occupants wearing seatbelts are generally protected to a maximum of 70km/h for frontal impacts and a maximum of 50km/h for side impacts.

Speed and the Drivers visual field

The speed at which a driver travels affects the field of vision of the driver. As shown in Figure 2 the field of vision is reduced when speed increases. A driver travelling at 40km/h has a field of vision of 100° which, in most cases, allows for obstacles on the roadside and other potential hazards to be clearly seen. At an increased speed of 70km/h the field of vision is reduced to 75° which in turn reduces the ability of drivers to clearly see potential hazards ahead and reduces the capability of the driver to assess potential danger at the kerbside or beyond (for example at intersections).

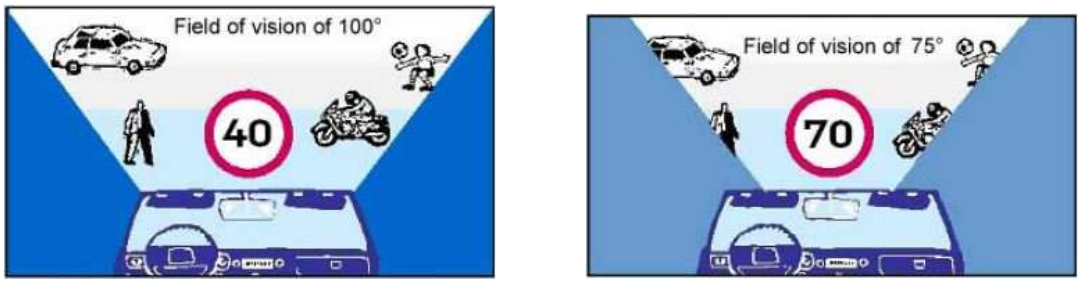

Figure 2: Impact of speed on the field of vision
Source: French Ministry for Transport (no date)

Traffic Conditions and Accidents

Studies conducted by the Australian Transport Council provide direct evidence that speeds just 5km/h above average in 60km/h urban areas and 10 km/h in rural areas are sufficient to double the risk of casualties in road traffic accidents.

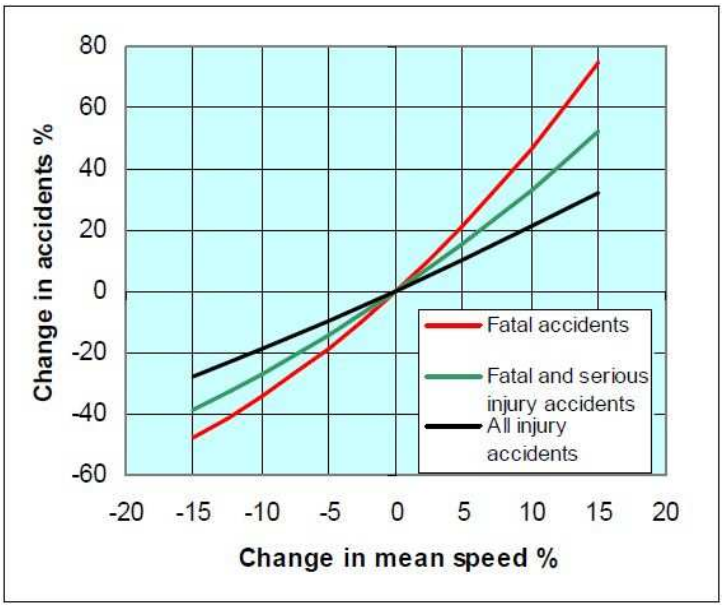

Figure 3: Relative injury accident rate on urban roads going faster and slower than average speed.
Source: *Speed Management in Sweden* Andersson and Nilsson (1997)

The European Transport Safety Council (ETSC) estimates that each 1km/h reduction in average speed leads to a 2%-3% reduction in injury accidents.

Speed and its Environmental Impact

Emissions from road vehicles contain a variety of pollutants which are produced in different quantities at different vehicle speeds. The main gaseous pollutants emitted from vehicle exhaust include: carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x) and particulate matter (PM). The production of pollutants varies both within vehicles and, depending on engine technologies, from one vehicle to the next. Modern vehicles, using the latest technologies, have much lower levels of local pollutants from older vehicles and emissions from these vehicles is generally more sensitive to rapid and sudden acceleration and heavy braking than to constant average speed.

The optimum speed at which emissions are minimised varies according to the type of emission. However, typically, pollutant emissions on average are probably optimised at around 60 km/h.

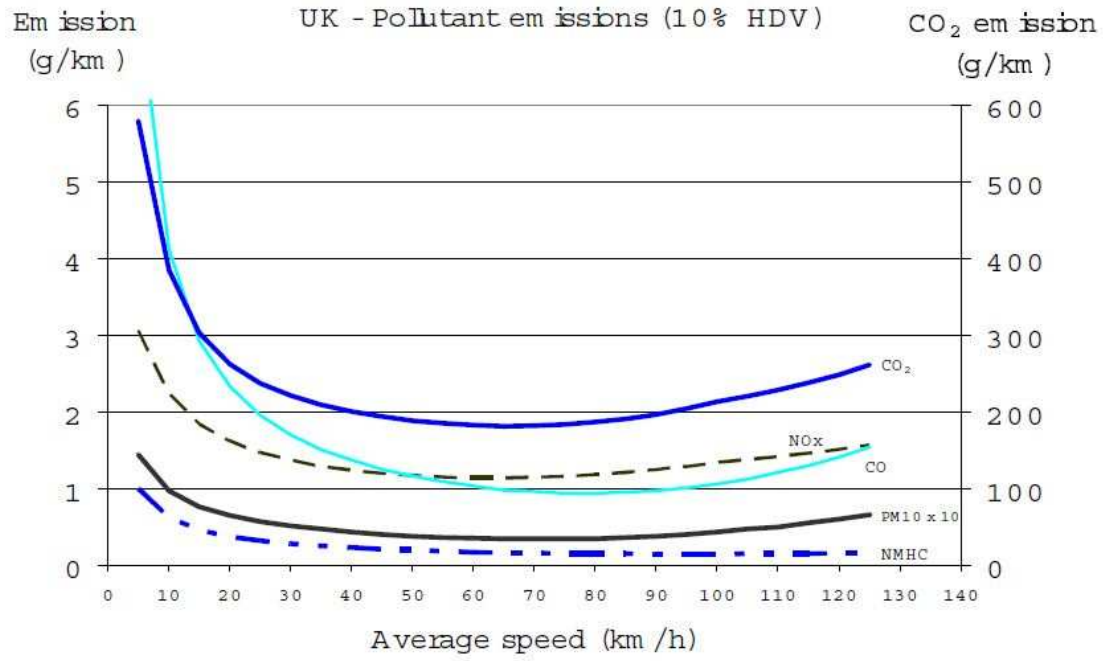

Figure 4: Gaseous emissions as a function of speed
Source: UK Department for Transport (2005)

Speed also has a considerable impact on the exterior noise that a vehicle emits. Traffic noise arises from two main sources; namely: the engine and the tyre-road interface. Indeed, noise from the tyre-road interface dominates at higher speeds.

Speed and its impact on journey times

There is a clear relationship between the time a journey takes and the speed at which the motorist travels at. However, this relationship is more applicable to longer distance travel on high capacity inter-urban roads with few intersections. Generally speaking Malta has few uninterrupted inter-urban roads. The vast majority of roads on Malta's road network, by international standards, would be considered urban roads by virtue of frequency of junctions, pedestrian crossings, direct accesses and frontages.

Studies illustrating the impact of travel speed on journey times have been undertaken in a number of cities which are similar in urban fabric to the Islands of Malta and Gozo. In Toulouse (France) a major study was undertaken on travels times taken at different times of day along a 7.6 km route containing 28 sets of traffic lights. Two travel speeds were assessed a) A 'fast' vehicle respecting the speed limit of 50km/h and b) a 'slow' vehicle not going faster than 30 km/h. The average speed of the 'fast' vehicle throughout the day was recorded as being 19.1 km/h while that of a 'slow' vehicle was 15.9km/h. The study concluded that, over the 7.6 km routes the 'faster' vehicle on average arrived at the end of the route only 5 minutes before the 'slow' vehicle. If a similar study were to be carried out in Malta it would probably reveal similar findings; we have all witnessed incidents of dangerous overtaking by those motorists who are prepared risk life and limb in order to arrive only one car ahead by the next junction.

It is a common misconception that reducing speeds will also reduce the throughput of a road. Both empirical studies and highway engineering theory show that above certain speeds the safe travelling distance between vehicles must also increase in order for vehicles to safely stop in the event of sudden slowing of traffic resulting from potential or real hazards. In this respect, the optimal

throughput vehicles using on a standard inter-urban dual 2 lane carriageway, has been determined to be between 60 km/h and 70 km/h.

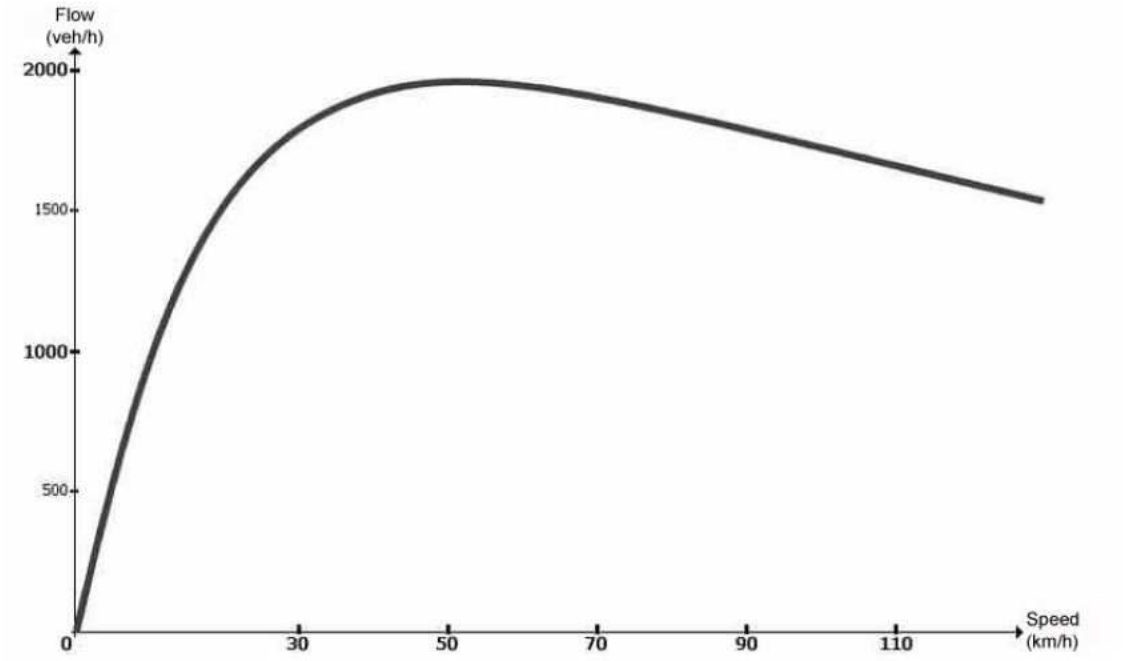

Figure 5: Traffic flow as a function of travel speed
Source: *Speed Management* OECD and ECMT (2006)

Speed and congestion

Over the last 10 years, the number of vehicles licensed to use Maltese roads has increased from 246,000 to 301,000. This has resulted in a typical increase in traffic levels of 2% per annum. Increased congestion, particularly during peak hours results in decreased average speeds on many roads. Although no specific studies have been carried out to measure the relationship between congestion and accident risk, it would appear from the latest NSO statistics that most traffic accidents that involve casualties take place when there is less traffic on the roads at times when traffic is generally more free-flowing. Specific studies will need to be carried out to establish the precise relationship between traffic levels and injury accidents, including the impact of driver frustration and risk taking during peak hours which could cause increased severity and number of accidents.

Speed limits and public perception

Studies carried out both in Malta and abroad indicate that drivers do not usually comply strictly with speed limits. The extent of speeding varies depending on the reasonableness of speed limits, the perceived likelihood of enforcement (and severity of penalties for non-compliance), fuel consumption, the driving context and the driver's own characteristics. Speed surveys recently carried out on Malta's main arterial and distributor network clearly indicate the diversity of speeds by different drivers travelling on the same stretch of road at the same time of day.

The degree of compliance with speed limits results from driver's appraisal of both the utility and disutility of non-compliance. A significant percentage of drivers who drive in excess of speed limits often perceive there to be a contradiction between the design speed of the road and the posted speed limit signs for example adhering to a 60km/h posted speed limit on an urban dual carriageway. Although in such instances, the adopted posted speed limits may have been established at a lower

level than the road design speed due other factors such to the presence of vulnerable road users such as pedestrians.

A Eurobarometer survey on Road Safety[4] carried out across the 27 Member States of the European Union highlights the growing concern in Malta regarding the seriousness of drivers exceeding speed limits. 89% of Maltese respondents to this survey opined that drivers exceeding speed limits pose a major safety problem in Malta - the fifth highest response rate of this nature behind Cyprus, Bulgaria, Estonia and Italy.

Nevertheless, both traditional media and on-line forums in Malta are rife with comments to the contrary, particularly following the increased level of speed enforcement on Maltese roads that has been put in place since 2005. Public forum comments following each major traffic accident report in the local media now follow fairly predictable patterns usually starting with road design & condition, followed by driver age, training & behaviour. Inevitably this is followed by a debate on speed limits, eventually leading to opinion writers' presenting views for or against speed cameras.

These debates have invariably also been held in most other countries Many EU member states have seen changes in public attitude towards speeding with a growing awareness of road safety issues and the need to manage speed. Following the introduction of their 'vision zero' policy on road traffic accidents, policy makers in Sweden, perhaps the most avant-garde country when it comes to road safety, faced great pressure from car, truck, coach and commercial drivers to increase speed limits on motorways from 110km/h to 130 km/h, while there was equal pressure being exerted from pedestrians and cyclist lobby groups to decrease speed limits from 50 km/h to 30 km/h in urban areas.

Debates on speed policies are not uncommon in small islands. Following the success and acceptance of the introduction of a lower blanket speed limit of 40mph (64 km/h) in the State of Jersey, road safety campaigners in the UK Isle of White have recently been lobbying for a similar blanket speed limit of 64 km/h to be introduced on the island. The Isle of White (which has an area of 384 square kilometres and which has a resident population of 140,000) now has quite serious road safety problems resulting in an average of 13 persons being killed each year through road traffic accidents. The stage is set for a lively debate.

[4] European Commission (DG Mobility and Transport) *Flash Eurobarometer 301 Road Safety Analytical Report* (July 2010)

Section 2

Establishing a Speed Management Policy for Malta

Introduction

Speed Management is an active approach that requires (or persuades) drivers to adopt speeds that offer mobility without compromising safety. The common approach in a speed management policy is to achieve a road transport system that anticipates and allows for human error, while minimising the risk of death or serious injury.

The Speed Management Policy for Malta does not suggest that higher speeds cannot be beneficial, as shorter journey times can provide economic benefits and increased mobility. However, public authorities have to take fully into account their responsibility for protecting human life and reducing avoidable serious injuries on the roads. This fundamental responsibility is distinctly different from other objectives of government interest such as improved economic circumstances for its citizens.

Setting and gaining public acceptance for a speed management policy is not an easy task because individual and collective benefits have to be reconciled with individual and societal responsibilities.

In this respect, the main goal of this Speed Management Policy is to achieve the desired road safety benefits evidenced through reductions in the number of road traffic accidents, injuries and fatalities where speeding is a contributing factor. To this end, the following strategic objectives have been identified:

- ensure that the correct speed limits are applied to the road network;
- ensure that drivers know the speed limit of the road through which they are travelling;
- encourage drivers to adhere with the established speed limits;
- Effectively enforce driver compliance with speed limits;
- educate drivers to understand circumstances where speeds lower than the speed limit of the road are required;
- co-ordinate, monitor and evaluate the implementation of this policy.

Components of a Speed Management Policy Package

A speed management policy usually consists of a number of different but inter-related components. Implementation of fragmented or isolated measures may have some impact, but this will not be as effective as an integrated, holistic approach to speed management. For example there is a strong and complimentary link between road infrastructure, clear signage and marking, legislation and enforcement.

Many countries, including Malta, are introducing speed management policies on transport networks where the roads have already been constructed. In an ideal world, it would be desirable to start from scratch when planning the road network system however, in reality, this is never possible. Therefore, the planning and development of a speed management packages must be progressive, and build on the outcome of clearly defined steps. The following steps (which are considered to be a best international practice), have been used in the development of this Speed Management Policy for Malta. Each step will be elaborated in separate Sections of this Speed Management Policy. Each Section shall outline best practices from other countries, an explanation of current practice in Malta and shall conclude with considerations for policy change in Malta.

Section 3 of this Speed Management Policy examines the various factors used in determining the function of the road, Section 4 looks at national speed limit regimes, while Section 5 discusses the setting local speed limits, Section 6 looks at ways of making sure people actually know the speed limit in force and section 7 explains how drivers can be informed and educated about speed and speed management and section 8 assesses how enforcement of can be used to control the intentional speeder.

Section 3

Determining the function of the road

Functions of roads and their hierarchies differ considerably in built-up and rural areas. Empirical data shows that the nature of crash and injury severity risk also varies within these two broad groupings. The classification of each road by its particular function will reflect current use in most cases. However, a road's function within a said hierarchy provides a basis for the consistent application of a speed management policy.

Most countries take population and road user density into consideration when classifying their road network and approach this classification in three components; namely: flow, distribution and access.

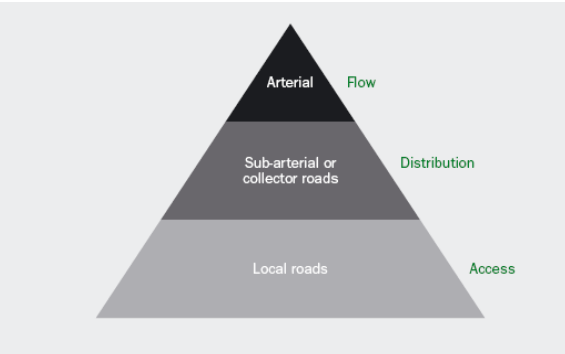

Figure 6: A simple road hierarchy for urban areas

Source: *Speed management on Roads - Manual for Decision Makers and Practitioners* (2008), WHO, World Bank and EIA Foundation

Roads with a flow function allow for an efficient throughput of traffic between urban areas over longer distances. It is desirable for other vulnerable traffic modes such as bicycles, karozzini and pedestrians to be separated from vehicular traffic. The number of access and exit points along these roads should be limited and a significant minimum distance between intersections needs to be maintained. Roads with a flow function should, as a general rule, be designed to have the highest carrying capacity and should have the highest speed limits

Roads with a distribution function allow for interface with all kinds of urban and rural areas at intervals along the road. Intersections are far more frequent that roads with a flow function and junctions and pedestrian facilities are often at the same level (at-Grade) with the main road. Roads with a distribution function should, as a general rule, have lower speeds than roads with a flow function.

Roads with an access function which allow direct access to properties along the road or street. Provision is made at intersections and links for traffic exchange. At such locations, road engineering measures may be required to support the low speed requirement.

Current Practice in Malta

The first basic policy framework for speed management in Malta was introduced through the Structure Plan[5] published in the early 1990's. As part of the preparatory process for the Structure Plan extensive travel and traffic data were collected and analysed. The Structure Plan established the

[5] *Structure Plan for the Maltese Islands Draft final Written Statement and Key Diagram,* Ministry for Development of Infrastructure Malta (1990)

following clear hierarchy for the road network based on road function which, over the last 20 years, has formed the basis for land use and transport planning policy and the devolution of certain powers to local government.

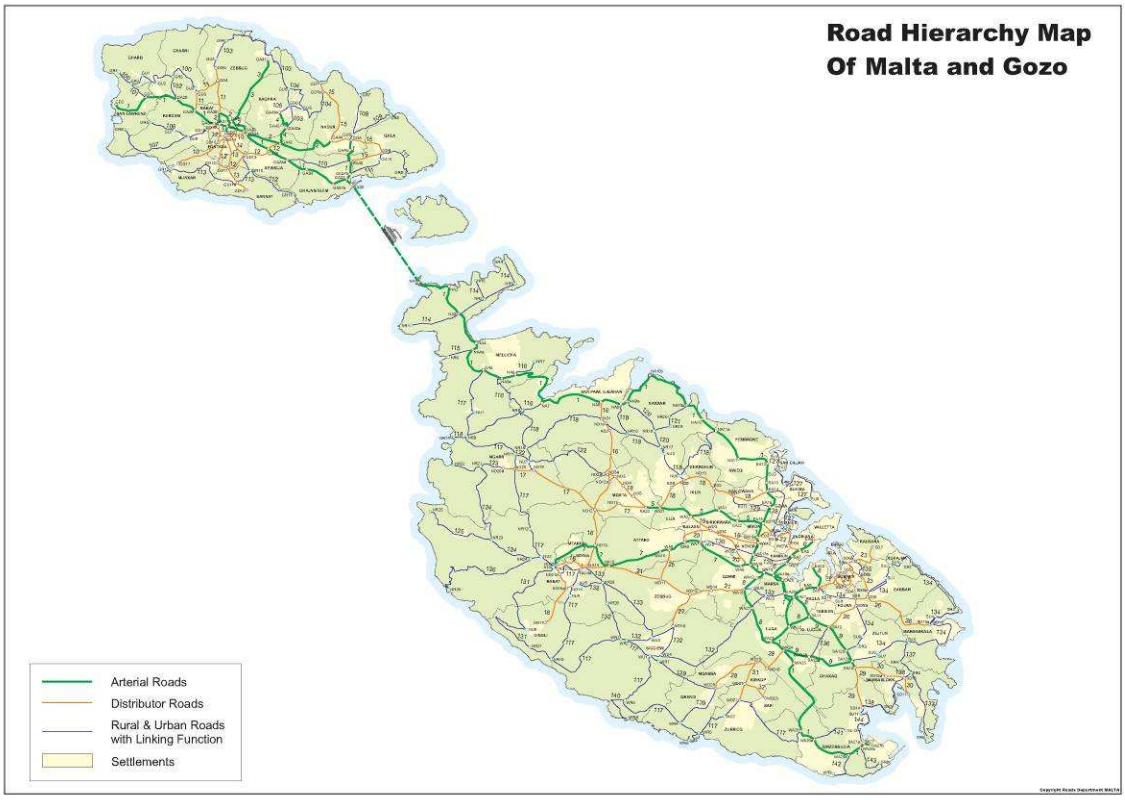

Figure 7: Road hierarchy map for Malta and Gozo
Source: Transport Malta (2006)

Road Category	Function	Regulatory Responsibility
Arterial roads	Roads with a flow function which allow throughput of inter-urban traffic. Roads which should not have development direct access and which there should be segregation of vulnerable road users	Transport Malta
Distributor roads	Roads with a distribution function which allow drivers to enter and exit towns and villages. Intersections are more frequent and at-grade. Such roads are widely used by public transport.	Transport Malta
Local access roads Access only and pedestrian streets	Roads with an access function which allow actual access to properties alongside the road. Both intersections and road links make provision for traffic exchange. At such locations, road engineering measures may be required to support low speed requirement	Transport Malta with delegated responsibilities for road maintenance to Local Councils

Table 1: Road Hierarchy in Malta
Source: Transport Malta

In recent years, the Transport Authority (now Transport Malta) had introduced a new category of road referred to as 'rural and urban road with linking function' for strategic planning purposes only. This road classification does not currently have a legal base (as do arterial or distributor roads) and, in many cases, may fall under the responsibility of local councils for maintenance and upkeep. As these

"roads with a linking function" often also cross different local council boundaries, it is important that clear regulatory responsibilities are formally established.

Road Category	Function	Regulatory Responsibility
Rural and Urban roads with linking function	Roads which provide important links between neighbouring local council areas	Not always clear

Table 2: Recent informal changes to Malta's road hierarchy

Also, since 2004 approximately 51km of the arterial road network which provides strategic connection between the capitals of Malta and Gozo, the airport, two external seaports and the inter-island ferry ports is now defined as Trans-European Transport Network TEN-T (road).

Policy Discussion

The road functional hierarchy for Malta which established in planning law in 1992 has, on the whole, provided a sound basis for transport planning and land use decisions. The Structure Plan for the Maltese Islands' contains various policies relating to land use development on the two upper categories of road to minimise direct land use impact on the flow and distribution functions performed by such roads whilst the six Local Plans also address planning policies relating to access roads and pedestrian areas.

Over the last 20 years, changes in travel patterns and traffic flows have resulted in certain local roads (which fall often under the responsibility of Local Councils for their maintenance and upkeep) functioning in practice as Distributor Roads (for example Mdina road in fleur de Lys) . As a result, there is legal ambiguity as to administrative and maintenance responsibilities given the higher maintenance requirements and budget limitations of Local Councils. On the other hand, certain roads which were classified 20 years ago as being Arterial Roads, do not in practice have a flow function not do they carry significant volumes of traffic.

As outlined further in Section 5, the function of a road is an important factor in determining the posted speed limit of the road. Although, the majority of roads in the Maltese Islands have been correctly classified, research that has been carried out in association with this Speed Management Policy would seem to indicate that a small number of roads may require re-classification. Such reclassification would result in the appropriate land use planning and traffic management policies being applied to roadside developments.

Policy Recommendations

1. Introduce the category classifications of 'Rural and Urban Roads with Linking Function' and TEN-T roads
2. Examine the reclassification of certain arterial and distributor roads to better reflect current flow and distribution functions to facilitate clearer application of speed limit principles discussed n section 5 and technical annex 1d.

Section 4

Determining the National Speed Limit Regimes

Speed limits are widely used to define acceptable speeds and to indicate the maximum speed for vehicles to travel so as to be compliant with the law. Set correctly, speed limits can help reinforce road users' assessments of a safe speed and can act as an indicator for drivers as to the nature and risk level associated with the road.

In most countries speed limits specify the maximum safe speed of travel permitted for light vehicles on a road under ideal conditions. Many countries adopt a two-tier system of national speed limits, comprising general national speed limits (established by national government) and a variety of local speed limits. Local speed limits are required where the general speed limits do not correspond to the appropriate speed on the relevant road or at times where the constantly roadway is in a changeable environment. These shall be discussed further in Section 5.

Maximum National Speed limits

General speed limits in European countries are normally defined according to one or more of the following criteria:

- Type of road or environment (e.g. urban road, built up area etc.)
- Type of vehicle (e.g. public transport vehicles, dangerous goods vehicles
- Type of tyres (e.g. special speed limits for studded or solid tyres)
- Type drivers (e.g. probationary drivers)
- Prevailing weather conditions (e.g. rain, snow, fog etc)

Type of Road or Environment

Most countries use differentiated national speed limits according to the road function and the surrounding environment. As outlined in Section 3 roads forming the national road network are classified according to function (flow, distribution and access). For the establishment of general national speed limits the roads are then further categorised according to the type of road (single carriageway, dual carriageway and motorway) their environment (urban or rural).

In Europe general speed limits for cars inside urban areas are effectively harmonised. However they vary widely outside urban areas and to some extent on motorways as shown by the table below

Type of Road / Environment	Speed Limit (km/h)
Home zones (often applied as local speed zones)	30
Inside urban areas	50
Outside urban Areas	60 to 110
Motorways	100 to 130

Table 3: Typical speed limits in European Union
Source*: adapted from the speed fact sheet 7/10* (2010) European Transport Safety Council

Type of Vehicle

The use of differential speed limits for different types of vehicles is an effective tool to improve road safety and to encourage heavier vehicles to use higher category roads. A typical classification of speed limits for different types of vehicles normally applies lower speed limits for heavy goods vehicles, larger public transport vehicles and coupled vehicles. The rationale behind this is that such vehicles, when fully laden, take a longer distance to stop on the roads. The classification of speed limits by vehicle type, which has been used in the UK for many years, as summarised below is a good example.

Vehicle type	Speed Limits (converted to km)			
	Inside Built up Area	Outside Built-up Areas		
		Single Carriageways	Dual Carriageway	Motorways
Cars and motorcycles	48	96	112	112
Cars towing caravans or trailers	48	80	96	96
Buses and coaches	48	80	96	112
Goods vehicles < 7.5 tonnes	48	80	96	112
Goods Vehicles > 7.5 tonnes	48	64	80	96

Table 4: UK National speed limits according to type of road and Vehicle Types
Source: UK Department for Transport (2010)

The other criteria for establishing general speed limits at a national level (types of tyre, types of driver and weather conditions) are less commonly used in European countries.

Types of Tyre

50 years or so ago the use of solid tyres on vehicles was more common. Improvements in tyre technology has meant that most vehicles use pneumatic tyres today and, in this respect, most countries prohibit the use of non-pneumatic tyres on public roads for safety reasons.

Types of Driver

Certain countries have introduced lower national speed limits for novice drivers. France, for example, has introduced a speed limit regime whereby all the mandatory speed limits on single carriageways, dual carriageways and motorways outside built-up areas are legally reduced by 10 km/h for all drivers with less than 2 years driving experience. Most countries, however, do not apply differentiated speed limits based on the type of driver as it is complex and often difficult to enforce. Alternatively, many countries, apply higher penalty on driving licences to novice drivers for traffic violations compared with experienced drivers to in order to provide a clear deterrence against speeding by new holders of driving licences.

Prevailing Weather conditions

Some countries apply differentiated speed limits according to prevailing weather conditions. For example in France when there is persistent rain mandatory speed limits on single carriageways, dual carriageways and motorways outside built-up areas speed limits are reduced by 10 km/h for all drivers. Similarly when there is limited visibility of less than 50 metres, the national speed limit on all categories of roads in France is reduced to 50 km/h. Again, this is not a common way of differentiating speeds limits, as the perception of prevailing weather conditions is subjective and hence difficult to enforce. Most countries nowadays apply Intelligent Transport Systems and deploy variable LED speed limit signs on main roads which are used to vary speed limits below the national speed limits on

stretches of road according to prevailing conditions of travel on that road e.g. rain, snow, fog and traffic accident ahead etc.

Minimum Speed Limits

Some European countries also apply minimum speed limits on stretches of road where slow moving vehicles can impede traffic flow or be a danger to other road users. The imposition of minimum speed limits on stretches of road in effect prohibits the use of horse drawn vehicles, bicycles and certain mopeds. The United Nations 1968 Vienna Convention on Road Signs and Signals provides for the possibility of establishing compulsory minimum speed limits for vehicles on roads with the following specific international recognized sign.

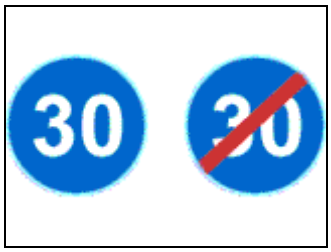

Figure 8: Minimum Speed limit signs
Source: Vienna Convention on Road Signs and Signals (1968)

Minimum speed limits, however, are normally applied on motorways (e.g. France, Germany and Belgium) often only in the overtaking (fast) lane/s and with a relaxation of the rules applying during adverse weather conditions.

Current Practice in Malta

Maximum National Speed Limits

The current regime of national general speed limits has been in force since 1994. National speed limits are understood by most motorists to be 50 km/h in built-up areas and 80 km/h outside of built-up areas. However, the legal speed limits prescribed in Subsidiary legislation 65.11 'Motor Vehicle Regulations' are much more complicated than this. National speed limits are not only differentiated by type of environment (in towns and villages or Outside towns or villages) but also according to type of tyre (pneumatic or solid) and type of vehicle (18 different vehicle categories in all).

Class of Vehicle	Maximum speed in kilometres per hour	
	In towns and villages	Outside towns or villages
(A) Fitted with pneumatic tyres		
Taxicars	50	80
Motor vehicles for hire	50	80
Self-drive motor vehicles	50	80
Private cars	50	80
Motor cycles	50	80
Motor cycle for hire	50	80
Motor hearses	50	80
Invalid carriages	50	80
Minibuses	40	60
Motor omnibuses	40	60
Goods vehicles up to 3 tonnes	40	60
Goods vehicles over 3 tonnes	40	60
Industrial and agricultural vehicles	20	30
Towing vehicles	20	30
Motor ambulances	No limit	No limit
Fire engines	No limit	No limit
Police, Armed Forces & Customs vehicles on emergency/priority duty	No limit	No limit
(B) Fitted with solid tyres		
All vehicles	15	20

Table 5: Malta national speed limits

Source: Malta Subsidiary legislation 65.11 Motor Vehicles Regulations

Minimum Speed Limits

Although Malta is not a contracting party to the United Nations 1968 Vienna Convention on Road Signs and Signals, the guiding principles and signage have been mostly transposed into national legislation under Subsidiary Legislation 65.05 Traffic Signs and Carriageway Markings Regulations. The relevant UN Convention signage designating minimum speed limits and the end of minimum speed limit are contained in this national legislation.

Policy Discussion

The national speed limit regime in Malta introduced over 16 years ago contains many of the essential elements which are nowadays considered to be European best practices. However, as with other countries we need to critical examine and reflect on whether this regime could be updated to take into consideration changes in traffic mix, road construction and vehicle technology or improved to facilitate greater awareness and compliance. At this juncture a number of issues may be raised for discussion

Are the National Speed Limits for different vehicle types appropriate?

The highest national speed limits are currently applicable to private cars and motor cycles (50 km/h in urban areas and 80 km/h outside of built-up areas). As discussed earlier in this Section, the majority of EU countries apply a harmonised national maximum speed limit of 50km/h in urban areas. The national speed limit of 80 km/h for roads outside of built-up areas is also in the middle within the range of speed limits applied in different EU countries and is also applied by road engineers as the maximum design speed for roads where the environment permits. It should be noted that no roads in Malta may actually be classified as motorways (OECD definition[6]).

[6] Road specially designed and built for motor traffic which does not serve properties bordering on it, and which:
(a) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other, either by a dividing strip not intended for traffic, or exceptionally by other means;
(b) does not cross at level with any road, railway or tramway track, or footpath;

The national speed limits for light goods vans more than 3.0 tonnes g.v.w was specifically changed in the Maltese law in 2002 from 30 km/h to 40 km/h in urban areas and from 40km/h to 60 km/h outside of urban areas. The use of 3.0 tonnes g.v.w. to define 'Light goods vans' is somewhat unconventional as the EU vehicle classification system uses 3.5 tonnes to define light commercial vans (N1 category). Light commercial vans under 3.5 tonnes g.v.w typically carry a payload of less than 1,000kg; these include the Ford Transit and Peugeot partner and generally meet the same safety criteria as passenger cars.

Speed radar surveys carried out on a number of different roads in Malta where no speed enforcement takes place reveals that the average speed of light commercial vans is identical to average speed of passenger cars. National accident analysis reveals that the number of road traffic accidents involving light commercial vans is not disproportionate to those involving passenger cars.

With respect to buses, coaches minibuses and heavy goods vehicles the maximum speed limit of 40km/h in urban areas and 60 km/h for outside of built-up areas is deemed to be appropriate given the relative weights of the vehicles and the extra stopping distances required.

The maximum legal speed limits for Towing Vehicles are 20 km/h for in towns and villages and 30 km/h. Although it is presumed that the legal term 'towing vehicles' is intended to mainly cover the towing of caravans and boat trailers, the inadequacy of the current legislative framework also means that this definition could be extended to articulated lorries. In this respect, it is fair to comment that few if any 'towing vehicles' in practice actually adhere to a speed limit of 30km/h in free flowing conditions on roads outside of built up areas.

How do we define 'in and outside towns and villages'?

The current legislative framework does not define the terms 'in towns and villages' or 'outside towns or villages'. The Vienna Convention on Road Signs and Signals defines "Built-up area" to mean an area with entries and exits especially sign-posted as such. Some countries use street lighting to demarcate the urban area boundary. In Malta the application of this definition to apply legal differentiated speed limits between built-up areas and outside built up areas would, however, give rise to confusion as a) Local council boundary signposting also incorporates rural roads, b) Nearly all roads have street lighting c) Urban sprawl and ribbon development over the years has resulted in most rural roads now having roadside development d) Some upper level arterial and distributor roads pass through built-up areas but frontages and pedestrian activity are physically separated by means of footbridges, service roads etc.

In this respect, the only practical solution to clearly distinguish the national speed limits being applied in urban areas from speed limits applied outside of urban areas would be to use speed limit signs on all entry points to urban areas.

Should a minimum speed limit be adopted on certain roads?

Many people consider slow drivers to be as much of a road safety hazard as motorists using excessive or inappropriate speeds. In practice, slow drivers create tailbacks and frustration for other road users often forcing dangerous overtaking by others. As pointed out earlier in this Section, very

(c) is specially sign-posted as a motorway and is reserved for specific categories of road motor vehicles

few countries apply minimum speed limits and those that do in Europe apply such limits only on inter-urban motorways. The application of minimum speed limits in practice in Malta would be very difficult to enforce due varying levels of congestion, driver behaviour and high frequency of intersections. Alternatively, what can be practically applied on the higher level roads would be a prohibition of certain vehicles and other road users which cannot travel above certain speeds.

Policy Recommendations

1. National speed limit legislation is simplified and revised as follows:

Class of Vehicle	Maximum speed in km / h	
	In Built-up areas	Outside Built-up areas
Vehicles under 3.5 tonnes Motor Cycles, Cars (M1 Category), Light Commercial Vans (N1 category)	50	80
Vehicles over 3.5 tonnes Passenger Carrying Vehicles (M2 and M3 categories) Heavy Goods Vehicles (N2 and N3 categories)	40	60
Cars Towing Caravans and Trailers	40	60
Industrial and Agricultural Vehicles	20	30
Emergency Vehicles and Vehicles on Priority Duty	No Limit	No Limit

2. The boundary defining a "built-up area" shall be determined on a case-by-case basis taking into consideration the number of dwellings with direct access to the road, type and function of road and other safety considerations.
3. Each 'built-up area' is appropriately signposted on all the entry points;
4. The following categories of vehicles are prohibited from using roads on Arterial roads: horse drawn vehicles, heavy vehicles which have manufactured design speeds of less than 30 km/h.
5. Prohibit use of certain industrial, plant or agricultural vehicles such as Fork lift trucks and JCBs on Arterial and Distributor roads
6. Better enforcement of the use of the overtaking lane on certain dual carriageway roads
7. Better promotion and education of the different national speed limits applied to different vehicle types within and outside built-up areas.

Section 5

Setting Local speed Limits

If it were possible to design all roads homogenously in terms of gradients, widths, visibility, vegetation, bends, junctions and kerbside activity, drivers would immediately chose the appropriate speed for travelling inside and outside built-up areas. However, no two roads are alike and for the foreseeable future there will always be situations where there is a discrepancy between different drivers' perceptions of the safe travelling speed on a road and the appropriate speed for that road, as established by theoretical analysis.

A key factor when setting a speed limit is what the road looks like to the road users in terms of its geometry and adjacent land use. Drivers are likely to expect and respect lower limits, and be influenced when deciding on what is an appropriate speed, where they can see there are potential hazards, for example outside schools, in residential areas or villages and in shopping streets.

Strong relationships between design speed, operating speed, and posted speed limit would be desirable, as these relationships could be used to design and build roads with a certain degree of consistency. In practice, while the relationship between operating speed and posted speed limit can be defined, the relationship of design speed with either operating speed or posted speed cannot be defined with the same level of confidence.

Design Speed of a Road

The process of designing a roadway begins with selecting a speed called the design speed. The road, street furniture and roadside features are designed according to this selected design speed in conjunction with a series of tables and figures (See Annex 1).

Operating speeds

At minimum speed limits should reflect an appropriate balance between safety and mobility. On a road without Posted Speed Limits, a driver will have to rely on his judgement of risk and perception of hazard in order to determine his safe operating speed. Some hazards may be obvious e.g. vulnerable road users near schools, tight bends while others less obvious concealed entrances, crest curves, poor skid resistance. Roads are dynamic structures and changes to the road environment will inevitably occur after the design and construction of the road. In this respect, there is often a wide discrepancy between the speed at which a road was originally designed for and the speed at which vehicles on the road are observed to operate.

The operating speed of vehicles on a section of road is an important factor in establishing safe speed limits for that road. Most European countries use actual measured speeds, typically the 85th percentile measured speed (the speed below which 85% of drivers travel in free flow conditions) as the first step in determining the maximum reasonable and safe Posted Speed Limit. Certain countries, however, are now moving towards the application the mean speed instead of the 85th percentile speed as their benchmark.

Posted Speed Limits

The Posted Speed Limit is the actual regulatory sign installed on the road which designates the speed limit for that road. In practice different countries adopt different technical policies to determine the Posted Speed Limits on roads within their jurisdiction. A principal aim in determining appropriate speed limits should be to provide a consistent message between the road geometry and environment and for changes in speed limit to be reflective of changes in the road layout and characteristics, since

these could have changed after the design and construction of the road. In addition to the assessment of measured speeds on stretches of road, the following important, objective, local factors are also normally taken into consideration by Traffic Engineers in determining the actual Posted Speed Limit:

- Road function (strategic, through traffic, local access etc.),
- Road geometry (width, sightlines, bends, junctions and accesses etc.),
- Road environment (rural, residential, shop frontages, schools etc.),
- Level of adjacent development,
- Traffic composition (including existing and potential levels of pedestrian and cycle usage), and
- Road accident rate

In Australia, posted speed limits are normally within 10 km/h of the 85th percentile operating speeds. The highway authorities have developed specific software 'X-limits' which, after inputting this localised data, will calculate the appropriate speed limit for the particular stretch of road.

Different countries have different ways of defining posted speed limits on their road networks. Whatever method is deployed, it is preferable to use a rounded number of the speed limit such as 40, 50, 60, 70 km/h to correspond with the major units on a vehicle's speedometer.

As a general rule, the minimum coverage length for a particular Posted Speed Limit (e.g. 60km/h) must be more than 600 metres. Adequate, consistent speed limit signage is critically important to maintain awareness of the limit and the public support for its application and enforcement.

Transition Zones

Transition zones are required to help drivers adjust their speeds in a gradual manner between points where the road environment changes for example where a road such as Triq il-Mistra passes through hilly terrain and local speed reduction is required at the sharp hairpin bends. Road intersections such as roundabouts and gateways not only perform the function of a road junction but can also physically slow down traffic to an appropriate speed on the entry points to towns and villages. It is common practice in many countries to decrease or increase posted speed limits by 20 km/h increments for example for a speed change from 80km/h to 60km/h.

Alternatively, transition zones can also use the following signage in the transition zone to warn drivers of the downward change of safe speed ahead due to changes in road environment, for example on the approach to a sharp bend where the safe driving speed reduces from 80km/h to 50 km/h. The Reduce speed now sign is used in combination with a triangular warning sign indicating the potential hazard.

Figure 9: Warning sign indicating reduction in speed necessary for a change of road layout ahead
Source: Traffic Signs Regulations and General Direction, UK (2002)

For upward changes of local speed limits the following 'end of speed limit' signs may be used. The second and third signs indicate the re-introduction of the national speed limits.

Figure 10: Speed Limit Signage
Source: Vienna Convention on Road Signs and Signals (1968)

Speed zones

30 km/h zones (often known as 'home zones') are used in several European countries, to name a few: Austria, Ireland Belgium, Denmark, Germany, Ireland, Sweden, United Kingdom (20 mph). Such zones can be used in single zones where traffic calming is needed or generalised to all zones that display a common characteristic such as school surroundings. 30km/h zones are normally installed in residential areas, in roads passing schools and in shopping streets where there is a high conflict level between motorists and pedestrians or other vulnerable road users. The idea is to slow motor vehicle speeds to a maximum level of 30 km/h.

Current Practice in Malta

Design speed of roads

Most of the arterial and distributor road network in Malta and Gozo was defined and constructed prior to the 1970s, at a time when the national legal speed limit for cars travelling outside towns and villages was set at 40mph (64km/h) and 25 mph (40km/h) within towns and villages. The design of the main road network was largely determined by the topography of the land and the alignment of the road was planned in a manner that largely respected existing physical obstructions such as buildings and fortifications. As a result, there are actually very few long and straight sections of arterial and distributor road in the Maltese Islands.

Over the years, the rapid growth in urbanization levels has resulted in further building outside urban areas and linear development along many of the main roads which, when combined with the environmental and conservation laws, practically preclude the either new provision or re-alignment of many existing roads in order to conform to the required geometric design parameters for an 80km/h road (Annex 1) which are taken from the UK Design Manual for Roads and Bridges and which became mandatory as design standards under Maltese law in 2003.

If we look at Malta's highest functional level of road the 'Arterial TEN-T road network', and retroactively apply the mandatory standards contained in Annex 1 for the '85A design speed (80km/h)' it is clear to see that most section of the TEN-T road network falls short of the minimum design standards for an 80km/h road in terms of on or more of the geometrical design factors.

For example, in order to apply an 80km/h design standard for one of the busiest section of TEN-T (Regional Road between Kappara and Pembroke), many residential properties adjoining this road would need to be demolished in order to provide the necessary minimum standards required for horizontal curvature and super-elevation as illustrated schematically below.. In addition, a design speed for 80 km/h would necessitate significant realignment of slip roads into environmentally protected valleys in order to provide the visibility 'y' distance of 160m (Annex 1).

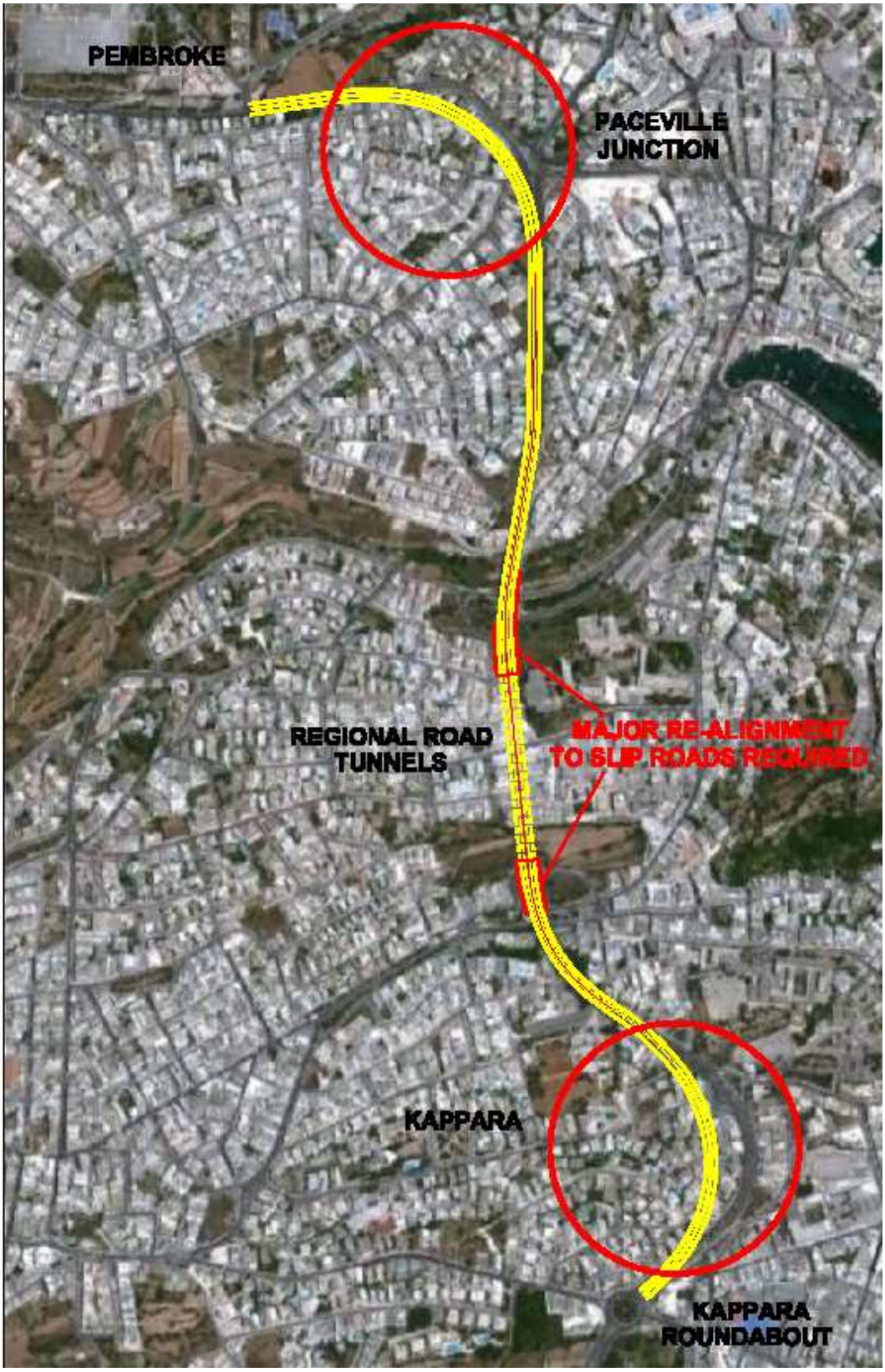

Figure 11: Malta TEN-T (road) Node EA15 (Kappara) to NA11 (Pembroke) required alignment changes for 80km/h design speed

Source: Transport Malta (2010)

Whereas, in the north of Malta where the terrain is hilly and roads follow the steep contours of the land, the only way in which an 80km/h road design speed can be applied is through the provision of tunnels and bridges to level out the steep gradients and bends. However, when such measures have been proposed as part of the upgrade of the TEN-T (for example bypassing Xemxija using a tunnel through Manikata, or constructing a tunnel and bridge behind Għadira Bay, the transport authorities at the time had received a strong negative reaction from a wide range of stakeholders and interested parties.

Posted Speed limits in Malta

In addition to the current national speed limits described in Section 4 the Maltese law[7] since 1994 has empowered the competent highway authority to prescribe a lower speed limit than the national speed limits in any particular road or area.

Posted Speed Limits started to be introduced on roads from the mid-1990s in what could best be described as a rather piecemeal and ad hoc manner. Speed limits were usually adjusted downward from the national speed limits and were posted at specific locations where there was a general perception of a speeding problem, which could not be resolved in the short term by engineering measures. Historical road accident statistics for these locations would often indicate frequent serious injury or fatal road traffic accidents, as for example, the Regional Road Bridge at Msida and the bend in the Coast Road near Għallis Tower.

The late 1990s saw the promulgation of 35 km/h Home Zones (based on the UK 20 mph 'Home Zone' concept) by the then Traffic Control Board which has been successfully introduced in a number of village cores and traffic sensitive areas.

The introduction of legal design standards in 2003 and the introduction of speed cameras in 2004 resulted in improved analysis of operating speeds and local factors such as road geometry, road environment, 85th percentile speed measurements, frontage and pedestrian activity prior to the implementation of Posted Speed Limits

The current Posted Speed Limits for Malta and Gozo are contained in Annex 1)

Policy Discussion

Do we have a comprehensive and effective system of Posted Speed Limits?

Although the national posted speed limit regime system effectively addresses safety concerns and speeding problems along certain stretches of road, there are other parts of the road network which fall far short of the standards required. These sections may have one or more of the following deficiencies.

Some Posted Speed limits indicating reduced local speed limits at bends or other dangerous sections of road are not cancelled by an 'end of speed limit' sign. Without an 'end of speed limit the local speed limit restriction would, according to the law, apply until the next posted speed limit. For example, the stretch of TEN-T network between the outskirts of Mellieħa and Mtarfa has local speed limits of 30km/h north of junction NA5 in each direction for the dangerous 'hairpin' bends but no further Posted speed limit signage until Xemxija or northbound, thus unrealistically restricting speed limits to 30km/h for several kilometres in either direction .

Certain stretches of road have frequent changes of posted speed limits whereas international best practice dictates that Posted speed Limits are not changes within distances of 600metres. The 3km section of TEN-T road (Regional road) between High Ridge and Msida Valley has no fewer than seven changes of posted speed limit.

[7] Subsidiary Legislation 65.11 Motor Vehicles Regulations

Certain roads make unconventional use of non-rounded numbers such as 35km/h and 45 km/h. As highlighted earlier in this Section, it is undesirable to use non-rounded numbers, as this both complicates the speed restriction message and, as most vehicle speedometers are graduated at 10km/h intervals and not 5 km/h intervals, making it more difficult for motorists to verify their operating speeds against the speed limit;

Certain roads do not have local Posted Speed Limits which should according to international best practice have local speed limits restrictions imposed. For example the road leading to down to Għar Lapsi has no posted speed limits therefore, as this is considered to be outside of a town or village the national speed limit of 80km/h would apply. The road is characterized by very tight bends, narrow carriageway, narrow bridge, inadequate barriers and poor skid resistance. Regular users of this road normally travel at suitably low safe speeds however, for non-regular users such as tourists without appropriate local speed limits there is the serious risk of speed misjudgement.

Use of inappropriate Posted Speed Limits on some roads which are well below natural free-flow operating speeds with no justification. Where certain speed restrictions have been imposed in the past and not enforced, it is clear that these signs are being blatantly ignored by the majority of drivers. The use of inappropriately low posted speed limits for no evidently justifiable reason can create a credibility problem for the competent authority in this important area of road safety.

Who is responsible for establishing or changing speed limits?

In most European countries the role of establishing speed limits is divided between the national government (which is normally responsible for upper level motorways and arterial roads) and local authorities (which are responsible for the lower level local roads within their administrative a boundaries). The national government normally provides the regulatory framework and clear guidelines for local authorities to following in setting local speed limits. Chapter 499 Article 7(J) of the Laws of Malta designates Transport Malta as the legal entity responsible for authorizing all road traffic signs. Local Councils may request a review of certain speed limits within their boundary as part of a traffic management application.

What system should be adopted to determine local speed restrictions?

There is no harmonised approach in Europe for determining local speed restrictions and each country has developed is own unique system. Whilst some countries rely exclusively on subjective opinion based on driving, other countries have developed quite sophisticated scientific ways of calculating speed limits. These often combine measurements of operating speeds (e.g. mean or 85th percentile speeds), local factors such as accident levels, road geometry with engineering judgement and practical observations through driving.

Where is the speed limit announced or published?

For either legal reasons or for the purpose of improving public awareness, most European countries publish changes to specific speed limits for different sections of road. Notification of these changes may be through speed limit orders, council notification, gazettes, and newspapers or in simply documented in the registry of the competent highway authority.

Who is responsible for maintaining database of speed limits and certifying speed limit decision has been correctly signposted?

Normally it is the competent highway authority

Policy Recommendations

1. Transport Malta retains regulatory competence for determining the Posted Speed Limits on all categories of road.
2. The methodology to determine Posted Speed Limits applied in Annex 1 and geographically onto Posted Speed limits maps of Malta and Gozo at the end of this section are approved.
3. Only the following rounded Posted Speed Limits Signs shall be permitted 10, 20, 30, 40, 50, 60, 70 and 80 km/h.
4. The list of posted speed limits and any subsequent changes to Posted Speed limits shall be discussed between Transport Malta, Police and the relevant Local Council/s (lower category roads 30km/h home zones) and the decision shall be published.
5. Transport Malta maintains speed limit database and certifies that speed limit decision has been correctly signposted.
6. Transport Malta should undertake periodic monitoring of speed compliance with Posted Speed Limits and continuous monitoring of road traffic accidents on all stretches of road using a Geographical Information System

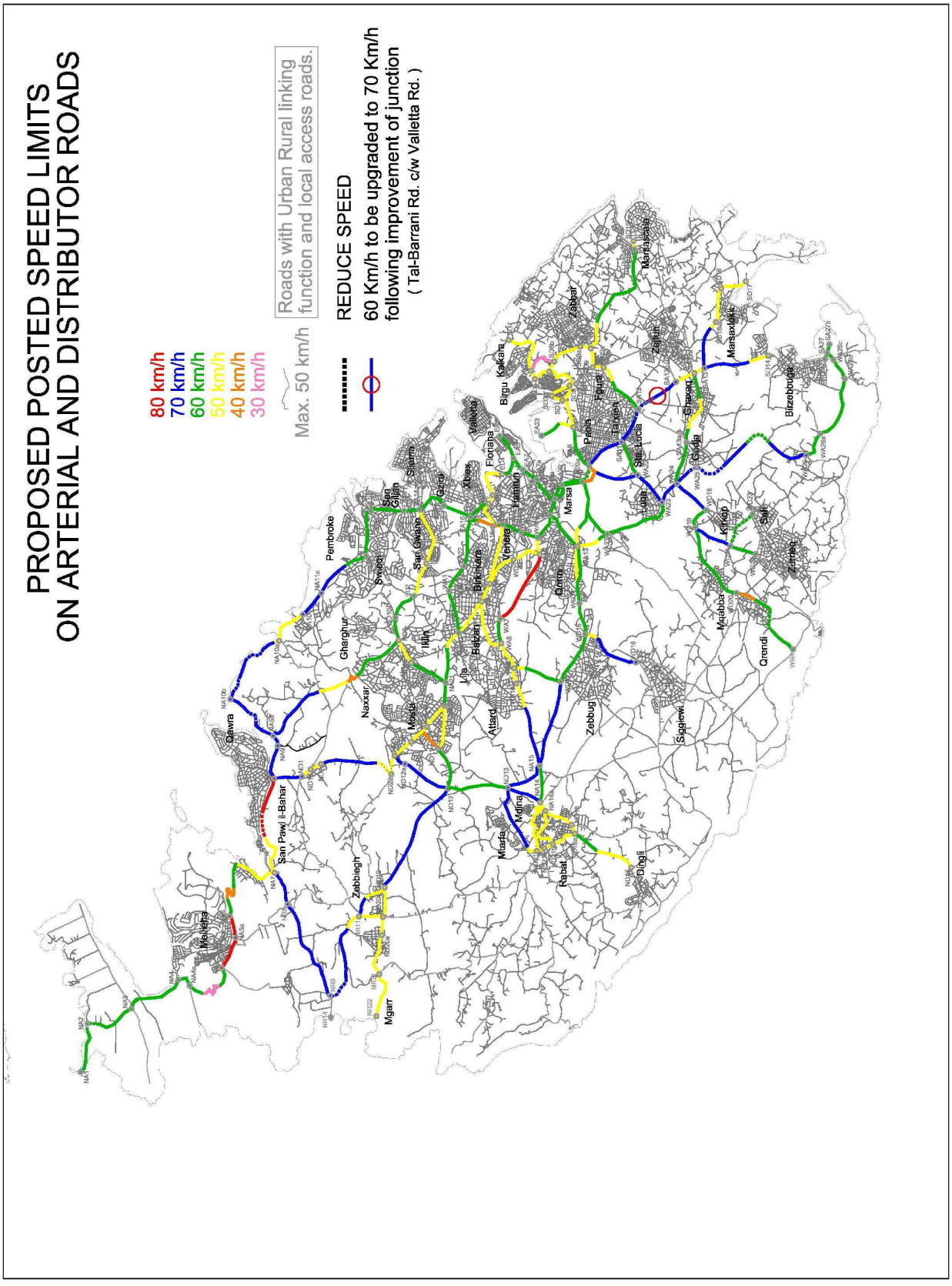

Figure 12: Proposed Posted Speed Limits on Arterial and Distributor roads in Malta

Source: Transport Malta

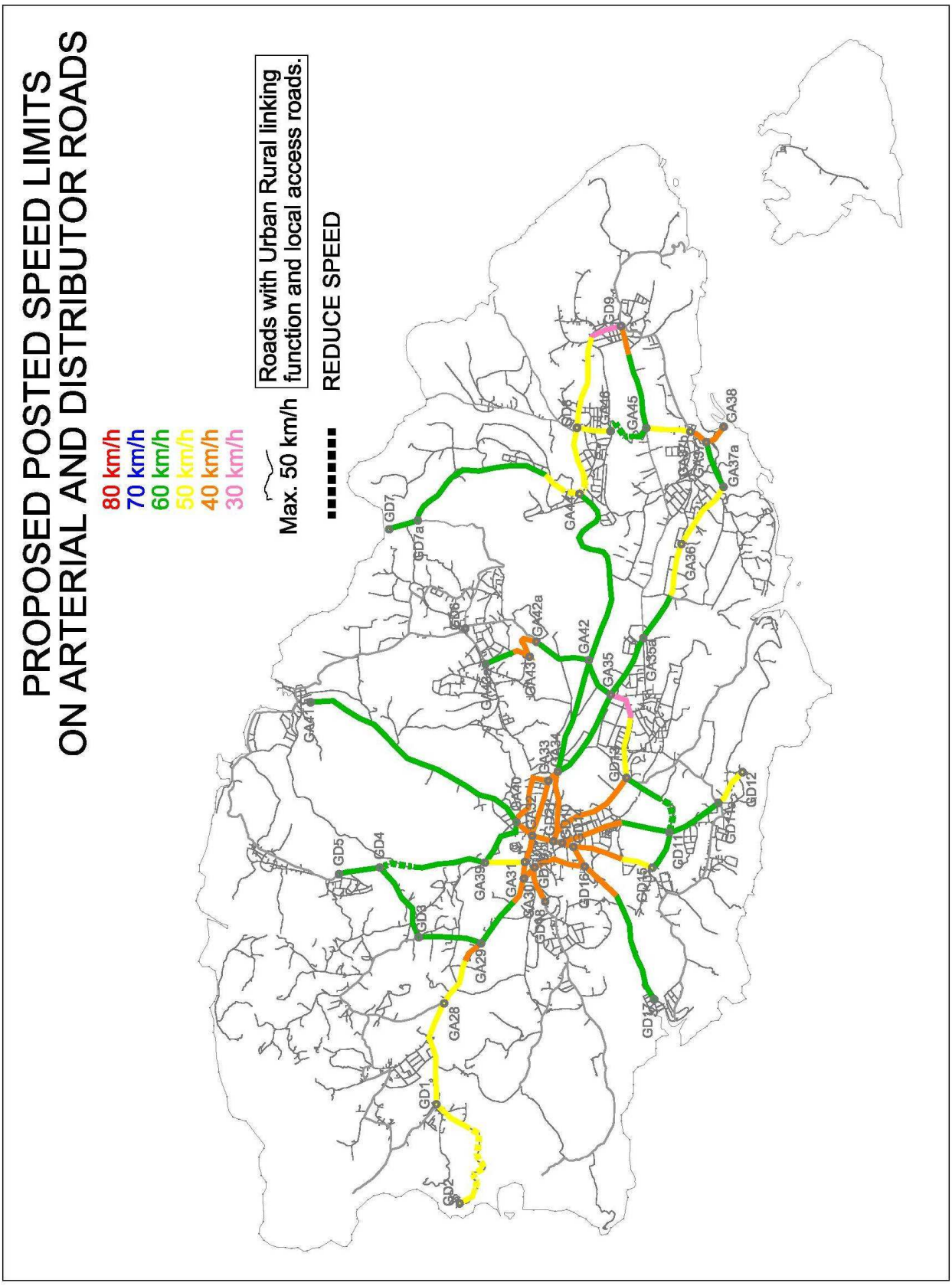

Figure 13: Proposed Posted Speed Limits on Arterial and Distributor roads in Gozo
Source: Transport Malta

Section 6

Making sure people actually know the speed limit in force

Generally speaking, drivers are educated about their county's national speed limits during the training and testing associated with obtaining a Driving Licence. This education is reinforced by information concerning national speed limits at ports, airports and border crossings and the use of Posted Speed Limit signs on the road network (which in most countries has been harmonised in accordance with the provisions of the 1968 Vienna Convention on Road Signs and Signals). As discussed in Section 4, national maximum speed limits may also be differentiated by other specific rules such as: according to type of vehicle, type of tyre, type of driver, prevailing driving conditions; which makes communication and provision of information for different road users more difficult. In cases where there are legal changes to national speed limits it is important to communicate such changes to both existing and prospective drivers. In this respect usual practice is that formal consultation is carried out with stakeholder groups and associations representing different categories of drivers, education campaigns are carried out using media channels and teaching aids for trainee drivers such as the Highway Code are updated accordingly.

Speed Limit Signage

The use and location of Posted Speed Limits on the road network needs careful consideration so as to provide a clear and consistent message to drivers, without cluttering the environment with superfluous driver information. To achieve this aim, the following basic best practices are applied. For fixed speed limit signage, these should:

- Be clearly visible at day time and night time (in other words should also be retro-reflective);
- Should have minimum diameter of 600mm at start and end of the speed limit restriction, with the diameter optionally reduced to 300m for repeater signs;
  Be installed in such a manner that compliments other important road signage e.g. upcoming bend or slippery road surface;
- Apply to a length of road not less than 600m before another change in the Posted Speed Limit;
- Be spaced at the intervals indicated in Table 6 between consecutive signs;
- Have terminal signs located at or as near as practicable to the point where the speed limit begins or ends:
  - For single carriageway roads, on each side of the road in each direction
  - For roads with more than one carriageway, on each side of each carriageway where the relevant speed limit applies.
- Be consistent with speed limits being indicated on variable message signs with clear indication which signage should take precedence.

At speed transition zones, most European countries decide on the most appropriate procedure for their national policy frameworks:

- at transitional sections of road with small variations in speed limits e.g. posted speed limit on a road changing from 50km/h to 60km/h - either display sign indicating 'end of speed limit' or a sign indicating the new Posted Speed Limit (see Section 5)
- at transitional sections of road with large variations of speed e.g. from a rural road 80km/h passing through a village centre 50km/h countries either use graduated increments of 10 km/h to reduce speeds (in this case the distance can be 100m-200m) or use the warning signage 'Reduce Speed Now' (see Section 5).

Type of Road	Max. distance between consecutive signs on the same side of the carriageway	Max. distance between consecutive signs on alternate sides of the carriageway	Max. distance between start/end of length of road to be signed & first/last repeater
Road over 250 metres in length with 50km/h limit	400m	250m	200m
Road over 350 metres in length with 60km/h limit	500m	350m	250m
Road over 350 metres in length with 70km/h limit	600m	350m	300m
Road over 450 metres in length with 80km/h limit	700m	450m	350m

Table 6: Recommended distances between first / last Posted Speed Limit signs and repeater signs
Source: adapted from the Suffolk Constabulary Policies and Procedures, 2006

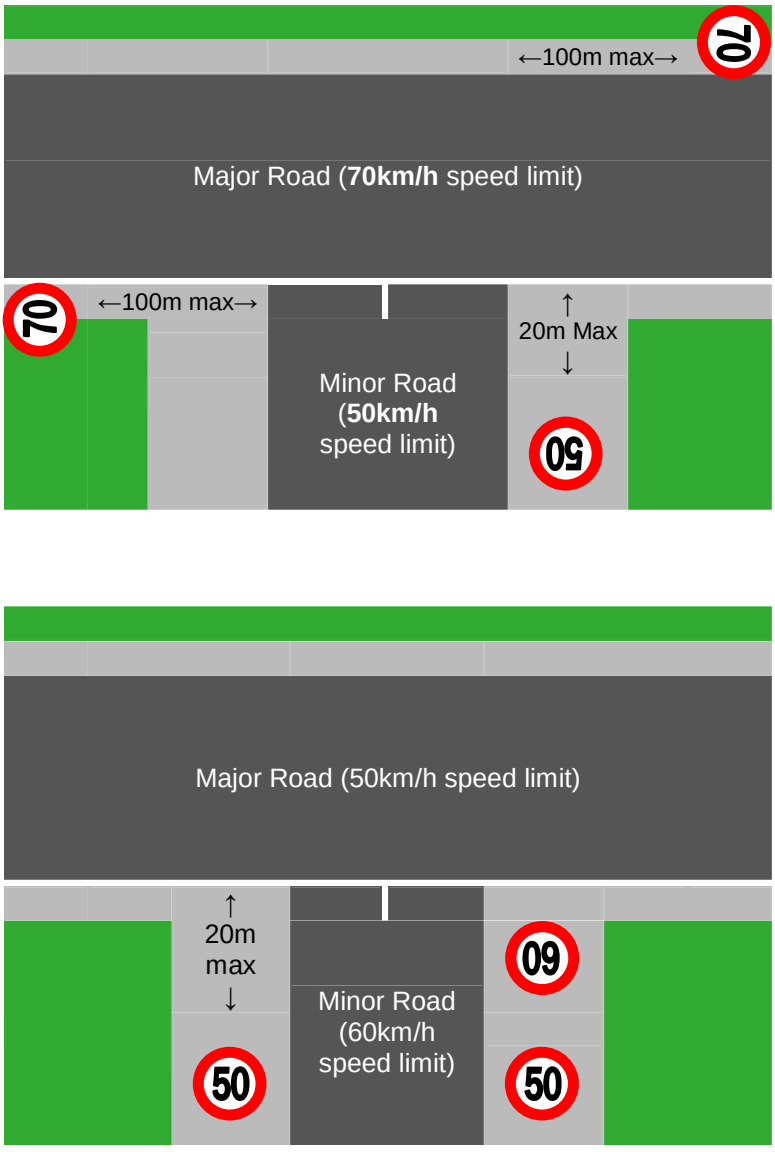

Figure 14: Examples of best practice in the layout Speed Limit Signage
Source: *Speed Limits* Association of British Drivers (2010)

Vehicle Activated Signs

Vehicle Activated Signs (VAS) have been developed to address the problem of widespread inappropriate speed where conventional signing has not been effective. The signs which have in-built radars are generally used for two purposes: speed limit compliance and warning of a hazard ahead. VAS do not target all drivers but are selectively activated by vehicles exceeding the posted speed limits or a safe speed for a particular hazard. VAS can either be permanently fixed or mobile for use in different sites where they communicate with drivers in real time when they are travelling at excessive speeds. VAS are considered to be an effective measure both from an educational; point of view and from a practical point of view as most motorists heed the warning and lower their speeds.

Figure 15: Examples of Vehicle Activated Signage
Source: Internet (not specific)

Road Markings

Road markings also perform an important function in influence the driver's choice of speed. They serve to guide motorists for example through lane delineation, they inform drivers about traffic regulations e.g. parking, overtaking etc, they can give advance warning of changes in road alignment ahead and they can be used to change speed perception by giving the impression of narrowing the road carriageway.

In addition to signage displayed alongside a road to indicate speed limits, certain carriageway markings must be varied according to the speed limit of the road. Three types of marking depend if the speed limit exceeds 60km/h as follows:

- centreline markings to divide traffic proceeding in opposite directions where there are no specific hazards
- centreline markings to divide traffic proceeding in opposite directions where it is dangerous to cross the centre of the carriageway
- markings dividing traffic into lanes on multi-lane roads where traffic in two or more lanes is travelling in the same direction.

The type of line markings required are as follows:

Type of Road Markings	Speed more than 60km/h	Speed less than 60km/h
Normal centreline	3m mark and 6m gap	2m mark and 4m gap
Hazard centreline	6m mark an 3m gap	4m mark and 2m gap
Divide traffic lanes	2m mark and 7m gap	1m mark and 5m gap

Table 7: Layout of road markings
Source: UK Department for Transport (2006)

Elongated speed limit roundels are permitted in specific circumstances as follows:

Figure 16: Speed Limit Roundels
Source: UK Department for Transport

- may not be used to show National Speed Limit
- to be used in conjunction with speed limit signs at the start of the speed limit or with a repeater sign.

Physical measures to influence vehicle speed

On existing roads with a speed limit of 50 km/h or below, a variety of physical measures may be necessary to reduce vehicle speeds to a level more suited to the physical characteristics of the road. There are broadly two types; those that involve changes to the highway geometry, such as road narrowing or junction modification and those that vary the carriageway surface to improve driver awareness of vehicle speed and thus inhibit speeding (e.g. road humps and rumble strips). The technical details relating to both types of physical measures are contained in Annex 3.

Figure 17: Road narrowing with road hump
Source: Internet (not specific)

Current Practice in Malta

As a result of introducing new EU requirements to the national system of driver licensing, a more comprehensive approach to driver training and testing was adopted from 2002 onwards. Nowadays, prospective drivers are expected to demonstrate full awareness and understanding of national speed limits (for each vehicle and road type) and posted speed limits.

Although the driver educational level of new drivers has improved considerably, it has been noted that changes that in the legal framework relating to national speed limits that have taken place since 2002 have not been reflected in teaching aids such as the Highway Code. Furthermore, it is becoming increasingly evident from comments in local media and posted in on-line forums that a number of the more-experienced drivers have neither awareness of current kilometre-based national speed limits for different vehicle types nor indeed the meaning of the national speed limit signs posted around the island.

Foreign drivers in Malta are currently not notified of national road speed limits at the airport or sea passenger terminal. However, as most car-driving visitors to the Maltese Islands' hire a car and several car hire companies have taken the initiative to provide their own information leaflets about driving in Malta.

Speed limit Signage

The types of posted speed limit signage that has been installed on the Maltese road network are in line with traffic sign types that are prescribed in the Vienna Convention on Roads signs and signals. As pointed out in Section 5 the current regime of speed limit signs is not comprehensive and to this effect, a number of policy recommendations have been made in this Section to remedy the situation.

The posted speed limit signage that has been installed on Malta's road network does not always conform to best practices identified in this Section in relation to location and spacing of repeater signs. Moreover, in the case of transitional speed zones an inconsistent and undesirable mixture of different policy measures in which both new speed limits, signs indicating 'Reduce Speed Now' and 'End of Speed Limits' and the display of the unit 'km/h' on some signs but not on others, rendering the posted speed limit signage system potentially confusing to new drivers and visitors.

In the case of Gozo, a grand total of three posted speed limit signs were observed to have been installed on the road network. It can be safely assumed that no speed management policy has been applied on the island of Gozo.

Vehicle Activated Signage

Although Vehicle Activated Signs have not yet been used in Malta, LED signage (an earlier technology) has been installed and tested at Ħal Far Road, Xemxija Hill and Telgħa T'Alla w Ommu in 2007. The LED signs that were tested are standard warning red triangle signs that are placed before dangerous bends on the road network and which are lit to be more visible to motorists and powered using a small solar panel. Shortly after installation, the LED signs on Ħal Far Road were stolen - possibly for the re-use of the solar panel equipment.

Source: Transport Malta (archive)

Road Markings

Road marking centrelines according to best practice standards illustrated earlier are often correctly indicated at the planning and design stage of a road but are then implemented incorrectly or repainted incorrectly following road maintenance. As a result, the frequency and spacing between centreline markings on most parts of the road network bears little or no resemblance to the national design standards.

Physical measures to influence vehicle speed

Comprehensive traffic calming polices and guidelines were published in the past both by the Planning authority and by the Malta Transport Authority. The guidelines are presented in a manner that is easily understood to technical and non0-technical persons. As traffic calming measures are applied to roads which have speed limits of 50 km/h or less they are normally applied on local access roads and fall under the responsibility of Local Councils. It is a procedural requirement for Local Councils to seek the approvals of the Transport Authority for the implementation of traffic calming measures on a local road. It is often the case, however, that what is approved by Transport Malta is not in practice implemented by the local Council in accordance with approved plans or design standards.

Figure 18: Photographs showing traffic calming measures applied correctly and incorrectly
Source: Transport Malta (archive)

Policy Discussion

Should we continue to use this sign to indicate the national speed limits? 

Although this sign is contained in the Vienna Convention for Road Signs and Signals it is only used in a limited number of European countries; namely: UK and Ireland to signify end of a local speed limit and re-introduction of the national speed limit on a stretch of road.. Other countries, especially countries with road border crossings, choose to display the actual national speed limit in figures.

Which road signage policy is best suited for Malta's road network in speed transition zones?

The most effective speed signage is that which presents a clear and consistent message to drivers without cluttering the road environment. The road network in Malta and Gozo is characterized by frequent intersections and changes in the road environment.

- Downward change in speed limit - it may be impractical to deploy the policy option for the downward change in using posted speed signage displaying incremental speed reductions up to the start of the section of road where the actual lower speed restriction should apply. The use of the 'Reduce Speed Now' sign placed at intervals on the approach to the lower speed section would provide a simpler and clearer solution given the short distances between changes of speed limits.

- The other policy option choice in speed transition zones relates to the use of 'end of speed limit' signs  or simply display the new speed limit sign 

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Can Vehicle Activated Signs be effective in Malta?

Vehicle Activated Signs are proven to be very effective devices to increase the awareness of drivers in relation to their use of excessive speed at a particular. VAS needs to be selectively sited at locations where there is use of inappropriate speed, where there are hazards such as tight bends, adverse camber etc. or where there is an actual or perceived risk of traffic accidents. In Malta there are several locations where installation of speed camera devices, using objective assessment criteria (see section 8), may not be justified and the installation of VAS may effectively address road safety problems. However, it is important that appropriate precautionary measures are taken to prevent VAS from being vandalised or stolen and that public awareness of their safety benefits is promoted prior to their installation.

Policy Recommendations

1. Replace all national speed limit signs with posted speed limits displaying the actual maximum speed as a number
2. In speed transition zones use only 'Reduce Speed Now' signs in combination with triangular warning signs and the actual posted speed limit at location where the speed limit actually applies.
3. Explore the technical feasibility of Malta becoming a contracting party to the UN 1968 Vienna Convention on Road Signs and Signals
4. Introduce Vehicle Actuated Signs (fixed and mobile) at key locations for example before or after existing fixed speed cameras as an information / educational measure and as a counter measure to the kangaroo effect' (see section 8), on approaches where local speed reduction is required before sharp bends, pedestrian crossings etc. Installation should be accompanied by appropriate public awareness campaigns on the purpose and road safety benefits of VAS.
5. Transport Malta to audit road markings and traffic management and calming measures to verify compliance with government standards
6. Transport Malta to introduce greater accountability amongst other entities responsible for undertaking road markings and constructing traffic control measures. All works should be signed off by a warranted Architect and Civil Engineer in the form of a completion certificate.

Section 7

Informing and educating the drivers about speed and speed management

The success of a speed management policy will depend overwhelmingly on the acceptability of the community and community decision makers. Speed is a highly controversial issue. Although there may be clear evidence that speed and speeding are problematic, it is vital that speed management policies, which by their nature necessarily restrict driving behaviour and driving choices, are well managed and so as not to be ignored.

Education, training and information are all essential to the success of a comprehensive speed and speed management policy. They are also a pre-requisite for other measures to be effective such as infrastructure, signage, road makings, enforcement and vehicle technology.

Speed management is an area of road safety for which there is often joint regulatory responsibility: the politician for legislating and approval of actions, the roads authority level (central and local) for the physical implementation of speed management measures, the driver licensing authority for the training and testing of drivers and the traffic police level for enforcement of speed limits and driving behaviour. Responsibility for speed management does not, however, stop with the public authorities and there are several other important stakeholders including media, insurance companies, schools, researchers, motoring and other associations, all of which can help promote speed management policies and greater awareness of road safety.

Education of children

Unlike other areas of road safety education taught at schools, school children are not in position to directly influence the speed of motorists. On the other hand, children are directly affected by the risks from motor vehicles being driven at speed, particularly near there home, where they play or on route to school. At a young age, their behaviour can be unpredictable in the road environment. Speed management programmes are therefore particularly important in sensitive areas such as near schools, playgrounds and in residential zones.

The educational technique used at schools is largely dependent on age group and is usually structured accordingly. Basic road safety can be taught using visual aids, toys and road safety games for very young children. Education about crossing the roads, safer routes to school, using bicycles and motor scooters at is often delivered at secondary school level. Finally the use of speed (as a driver) is taught as part of road safety education for prospective motorists in the final year of secondary as well as at post-secondary schooling.

Driver Training

There are a number of European Union directives that aim to standardise and harmonise the testing and licensing of prospective drivers of different vehicle categories. The EU driving test assesses a driver candidate's level of theoretical knowledge on speed and speed limits and the control of the vehicle under different road environments at different speeds in the practical test (see Section 5).

However, currently EU member states are allowed full discretion regarding legal requirements for training before (and after) the test for a driving licence is mandatory. Some EU countries such as the UK apply the traditional mandatory test-only approach. Many EU countries apply the mandatory test plus pre-test driving school model in which a minimum amount of formal driving instruction is required before becoming eligible to sit for a driving test. Young car drivers (18 to 25 year olds) account for 27% of the total number of car drivers killed across the EU. A number of non-EU countries (e.g. Australia, Canada, USA and New Zealand) have introduced probationary periods in which novice

drivers must be accompanied for a minimum number of driving hours or kilometres before they are allowed to drive solo. Austria has introduced second-phase training after drivers receive their license based on participation, but this is not usually connected with a test.

The European Union has recently introduced mandatory requirements for initial and periodic training of professional drivers (goods and passenger transport vehicles and passenger transport vehicles). It is likely that future policy and legislation in the EU will focus more on the training of other drivers and establishing harmonised standards for driving instructors to improve the quality of driver training and encouraging the use of driving simulators for drivers to more quickly acquire experience in travelling in different simulated road conditions.

Licensed drivers

Licensed drivers, particularly those with many years experience are normally the most difficult category of motorists to inform, educate and train about speed and speed management policies. Most European countries embark on widespread information campaigns to increase road awareness about speed, as well as other known major contributors to road traffic accidents such as driving under the influence of alcohol or drugs or not wearing seat belts. Speed management, in practice, is probably the most difficult area of road safety to relay to motorists, particularly when the same media also broadcast adverts for fast cars, motor car racing as well as the availability of cinematic thrillers involving high speed car chases.

The effects resulting from an information campaign seeking to change attitudes and behaviour is difficult to quantify in terms of road accident reduction. If information campaigns are introduced without supporting measures, the outcome is likely to be insignificant. On the other hand, when information campaigns are developed as part of a broader speed management and enforcement policy, they can be very effective in illustrating and explaining the rationale behind the policies the public.

“Safe driving” courses are another effective road safety educational initiative which may be applied on a voluntary or mandatory basis by employers (government, local government and companies) as part of a corporate safety strategy. Typically, the target group of employees undertake this training at the beginning of their employment. “Safe driving” courses include both theoretical and practical elements e.g. classroom and in-car training and in practice, this training is often combined with other corporate social responsibility driving initiatives such as ‘eco-driving’.

Several European countries apply a driving licence penalty point system to all driving licence holders irrespective of their level of experience. Some police authorities run “Speed Awareness” courses which are offered to drivers usually caught by speed cameras driving just above the speed limit, as an alternative to a penalty such as a fine and/or demerit points on the drivers’ licence. This is not seen as an easy option, since every participant who attends a seminar is expected to take a full and active part in the course. The UK enforcement agencies have been delivering these courses for a number of years and results indicate that they are an effective rehabilitation measure for repeat offenders.

Current Practice in Malta

Education of children

Over the last few years, a number of road safety educational initiatives have been carried out at schools by Transport Malta and by the Traffic Police in collaboration with the heads of various schools around Malta and Gozo. At primary school level, local road safety education tends to focus on practical demonstrations using educational aids in the school

playgrounds which practically illustrate the potentials of playing near roads.

At secondary schools, road safety classroom lessons are often accompanied by practical exercises for children, for example cycling or the use of puzzles and quizzes, as tools designed to increase awareness and interest of children in various aspects of road safety.

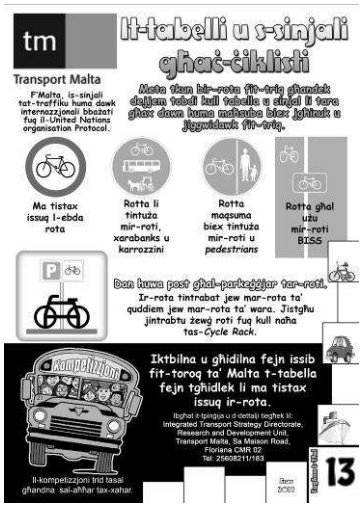


Figure 19: Overall, the road safety education carried out at various schools
Source: Transport Malta (archive)

Driver Training

Following the introduction of new EU requirements to the national system of driver licensing, a more comprehensive approach has been adopted for the testing of prospective drivers. A harmonised syllabus was introduced which sets out all the various subjects that could be tested in the practical test of skills and behaviour as well as in the driver theory test.

Driver training continues to be vitally important in order to relay the necessary road environment awareness and car handling skills. National legislation was amended in 2007 requiring all professional Driving Instructors to pass a theory examination; a driving ability and fitness test and to demonstrate ability to instruct candidates (on average 20-30 a year) prior to being licensed by Transport Malta as instructors. It is intended that a continuing ability test for the 180 incumbent driving instructors be deployed, since it is evident that the standard of instruction by currently licensed instructors is variable. However this test has not yet been organised.

Literature is also available for novice drivers to read and learn about signage, road markings and general rules of the road in Malta, however very little is yet available in the Maltese language.

Malta has also recently introduced the EU mandatory requirements for all drivers of goods and public transport vehicles (driver licence categories C and D) to be certified as being professionally competent to work in this vocational area. All drivers who passed a category D driving test after 10th September 2008 or a category C test after 10th September 2009 are then required to be certified with an initial qualification following successful completion of further theoretical and practical tests. As part of the same EU initiative all professional drivers (including those incumbent drivers who were not required to sit for the initial qualification) are required to undergo 35 hours of periodic training at least every five years.

The mandatory initial qualification and periodic training requirements for professional competence certification provides further opportunity for education of all heavy goods and passenger transport vehicle drivers on important areas such as national speed limits, appropriate speeds for different road conditions and speed management.

Licensed Drivers

The mandatory periodic training for professional drivers will help to keep professional drivers updated and informed about road safety issues. The vast majority of drivers, however, are private drivers using personal and smaller vehicles such as cars and motorcycles and do not fall within the scope of this EU training initiative. In this respect, increasing public awareness of the speed management aspect of road safety through education campaigns and other initiatives at a national level will remain important.

In the last five years, very little positive public education has taken place in relation to driver speed as a problem and enforcement of speed as a potential solution. As a result, the public and media have largely been left to debate the issues often subjectively based on personal experiences and pseudo-scientific assumptions, in the main part, rather devoid of objective content or facts. This Speed Management Policy introduces the issues relating to speed management in a structured way, and sets out the policies and practices that are required to be adopted to create a comprehensive framework for this vital aspect of road safety. The issues being raised in each section of this policy document, will therefore, need to be relayed to the public through an effective media strategy so as to increase the public understanding of the complexity of the road safety landscape and thus increase public acceptability of policy decisions and measures that may be taken as a result of the adoption by government of the Speed Management Policy.

Policy Discussion

Should road safety education become part of the school curriculum?

All school children will eventually become road users from being pedestrians and cyclists to becoming drivers. Road safety education during a child's formative years will help increase his / her awareness of potential dangers on the road throughout his adolescence and hopefully into adulthood. The carrying out various experimental road safety educational initiatives in different schools in Malta has so far been positively received and it would seem that what has been piloted in a limited number of schools could be formally transferred to a national level with different educational courses being set up for different age groups.

Can we make driver learning more interesting even before getting into a car?

In today's world there are many interesting learning aids that can be used persons approaching the eligible age to start driver training. These include inter-active web-sites where you can learn and test yourself on aspects of the highway code, driving simulators, thematic quizzes and driving videos that could be shown to classes at the Junior colleges, MCAST and the University which can certainly make driver training and education more interesting to the candidate.

Should newly qualified drivers require to accompaniment for a limited period

Although this is not an EU mandatory requirement, several countries require new drivers to be accompanied by a more experienced driver for the first few weeks and are required to use a special 'L' plate for designation as novice drivers for a fixed period before being allowed to drive solo drive. It is envisaged, however, that in practice this initiative is probably difficult to ensure compliance with and violations are only detected when stopped by the police in connection with other violations. In saying this, a newly qualified driver will very often find himself in a driving situation or scenario that he has not experienced during his driver training e.g. traffic light power outage and would benefit from being given instruction by a more experienced driver until he gains confidence.

How can the Media help in Road Safety Education?

Media can play a vital role in increasing awareness on issues in road safety, if the correct messages are being brought across in the public domain in an interesting and thought provoking manner. Alternatively, the media can effectively undermine road safety policy objectives and measures if media producers, journalists and opinion makers do not understand the rationale behind policy objectives or do not agree with the policy measures. It is, therefore, critical for the authorities responsible for road safety to be in a position to back up all policy decisions measures, with objective facts and statistics and for these to be clearly communicated before policy measures are implemented.

The problem of speeding - What makes a successful education and information campaign?

The most successful education and information programmes encompass the logical basis of the speed limit system and the reasons for speed management measures, highlighting the positive safety outcomes of these measures, as well as other benefits e.g. reductions in noise, air pollution.

Countries generally rely on information campaigns, e.g. by billboards alongside the road or messages on television. Information campaigns are indispensable when used to support other measures but will have little effect if they are applied as a stand-alone measure. The production and dissemination of information should be a continuous activity and should, in particular, precede and accompany speed enforcement initiatives. There is much debate over the effectiveness of 'fear-inducing' messages versus the softer approach. Although, there is no definitive study to conclude which approach is more effective, there would seem to be common agreement that there is a strong relationship between the arousal of fear and the convincing power of message especially that which has a strongly stated solution.

Policy Recommendations

1. Discuss with education authorities the feasibility of establishing Road Safety as part of the national learning curriculum.
2. Competent authority to prepare educational video for sixth-formers regarding road safety and the driving test.
3. Competent authority to invest further in road safety educational material and tools
4. Introduce continued ability test for existing Driving instructors
5. Establish and pilot a safe driving course model for Government employees with transferability potential to private sector.
6. Carry out pilot study into new driver accompaniment.
7. Hold information session for the media in order to discuss and explain speed policies initiatives and measures (i.e. national speed limits, the setting of local speed limits, use of variable message signs, traffic calming and other engineering measures, speed enforcement through fixed and mobile cameras).
8. Appoint media experts to plan a long-term programme of media campaigns relating to speed management and other road safety issues.

Section 8

Enforcing to control the intentional speeder

In a perfect world, speed limits on roads would be credible and self explanatory and motorists, in full cognisance of the consequences of using excessive or inappropriate speeds, would readily adhere to safe driving speeds at all times and in all conditions. However, in the real world it is a fact that a high percentage of motorists regularly exceed the posted speed limits either inadvertently or knowingly and deliberately. It is an unfortunate fact, however, that it is only drivers who subsequently to travelling at excessive or inappropriate speeds and who have killed or injured other people change both their driving behaviour and their views about speed management.

Enforcement can be both an effective educational tool and, if approached appropriately, can also be a powerful measure contributing directly to the reduction of speeding and associated traffic accidents, injuries and fatalities.

Enforcement is based on the psychological premise that most people will try and avoid the legal penalty of not complying with the rules. This premise is reinforced by the actual amount of enforcement carried out and the level of penalties and fines applied to offenders. The objective risk of apprehension based on the likelihood of being caught and prosecuted is in itself a deterrent which effectively ensures compliance with the rules by most drivers. The subjective risk of apprehension can be increased by the use of publicity campaigns and increase media awareness.

Until the time when compliance with the speed limits is enforced via on-board instruments, speed enforcement using roadside equipment or by mobile enforcement personnel will continue to be main process. Targeting roads which have a poor safety record or where there is a perceived risk of danger from motorists and speed enforcement is important; however this enforcement should take place on all categories of road.

Speed Enforcement Systems and Equipment

In all cases, the burden of proving the actual speed and linking the speed to the offending driver rests with the enforcement body Evidence will include:

- the identity of the driver;
- evidence of the speed limit;
- verifiable evidence of the speed alleged, including visual observations;
- the type of equipment used;
- the fact that the equipment was certified as accurate (by a secondary speed measurement device verified periodically);
- any explanation offered by the driver (not essential);
- environmental conditions e.g. traffic, weather and road conditions (relevant although not essential).

Conventional manual speed enforcement

With the increase in the burden of proof on the enforcement bodies outlined above, traditional speed enforcement tools (which in the past include stopwatches, pneumatic tubes and radar guns) have over the past 15 years gradually been taken over by a new generation of intelligent speed detection equipment which provides real-time photographic proof of the infringement.

Mobile police squads were the first to be equipped with video camera-based laser or radar detection. Police cars (often unmarked) equipped with this speed enforcement equipment, drive around an enforcement area e.g. between two intersections on a motorway or within an urban area on the

lookout for major infringements such not stopping at red lights or driving at high speed. The vehicle is followed and stopped, and the video footage which displays the travelling speed of the vehicle in question is then used as evidence for the prosecution. Nowadays the only advantage that manual speed enforcement has over automatic speed enforcement is that it can enforce speeds of different vehicle types which, in certain jurisdictions, may have legally differentiated national speed limits.

In addition, it is not uncommon for footage from Urban Traffic Control CCTV systems to be used to assist enforcement bodies in the prosecution of motorists alleged to be dangerously driving or using inappropriate or excessive speed.

Automatic speed enforcement

As the phrase implies automatic speed enforcement is generally carried out without with little manpower required to operate the equipment. Most speed camera systems today automatically detect the speed offence during day or night (using infra-red technology or loops), register the traffic offence, register the number plate of the vehicle on site and then transfer the data electronically to a centre for automated information processing in which Automatic Number Plate Recognition (ANPR) software is used to match the registration number plate on the photograph with the vehicle registration database and then to issue an automated infringement notification.

Automatic speed enforcement is by far the most cost-effective means of enforcing speed limits on roads. The EU-financed research project 'VERA' (Video enforcement for Road Authorities) in 2000 estimated the typical cost of issuing a speed fine to be €80 per fine using the manual enforcement system compared with €12 per fine using an automated fixed camera system.

The main disadvantages of automated speed enforcement are vandalism and the lack of personal communication associated with manual enforcement which can have an educational benefit towards the offending motorist. In countries that legislate different national speed limits for different types of vehicles automated speed enforcement systems also have the disadvantage that they generally do not easily differentiate between speeds of different vehicles and are generally set at the maximum national or posted speed limit speed for passenger cars. However, it is understood that new models of fixed speed camera can now distinguish between a large vehicle and a car or light goods vehicle.

There are three main types of automated speed cameras in operation across Europe.

a) Fixed speed cameras
b) Mobile speed cameras
c) Average speed cameras

Fixed Speed Cameras

Fixed speed cameras are used to deter drivers from speeding in places where there has been a history of collisions involving death or injury, where speeding is perceived to be a potential risk in combination with red light violation detection. Fixed Speed Cameras only measure vehicle speed at a specific location and work independently of each other. Spot speed cameras can cover a number of traffic lanes and may be installed to measure vehicle speeds for both directions of vehicle flow.

Mobile Speed Cameras

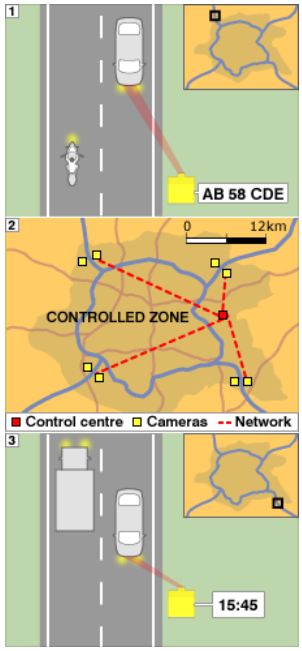
Mobile speed cameras work on the same principle as fixed speed cameras but are usually place on tripods or housed in the back of an enforcement van. Mobile cameras have the advantage that can be moved relatively easily around the road network decreasing the predictability of enforcement associated with fixed camera sites.

As pointed out earlier in this Section, the combination of fixed and mobile cameras is considered to be the most effective solution in terms of improving compliance with speed limits and reducing the level

road traffic accidents. The actual measurement impact of enforcement using mobile and fixed speed cameras is largely relational to the severity of the problem before the introduction of the speed enforcement device. Some speed control devices are also installed on new roads as a precautionary measure where the use of excessive or inappropriate speeds being perceived to be a potential problem prior to the opening of the road.

Average Speed Cameras

The concept of the Average Speed Cameras (ASCs) is to monitor vehicle speed between two points and check the average speed to ensure the limit is adhered to. Such is carried out through the identification of the vehicle registration number plate. ASCs are typically positioned at major road works sites to benefit the safety of road users or on continuous stretches of major roads: motorways, arterial and distributor roads (usually covering an enforcement zone of 2-5km) which are not interrupted by major intersections. The principle is quite simple: the vehicle is identified at the entrance of the enforcement section and again when leaving it. The average speed can be calculated based on the time between these two points. The information on those vehicles that travelled too fast is filed and processed



ASCs are known to encourage better speed regulation than fixed 'Spot Speed' Cameras since they have the effect of calming the speed over a longer distance and hence may be used at sites which a significant number of collisions are scattered along a length of road. However, the use of average speed to determine infringement of the law can be legally complex.

The introduction of automatic speed enforcement on European roads has presented the legislators and enforcement bodies with three technical problems. Firstly, certain vehicles (for example, certain motor-cycles) only have a single Vehicle Registration Number (VRN) plate affixed to the vehicle and therefore detection by an automatic camera pointing in a single direction may not be sufficient. Secondly, articulated vehicles may be legally driven on the roads using different VRN plates for the tractor unit and the trailer or semi-trailer (which may or may not be registered to the same owner). Thirdly, using a single camera for enforcing two opposing directions of traffic has been reported to cause temporary blindness of oncoming motorists at night when a flashing device is used.

A number of legal and policy issues must also be considered by the competent enforcement bodies prior to the installation of automatic speed enforcement equipment; for example whether or not to permit the covert operation of invisible cameras in speed enforcement and whether or not to permit the use of dummy speed cameras (empty speed camera boxes) as a deterrent

Consideration must also be given to the legal system to determine whether the driver or the owner of the vehicle should be held responsible for the penalties and fines associated with the speed-related offence. Countries in the European Union are equally divided between these the legal systems that hold only the driver responsible for speed violations and those which hold the registered owner of the vehicle responsible. In the latter group of countries it is usually permissible for owner to provide the identity of the driver who would subsequently take full responsibility.

Tolerances for speed limit enforcement

Speed limit enforcement is dependent on the accuracy of two measuring instruments a) Vehicle speedometer and b) accuracy of speed limit enforcement's radar or laser device.

In this respect, most enforcement bodies usually permit a degree of tolerance but care should be taken so as not to induce drivers into the frames of mind that speed limits are not very strict and a bit

of speeding is acceptable. As indicated in the table below most European countries have either introduced a practical tolerance limit which is kilometre–based or a technical tolerance based on percentage tolerance above the posted speed limit. Best practice guidelines would seem to strongly advocate the adoption of technical tolerance approach.

Country	Tolerance Rule	Road Speed Limit Speed at which penalty is imposed (km/h)			
		50	60	70	80
Austria	5km/h	56	66	76	86
	7km/h	58	68	78	88
Germany	3km/h	54	64	74	84
France	5km/h	56	66	76	86
Ireland	5%	53	64	75	86
	7%	54	65	76	87
Switzerland	5%	53	64	75	86
Netherlands	7km	58	68	78	88
Greece	10%	56	67	78	89
Sweden	10%	56	67	78	89
UK[8]	10%+2mph	58.3	69.3	80.3	91.3
Czech Republic	3km/h	54	64	74	84
Average tolerance		**56**	**66**	**77**	**87**

Table 8: Fixed speed camera tolerance limits in Europe for roads with speed limits of 80km/h or less
Source: Transport Malta and European Transport Safety Council (2009)

Speed enforcement using radar and laser technology requires periodic testing and recalibration. Although not covered by current EU metrological legislation (Directive 2004/22/EC on measuring instruments), many EU countries have adopted a best practice of periodically checking the integrity of the device. This is normally carried out at a European Union accredited laboratory which will normally certify the correct calibration of the instrument every 12 months.

Where and how to use speed Enforcement?

Most traditional speed enforcement methods are known to be limited in both space and time. The installation of a fixed speed camera for example generally results in what is known as a "kangaroo effect". This means that traffic generally slows down to a speed well below the posted speed limit (representing a lack of faith in the accuracy of speed camera calibration) and then once out of the range of the speed camera, increase speed with certain vehicles exceeding the posted speed limits of the area. This phenomenon is a regular occurrence and clearly indicate that fixed speed cameras have a distinct zone of influence or 'halo' (usually not more than a kilometre either side) over which the enforcement measure is spatially effective.

The traditional method of policing speed using handheld radar equipment is also limited in the sense that irregular surveillance (say every 3 weeks on the same day at the same time) by highly visible police officers on the road network usually result in a high level of speed limit compliance at the time of enforcement but for the rest of the time (when the subjective risk of apprehension is low) speeding problems will persist. For speed enforcement to be effective it must be carried out at regular intervals and at high intensities.

During a typical trip on any European road of 100 km, it is most unlikely that a motorist will come across a mobile police unit visibly operating a speed control of traffic. Highly visible control of speed

[8] Converted from miles per hour

by police will, of course, like fixed speed cameras, have a positive impact within 'halo' of that particular spot. However, visible enforcement when combined with invisible 'covert' enforcement using mobile cameras without signage has a major bearing on speed deterrence and on the extension of the zone of influence of the enforcement measure.

Figure 20: Camouflaged Speed camera in Loipersdorf, Austria
Source: Wikipedia (2010)

Best practice guidelines recommend a combination of visible and invisible enforcement for the best results in terms of general compliance rates with speed limits. Internationally, a number of police forces have adopted enforcement methods based on an 'any time, any place' approach to deter all speeding on the network. Their message is clear: speeding is illegal and unacceptable behaviour and at odds with the interests of the community. The mix is very effective in reducing average travel speeds on major sections of road as opposed to specific accident 'blackpots'.

A number of countries, on the other hand, do not apply the policy of covert speed enforcement as it is generally unpopular with motorists. These vociferously claim that it is a form of entrapment, irrespective of the fact that national speed limits and the regulatory posted speed limit signs, like other regulatory signs denoting a prohibition (e.g. no overtaking), clearly indicate what is permissible and what is not.

When selecting potential camera sites, analysis of collision data is usually undertaken over a minimum period (e.g. most recent 3 years, or preferably 5 years) to determine whether a camera could be an appropriate solution to reduce speeds and/or collisions at that site. Average (mean) and 85th percentile speed is also collected at the site to ensure data that is up-to-date. This data demonstrates the level of non-compliance with the speed limit, which itself should also have been constant over the same minimum period, and aids the regulator to determine the feasibility of using this technology to reduce speed.

European countries adopt various systems to objectively determine whether or not a speed camera should be installed. The UK guidelines for local authorities (Annex 3) is probably the most comprehensive and objective system of speed camera site selection.

Fines and Penalties

Traffic violations in all EU member states are subject to monetary fines. In the case of speeding fines, level of monetary fine normally increases according to the speed travelled over and above the speed limit with established minimum and maximum levels. As can be seen from the table below the monetary fine issued for the same speed violation varies considerable from one country to another.

Some countries also apply a demerit points system to national driving licences in which licence holders are allocated a maximum number of points on their driving licences. Following the committal of a traffic violation such as a speeding offence points will be deducted. If all the points on the driving licence are taken away which may occur in the case severe speeding violations or in the case of recidivism, a more severe sanction will follow (e.g. licence suspension or requirement to re-sit for a driving examination).

Country	Fine for a speed violation of 9 km/h (€)	Fine for a speed violation of 19 km/h (€)	Penalty Points or licence withdrawals
Belgium	50	150	Court remission for driving in excess of 31km/h over speed limit
Czech Republic	10-30	10-30	-
Denmark	Based on net income of driver		-
Finland	Based on net income of driver		-
France	68 to 135	68 to 135	Yes
Germany	15 to 20	30 to 35	Yes
Greece	30	30	-
Ireland	80	80	Yes
Italy	143	573	Yes
Malta	**34.94**	**€69.88**	**Probationary drivers only**
Netherlands	30	55 to 70	Court remission for driving in excess of 71km/h over speed limit
Poland	14.75	14.75 to 29.53	-
Portugal	60 to 300	60 to 300	Driver disqualification for driving in excess of 61km/h over speed limit
Spain	140	200	Licence suspension for driving in excess of 31km/h over speed limit
Sweden	161.11	257.82	-
UK	89	89	Yes

Table 9: Speed fines and Penalty Points by European Country
Source: *Complete guide to speed limits and speeding fines for Europe* Logitravel (2010)

Administration of speed cameras

The coordination and administration of the operation of speed enforcement systems in most countries normally falls under the auspices of the Police who usually work in partnership with the highway authorities and researchers to identify the locations where speed enforcement is necessary and monitor the effectiveness of speed control measures. Public perception appears to falsely consider that the main aims of these enforcement activities are revenue generation. This perception decreases public and political support for these mechanisms as a speed enforcement tool and can, in the long term, lower the effectiveness of speed checks.

Possible methods to reduce this misperception include:

a) Clear rules stating that speed checks may only be performed at locations with above average numbers of crashes and where speed can be assumed to be a contributory factor to the crashes
b) A transparent accounting of cost and fines generated by enforcement programmes

Speed enforcement programmes can, for example, be funded on a 'cost recovery' basis in which the police, local road authorities, research and publicity institutes who are involved in the programme are allowed to recover the costs of speed enforcement from the fine revenue. Investment of the revenues exceeding the costs of the enforcement should visibly be in favour of programmes road safety or mobility measures.

If the installation and operation of speed cameras is outsourced by the authorities to third parties, it is normal practice to pay a fixed contractual fee to the contractor rather than a fee per fine issued.

Evaluation of the impact of Speed Enforcement measures

The best estimate is that automatic camera enforcement results in a crash reduction of 15 to 20% (EU SafetyNet Project 2009). Individual evaluation studies differ widely in the reported effects. The actual effectiveness depends on many factors, such as the actual enforcement effort, the initial speed and safety level and the type and amount of supporting publicity. The following measures are generally deployed to determine effectiveness of the measure.

Speed management systems are monitored by surveying and recorded speeds registered on site, prior to and after the installation of speed management systems. This data is usually obtained immediately prior to installation, and then following a specific regime over time (e.g. 1 month, 3 months 6 months and 12 months after the scheme is introduced) to determine effectiveness.

Reported collisions involving injury data for a full 5-year period should be obtained before speed management systems are installed and the average number of collisions per year calculated. Collision data should then be obtained for a minimum of 1 year after installation and then compared with the 'before' data (using the average number of collisions per year when comparing before and after data)

Changes in the layout of the carriageway subsequent to installing such systems should also be recorded as these also directly impact average speed of the traffic and should not be included in the evaluation of the said measure. For example, a speed table, mini roundabout, new road markings etc may all contribute in lowering the traffic speed independently of the enforcement system and these must be taken into account.

Current Practice in Malta

Until 2004, speed enforcement was carried out by random checks by mobile police located at the roadside at select locations and by using a hand held radar device. The coordination of activities from the setting up of the site to the eventual prosecution proved to be a time-consuming and labour intensive exercise.

In 2004, following Government policy direction subsidiary legislation 65.11 'Motor Vehicles Regulations' was amended in order to legally provide:

- for the use of speed monitoring devices that use Photographs, film, video-recordings, electronic images as evidence for prosecution;
- Ministerial authorisation process for particular speed monitoring device
- to extend legal responsibility for certification of evidence to local wardens; and
- to assign legal responsibility for an offence to the owner of the motor vehicle (unless is immediately stopped and identified by the police following the offence);

In August 2005, the make and model of prescribed speed monitoring device under Regulation 127 of Motor Vehicles Regulations was published in the Government Gazette. An agreement was entered into between the then ADT (which was legally responsible for administering and operating roads, now Transport Malta) and Local Council's Association (representing Local councils that had delegated legal responsibilities for enforcing offences). The agreement defined the relative responsibilities of each entity in relation to the authorisation process permanent and mobile speed cameras, the operation of speed cameras, information, and the apportionment and utilisation of revenue derived from speed camera fines.

In 2007, main legislation Chapter 65 'Traffic Regulation Ordinance' was amended to introduce a system of graduated fixed monitory fines according to kilometres travelled over the speed limit.

Speed Enforcement Systems and Equipment

The type of speed camera equipment put forwarded by the Local Councils' Association and subsequently approved and prescribed by the Minister responsible for Transport in August 2005 was a speed recording device that uses radar technology which could be used either as a fixed speed camera or as a mobile speed camera.

The fixed speed camera identifies number plates and is fully automated from on-site speed detection stage to transmission to off-site back office to the postal infringement notification. The model of fixed speed camera does not, however, distinguish between different vehicle types and the different national speed limits that apply to these vehicle types.

Although this speed camera model has the capability of being used as a mobile camera, authorisation was not granted by the Minister responsible for Transport on the grounds of lack of government policy framework and standards relating to the setting out of mobile speed control sites and to the lack of necessary accreditation of enforcing officers.

Where and how to use speed Enforcement?

A policy decision was taken that the speed cameras were to be permanently fixed, visible and the approaches were to be clearly signed with information signs to advise that cameras are being used for enforcement and the posted maximum speed limit.

The agreement between the then ADT and the Local Councils' Association stipulates that Local Councils wishing to install a speed camera would be required to submit an application form to the Transport Authority clearly indicating the proposed location of the speed camera.

For each application made by a Local Council for a fixed speed camera, the Transport Malta had carried out traffic studies which included classified link traffic counts, vehicle 85th percentile speed readings in free flowing conditions, assessment of road traffic accidents over the previous 3 years and inspection of the suitability of the site. The following benchmark criteria (adapted from the UK Department for Transport's handbook for rules and guidance - November 2004) were applied to all applications.

- At least four persons killed or injured on the road within a kilometre of proposed site (past 3 years)
- Speed surveys indicate that 85th percentile free flow speed is greater than speed limit
- At least 20% of drivers exceed speed limit
- No other engineering solutions can be implemented in short term.

Out of approximately 44 applications for speed cameras that were submitted by Local Councils between August 2005 and 2009 11 locations complied with the aforementioned criteria for fixed camera 'core' sites and were subsequently approved, installed and are being operated

These guidelines also provide for the installation of speed cameras in exceptional circumstances which do not necessarily meet all of the criteria listed above, but where there is evidence to suggest that a speeding exists and that there is a perceived risk of serious accident taking place. This exceptional rule was applied in the case of the speed camera Ħal Far Road a few weeks after completion of reconstruction in the aftermath of the tragic multiple fatality accident on upgraded Mdina road on the outskirts of Zebbuġ.

Tolerances for speed limit enforcement

While all speed enforcement cameras are required to be calibrated every 12 months by an EU accredited laboratory and evidence of this is retained at the Local Tribunal for evidence purposes, the system is designed with certain tolerances. The current tolerances being advised by the Ministry for

Infrastructure, Transport and Communications for speed enforcement in Malta are contained in the table below. These are in line with the recommended practice to used technical tolerances rather than practical tolerances. It is understood, however, that not all Joint committees and Local Tribunals have applied this advice in practice.

Posted Speed Limit	Tolerance (10%)	Enforced Speed
50 km/h	55 km/h	**56 km/h and above**
60 km/h	66 km/h	**67 km/h and above**
70 km/h	77 km/h	**78 km/h and above**
80 km/h	88 km/h	**89 km/h and above**

Table 10: Malta Fixed speed camera tolerance limits for Roads with Speed limits of 80km/h or less
Source: Transport Malta

Fines and Penalties

The principal legislation, Traffic Regulation Ordinance (Chapter 65), was amended in 2007 in order to introduce the following graduated system of traffic fines for driving at an excessive speed:

- €34.94 for travelling up to 15 kilometres per hour over the limit
- €69.88 for travelling over 15 kilometres per hour over the limit

When compared with the fines issued by other EU countries (Table 9) the level of fines for lower speed offences is considered to be average. However, Malta's two tier graduated fine structure is limited insofar as other countries introduce incrementally stricter penalties on drivers who exceed the speed limits by more than 20, 30 and 40 km/h. Therefore, for a car driver travelling 90km/h in a built-up area (where the 50km/h national speed limit applies) the same fine of €69.88 would be applied.

Furthermore, in practice the current fine system does not distinguish between drivers of vehicles for which different national speed limits apply. For example, if a driver of a coach was detected by a speed camera, travelling at 60km/h in a built up area (where there is posted speed limit 50 km/h) the driver would receive a fine of €34.94. However, according to the law, the national maximum speed limit for a coach travelling through a built-up is 40km/h and, in the respect, the violation is in fact 20km/h over the speed limit and the respective fine should be €69.88.

All new drivers who pass their driving test are issued with a 'Probationary' driving licence. This driving is valid for three years and is subject to a penalty point system (on a paper counterpart licence) applicable for all licence categories. A probationary driving licence is revoked if, at any time, during the probationary three year period its owner accumulates an aggregate of 12 penalty points or over. The driving offence of 'exceeding speed limits signs or regulations for classification of road and type of vehicle' carries with a penalty of 3-6 points. For each contravention, penalty points are imposed by the court of magistrates or by the commissioner's for justice. In 2010, 422 probationary driving licences 2.9% of all probationary licences) were endorsed with penalty points relating to code PH-1 (Exceeding speed limits signs or regulations for classification of road and type of vehicle). 32 drivers with probationary licences had committed repeated violations relating to exceeding the speed limits in 2010.

Code	Offences	Points
	Accident Offences	
AC-1	Failing to stop after an accident	5-10
	Construction and Use of Vehicle	
CU-1	Using a vehicle with defective brakes	3
CU-2	Using a vehicle with defective tyre(s)	3
CU-3	Using a vehicle with defective steering	3
CU-4	Causing or likely to cause a danger by reason of load or passengers	3
	Reckless/Dangerous Driving	
RD-1	Reckless, negligent or dangerous driving	3-11
RD-2	Manslaughter or culpable homicide while driving a vehicle	3-11
RD-3	Causing death by dangerous driving	3-11
	Drink or Drugs	
DD-1	Driving or attempting to drive or be in charge of a motor vehicle with alcohol level above the limit	3-11
DD-2	Driving or attempting to drive then failing to provide a specimen for analysis	3-11
DD-3	Driving or attempting to drive when unfit through drugs	3-11
	Insurance Offences	
IN-1	Using vehicle uninsured against third party risks	6-8
	Licence Offences	
LC-1	Driving otherwise than in accordance with a licence	3-6
LC-2	Driving while disqualified by order of court	6
LC-3	Non-renewal of vehicle road licence	3-6
LC-4	Non-renewal of driving licence	3-6
	Miscellaneous Offences	
MS-1	Emission of loud electronic sound from vehicle	3-6
MS-2	Use of mobile phone while driving	3-6
MS-3	Driving without seat belt on	3-6
MS-4	Wearing or using headphones or any other similar device while driving	3-6
	Public Highway Offences	
PH-1	Exceeding speed limits signs or regulations for classification of road and type of vehicle	3-6
PH-2	Contravention of pedestrian crossing regulations by a moving vehicle	3-5
	Traffic Direction and Signs	
TS-1	Failure to comply with traffic light signals	3-5
TS-2	Failure to comply with double white lines	3-5
TS-3	Failure to comply with a traffic prohibitory direction sign	3-5
TS-4	Failure to comply with a sign which prohibits entry of vehicle into a road or pedestrian zone	3
TS-5	Failure to comply with a sign prohibiting vehicle overtaking	3-5
TS-6	Failure to comply with a 'Stop' sign	3-5
TS-7	Failure to comply with a traffic mandatory direction sign	3
TS-8	Failure to comply with direction of a constable or warden	3

Table 11: Malta Probationary Licence Penalty Point System

Source: Subsidiary Legislation 65.18 Motor vehicles (Driving Licences) Regulations

Administration of speed cameras

As outlined earlier in this section administrative procedures were clearly defined by an Agreement between Transport Malta's predecessor and the Local Councils Association. Local Councils have delegated responsibilities for enforcing offences have, in turn, outsourced the supply, installation, operation and maintenance of speed cameras to third parties. The revenue from fines is used to cover the costs of the costs of installation and operating the speed camera system, a small proportion

of revenue from each fine is passed over to Transport Malta for use in road safety campaigns, and surplus revenue being used by to fund local council road maintenance and improvement in their respective localities.

Evaluation of the impact of Speed Enforcement measures

Transport Malta has adopted the following best practice procedures for monitoring and evaluating the impact of speed enforcement measures. In order to carry out an objective assessment of the impact of a fixed speed camera. It is important to compare the traffic and accident situation before and after the installation the speed enforcement device. Speed camera sites must be in operation for at least three years in order to be confidently changes in travel behaviour an accident rates. The following diagram outlines the evaluation process that has been adopted.

Transport Malta has been receiving records of road traffic injury accidents as provided by the Police. However these records are not yet of sufficient detail and technical accuracy to be used to assess the effectiveness of speed cameras and other accident remedial measures introduced at particular accident 'blackspots'. With an average of 800-900 road traffic injury accidents typically occurring each year, accident analysis using this information is therefore limited. Accurate location of the accident is particularly problematic on longer roads with few landmarks e.g. Coast Road, Hal Far Road etc due to the manual nature of compilation of this data.

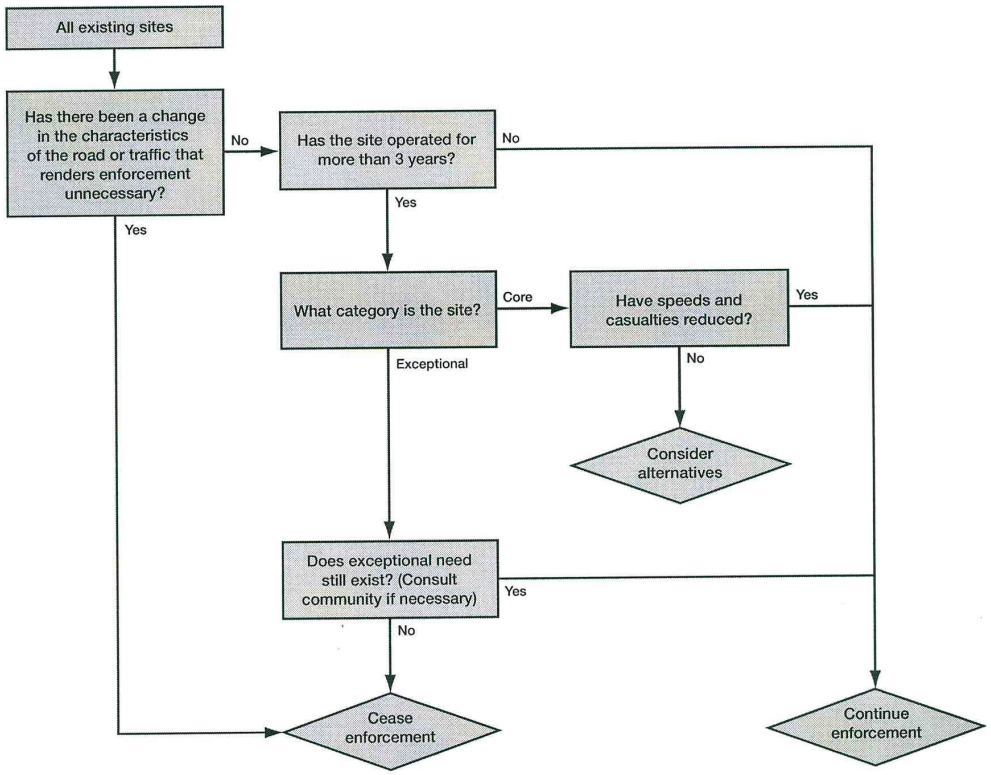


Figure 21: Process to review existing speed camera sites

Source: *Handbook of rules and guidance for national safety camera partnership in England and Wales* (2004) UK DfT

The highest recorded speed offences at speed cameras are of great concern and are, in most cases, more than double the legal speed limit. It is pertinent to note that the majority of these highest speeds took place late at night and in the early morning. It is of most concerning that the recorded speed of a vehicle travelling 123 km/h through the residential area of Notary Zarb Street in Attard took place at a time when there are a lot of vulnerable road users using the road e.g. school children crossing.

Existing Speed Cameras								
Site and Fixed Speed Camera Details				2010		Before and After[9]		
Locality	Street	Installed	Speed limit	Ave. Tickets / Day	AADT[10]	85th Percentile Speed (Before)	85th Percentile Speed (After)	Highest recorded speed offence on camera
St. Julians	Regional Rd	Dec 2004	60	5.3	58,984	73km/h	66km/h	138 km/h
Qormi	Mriehel Bypass	Dec 2005	80	1.1	26,202	87km/h	72km/h	169 km/h
Zebbug	Mdina Rd	Jan 2006	70	4.8	19,213	89km/h	76km/h	163 km/h
Attard	Not Zarb Str	Jun 2006	50	13.5	26,703	64km/h	54km/h	123 km/h
St. Paul's Bay	Burmarrad Rd	Jun 2006	70	2.5	20,682	88km/h	62km/h	172 km/h
Pembroke	St. Andrew's Rd[11]	Jan 2007	70	5.5*	26,134	N/A	66km/h	144 km/h
Birzebbugia	Hal Far Rd	Feb 2008	60	22.0	14,298	82km/h	63km/h	194 km/h
Birkirkara	B'kara Bypass	Mar 2009	60	20.8	21,430	70km/h	58km/h	188 km/h
Santa Venera	Tunnels	Mar 2009	60	10.8	18,763	74km/h	67km/h	159 km/h
Zejtun	Tal-Barrani Rd	Mar 2009	60	9.3	32,486	80km/h	48km/h	175 km/h
Qormi	Imdina Rd	Apr 2009	60	11.3	22,427	66km/h	63km/h	123 km/h

Table 12: Assessment of existing speed cameras in Malta
Source: Transport Malta

Policy Discussion

Should we make more use of mobile speed cameras?

The combination of fixed site speed cameras with the random use of mobile speed cameras is considered to be a best practice for speed compliance throughout the road network. As pointed out in this section, the primary reasons why the use of mobile cameras operated by local wardens has not been approved in the past relate to regulation of the setting out of the site (advance warning signage layout, conspicuousness of speed camera and safe location of tripod or vehicle) and ensuring that the proper speed tolerance is set before operating each site., It is, however, technically possible for a National Accreditation Body to accredit the personnel responsible for setting up the site thus ensuring the necessary quality control and assurance.

Should invisible / covert enforcement be allowed?

The use of invisible or covert speed enforcement equipment is a subject of much controversy worldwide. In many countries, the police are legally empowered to carry out covert speed enforcement but often this is considered as a measure to deal with exceptional situations. Exceptional situations may include for example extreme car drivers or motorbike riders are prepared to reconnoitre roads for any cameras, including mobile cameras, before using them illegally for high-speed racing. The practice of carrying out covert speed enforcement is usually left to the discretion of the Police.

Should 'dummy' speed cameras be permitted?

'Dummy' speed cameras usually comprise an empty box containing no speed camera or radar equipment. These are generally considered to be a cost-effective measure for ensuring compliance with posted speed limits, but in small communities it is recommended that speed cameras are

[9] 85th percentile speed indicates the faster direction of the two directions (measurement taken 400m downstream of camera)
[10] AADT – Annual Average Daily Traffic (both directions)
[11] operated only in the month of December 2010

randomly installed in the empty boxes and rotated between the sites.

Should the tolerances on speed cameras be changed?

From research carried out, the 10% tolerances set on the speed cameras (above which vehicles will be detected and issued with a fine) is in line with the average across the EU and takes into full account as margins of errors of speed measuring devices. However, this 10% tolerance is not being applied at all of the speed cameras being operated by the Joint Committees which raises concern.

How often should speed cameras be checked for correct calibration?

Currently, speed cameras are covered by a calibration certificate issued every 12 months. A few weeks before the certificate expiry date the camera is sent to an EU accredited laboratory. To date, all speed cameras (some of which have been in operation for over five years) have checked and returned 'as found, as left' with no required calibration adjustment. In this respect, it is confirmed through best practice for this type of measuring instrument, manufacturers' recommendations and through practical application that a calibration certificate which is valid for 12 months is fully acceptable.

Site identification

The UK Department of Transport set of guidelines for local authorities (DfT 01/2007 – Annex 3) provides a comprehensive and objective assessment framework for speed monitoring devices and would be fully transferable to the Maltese environment.

Under the current agreement with the Local Councils' Association, it is the Local Councils that are responsible for nominating suitable sites for speed camera operation. In this respect, the sites eventually selected for speed cameras are dependent on the ability of Local councils to identify a speed problem and the risks that associated and for the council to be prepared to submit an application to Transport Malta. Inevitably, there are certain localities in which speed enforcement should (according to objective criteria) be carried out, but no application for a speed camera has been submitted.

In most European countries, the site of speed cameras is determined in agreement between the highway authority and the Police. Competent authorities that have regulatory responsibilities and expertise in road design, traffic control, enforcement and road safety.

Should new posted speed limits be installed at the same time as speed enforcement devices?

The currently network of posted speed limits is neither comprehensive nor complete (see Section 5). If a stretch of road requires a posted speed limit that is lower than the applicable national speed limit it is important for the posted speed limit signs to be in place for at least six months for monitoring of the site before deciding to use speed enforcement devices.

Is the current system of speed fines and penalties effective?

The two tier system of fines (for vehicles travelling up to or in excess of 15 km/h over the posted speed limit in the main part works effectively. However, for someone who is intent on using his private car as racing car, something that clearly takes place in Malta in the early hours, a fixed fine just under €70 is not considered to be an effective deterrent.

Several countries in the European Union have successfully introduced a system of penalty points on driving licences, other countries have decided not to introduce such a system because of the amount of administration involved or the high number of foreign plated vehicles using their roads. The introduction of a harmonised penalty point system is being discussed with the European, but a solution in the short term is unlikely. In Malta, the administrative procedures are already in place and the system of penalty new drivers under a probationary licence has been in operation for a

number of years. Extending the existing penalty point system to cover all drivers would require legal changes but, from an administrative point of view, would be relatively straight forward.

Monitoring

The monitoring of the effectiveness of speed management measures is still largely a manual process, particularly the collection and collation of data from road traffic accidents. Modern road accident investigation in other countries has removed much of the administrative burden form the Police and traffic authorities by automation of data collection using GPS technology to accurately locate the accident and the use of GIS as a presentation and as an analytical tool for road accident investigation.

Policy Recommendations

1. Set up the administrative and accreditation framework for mobile cameras.
2. Carry out further studies on the potential for using Average Speed Cameras on long stretches of road with few intersections (2-5km) such as Coast Road and Burmarrad Road.
3. Transport Malta to formally permit the deployment of 'dummy' speed cameras in approved locations.
4. Transport Malta to formally adopt the speed camera site selection criteria and assessment framework contained in Annex 1.
5. Formally adopt the 10% tolerance for speed enforcement using cameras nationwide
6. Amendment to the agreement with the Local Councils' Association to stipulate that Transport Malta (in agreement with the Police) shall determine the site for the installation, operation and/or removal of fixed and mobile speed cameras, based on objective reasoning.
7. Assess technical feasibility through the VERA system for the correct fine to be applied to Heavy vehicles.
8. A third tier of speed fines should be introduced into the law for drivers travelling 30km/h over the posted speed limit with a pecuniary fine of not less than €500.
9. Examine the technical feasibility of extending the driving licence penalty point system that is currently applicable to new drivers with probationary driving licences, to cover drivers with standard licences.
10. Discuss new contracting procedures with Local Council Association for camera service provision to be based on fixed annual fee rather than fee per fine payment received.
11. Improve data collection of road traffic accidents through the use of handheld data capture devices with the facility for logging coordinates of the road traffic accident using GPS and continued development of Transport Malta's road accident GIS database.
12. Transport Malta to discuss with the Police and respective Local Councils the monitored performance of the listed fixed speed cameras after three years of operation.

References

American Association of State Highway and Transportation Officials *Expert System for Recommending Speed Limits in Speed Zones*, USA (2006)

Association of British Drivers *Signing Requirement for Speed Limits*, UK (2009)

BCEOM French Engineering Consultants *Feasibility and Environmental Impact Studies for Transport Infrastructure Projects in Malta*, EuropeAid 114473/D/SV/MT, Brussels (2004)

Department for Transport *Graduated Fixed Penalties for Speeding Offences – Discussion Note*, UK (2010)

Department for Transport *Setting Local Speed Limits DfT Circular 01/2006*, UK (2006)

Department for Transport *Traffic Signs Manual*, UK (2006)

Department for Transport *Interaction between Speed Choice and Road Environment – Road Safety Research Report No. 100*, UK (2008)

Department for Transport *Handbook of Rules and Guidance for the National Safety Camera Programme for England and Wales for 2005/*06, UK (2004)

European Commission, Directorate-General Transport and Energy *SafetyNet Speed Enforcement*, Brussels (2009)

European Commission, Directorate-General Transport and Energy *Speed Alert D2.1 Common Definition of Speed Limits and Classifications*, Brussels (2004)

European Commission, Directorate-General Transport and Energy *Saving 20,000 lives on our roads – a shared responsibility*, Brussels (2003)

European Commission, Directorate General Transport and Energy *Supreme- summary and publication of best practices in road safety in the member states – thematic report: Enforcement*, Brussels (2007)

European Commission, Directorate-General Mobility and Transport *Flash Eurobarometer 301 – Road Safety Analytical Report*, Brussels (2010)

European Federation for Transport and Environment *CARS21 Road transport speed and climate change*, Brussels (2005)

European Transport Safety Council (ETSC) *ShLOW! – Reducing Excessive and Inappropriate Speed Now: a Toolkit,* Brussels (2008)

European Transport Safety Council (ETSC) – *Speed Fact Sheet 2/08 Combating speed through penalty point systems*, Brussels (2008)

Eurostat *Energy, Transport and Environment indicators*, Brussels (2008)

Global Road Safety Partnership (WHO, FIA Foundation and World Bank) *Speed Management: a road safety manual for decision makers and practitioners*, Geneva (2008)

Highways Agency *Design Manual for Roads and Bridges volume 6 section 1 part 1 TD 93/3 highway link design*, UK (2002)

Highways Agency *Design Manual for Roads and Bridges volume 6 section 1 part 1 TD 42/9 Geometric Design of Major/ Minor Priority Junctions*, UK (1995)

Leichhardt Road Safety Committee *Speed Management Strategy for the Leichhardt LGA, 2000-2005*, NSW Australia (1999)

National Cooperative Highway Research Programme NCHRP *Design Speed, Operating Speed and Posted Speed Practices,* Washington D.C (2003)

National Statistics Office *Transport Statistics 2010*, Malta (2010)

OECD and ECMT *Speed Management*, Paris (2006)

Parliamentary Office of Science and Technology *Post Note Speed Cameras*, UK (2004)

Suffolk Constabulary Policies and Procedures *Speed Enforcement – General*, UK (2006)

Surrey County Council *Speed Management Policy* UK (2006)

The Institute of Highways and Transportation *Transport in the Urban Environment*, UK (2006)

The Royal Society for the Prevention of Accidents (RoSPA) *Working together for Road Safety*, UK (2009)

Transport Research Laboratory Barlow T.J. and Boulter P.G *Emission Factors – a review of average speed approach for estimating hot exhaust emissions*, UK (2009)

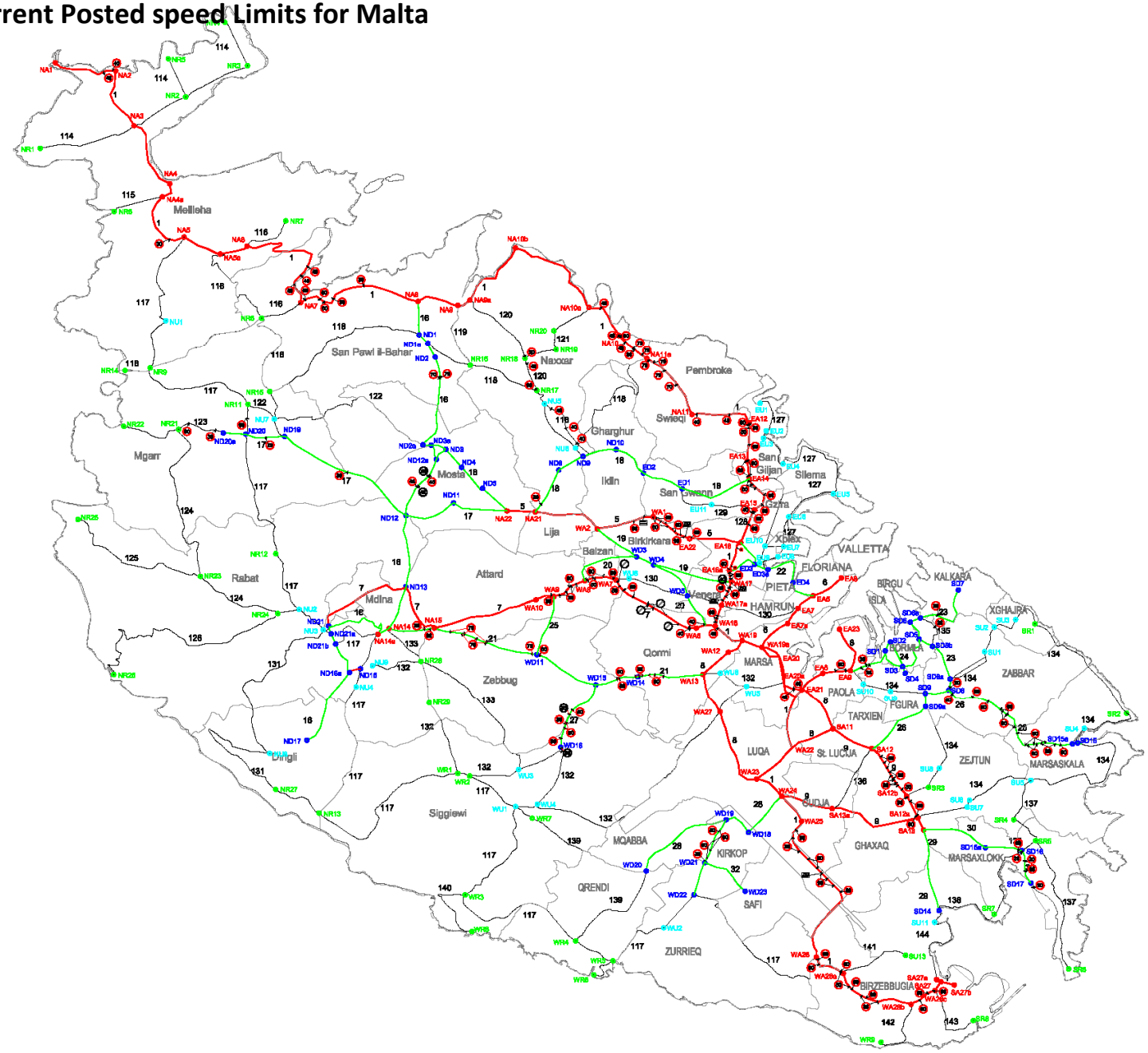
UN-ECE *Convention on Road Signs and Signals, of 1968 (Vienna Convention)* Vienna (1968)

ANNEX 1

Technical Guidance to Setting Local Speed Limits

(Section 5)

a. Current Posted speed Limits for Malta



b. Design Speed Related Parameters (source: DMRB)

1.8 Urban Roads: Low speed limits (30–40 mph) may be required due to the amount of frontage activity, but also where physical restrictions on the alignment make it impractical to achieve geometry relative to a higher Design Speed. Design Speeds shall be selected with reference to the speed limits envisaged for the road, so as to permit a small margin for speeds in excess of the speed limit, as shown in Table 2. The minimum Design Speed for a primary distributor shall be 70A kph.

SPEED LIMIT		DESIGN SPEED
MPH	KPH	KPH
30	48	60B
40	64	70A
50	80	85A
60	96	100A

Table 2

Design Speed Related Parameters

1.9 The Design Speed bands 120, 100, 85 kph, etc dictate the minimum geometric parameters for the design, according to Table 3, which shows Desirable Minimum (Absolute Minimum For Sag Curves only) values and values for certain Design Speed steps below Desirable Minimum. Desirable Minimum values represent the comfortable values dictated by the Design Speed.

DESIGN SPEED kph	120	100	85	70	60	50	V/R
STOPPING SIGHT DISTANCE m							
Desirable Minimum	295	215	160	120	90	70	
One Step below Desirable Minimum	215	160	120	90	70	50	
HORIZONTAL CURVATURE m							
Minimum R* without elimination of Adverse Camber and Transitions	2880	2040	1440	1020	720	520	5
Minimum R* with Superelevation of 2.5%	2040	1440	1020	720	510	360	7.07
Minimum R* with Superelevation of 3.5%	1440	1020	720	510	360	255	10
Desirable Minimum R with Superelevation of 5%	1020	720	510	360	255	180	14.14
One Step below Desirable Minimum R with Superelevation of 5%	720	510	360	255	180	127	20
Two Steps below Desirable Minimum Radius with Superelevation of 7%	510	360	255	180	127	90	28.28
VERTICAL CURVATURE							
Desirable Minimum* Crest K Value	182	100	55	30	17	10	
One Step below Desirable Min Crest K Value	100	55	30	17	10	6.5	
Absolute Minimum Sag K Value	37	26	20	20	13	9	
OVERTAKING SIGHT DISTANCES							
Full Overtaking Sight Distance FOSD m	*	580	490	410	345	290	
FOSD Overtaking Crest K Value	*	400	285	200	142	100	

Table 3

* Not recommended for use in the design of single carriageways (see Paragraphs 7.25 to 7.31 inclusive)

The V/R values shown in Table 3 above simply represent a convenient means of identifying the relative levels of design parameters, irrespective of Design Speed.

c. The distance back along the minor road from which the full visibility is measured is known as the 'x' distance. It is measured back along the centreline of the minor road from the continuation of the line of the nearside edge of the running carriageway of the major road. The 'x' distance shall be desirably 9m (but see para 7.8). From this point an approaching driver shall be able to see clearly points to the left and right on the nearer edge of the major road running carriageway at a distance given in Table 7/1, measured from its intersection with the centre line

of the minor road. This is called the 'y' distance and is defined in Fig 7/1. Relaxations are not available for this distance.

7.7 If the line of vision lies partially within the major road carriageway, it shall be made tangential to the nearer edge of the major road running carriageway, as shown in Fig 7/2.

Design Speed of Major Road (kph)	'y' Distance (m)
50	70
60	90
70	120
85	160
100	215
120	295

Table 7/1: 'y' Visibility Distances from the Minor Road (Relaxations not available - para 7.6c)

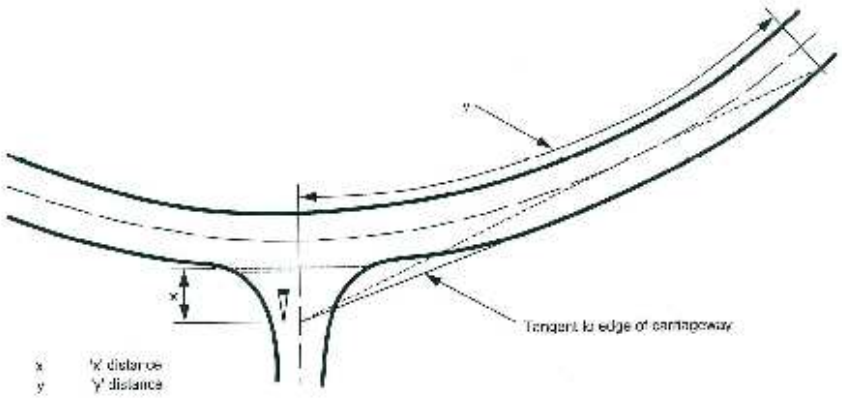
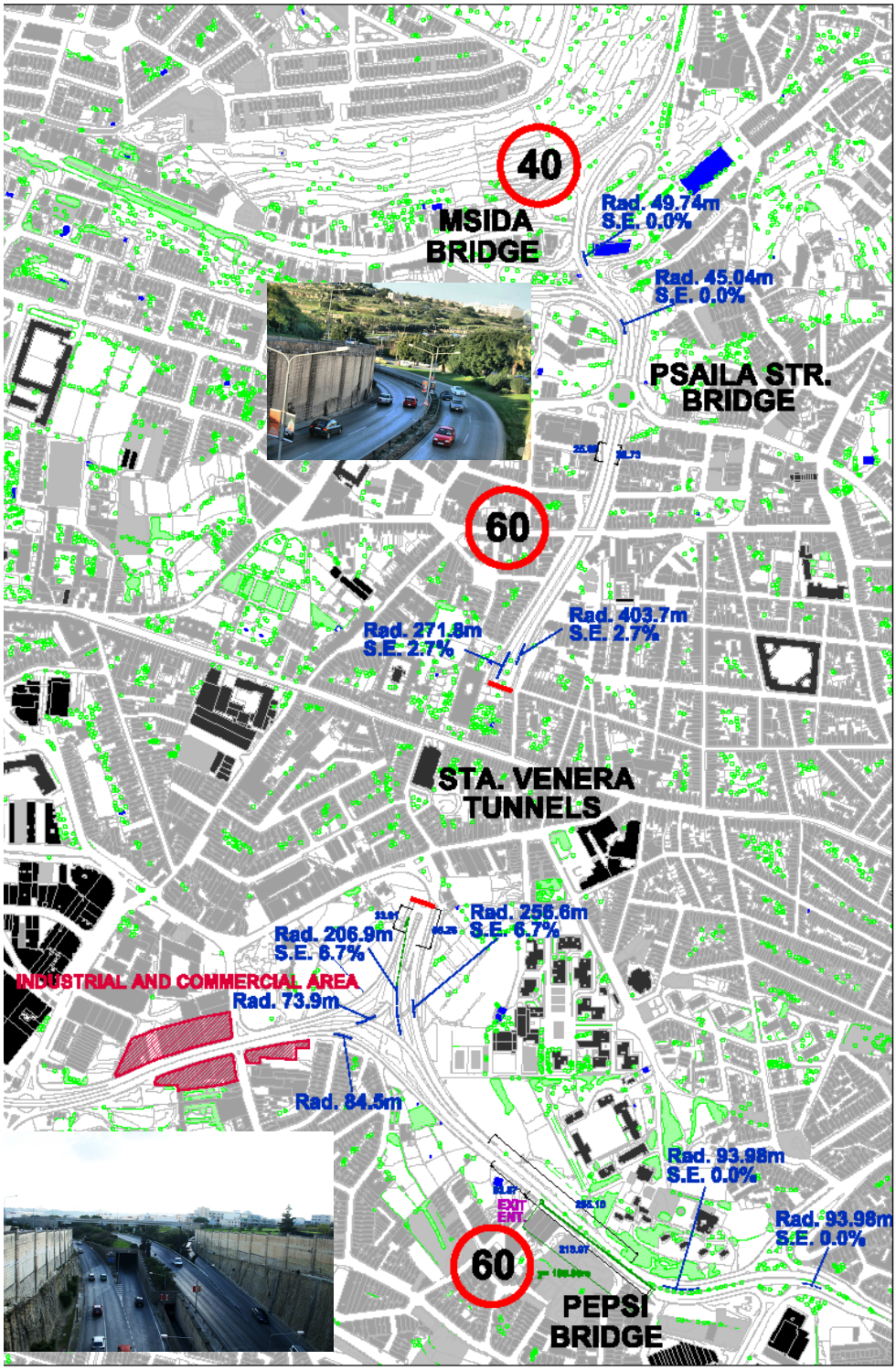


Figure 7/2 : Visibility Standards with a Curved Major Road (para 7.7)

c. Practical Example of Retrospective Assessment of a Road's Design Speed



Horizontal Radius (Rad), and Super-elevation (S.E.) and stopping sight distances to be compared with Design speed tables

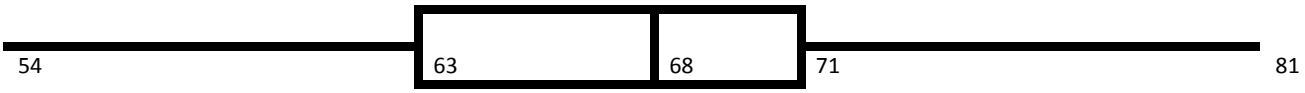
d. Setting of Local Speed Limits – Technical Guidance

Calculation of 85th Percentile Speeds on Different Roads

85th Percentile DRY Weather Speed on Arterial Roads

RAW DATA: 85th Percentile Dry Weather Speed (km/h)								
46								
48								
49								
53								
54	54							
57	57	57	57					
58	58	58	58					
59	59							
62	62							
63	63	63						
64	64	64						
65	65							
66	66	66	66	66				
67	67	67	67	67	67			
68	68	68	68	68	68	68	68	68
69	69	69	69	69	69			
70								
71	71	71	71	71	71			
72	72	72	72	72	72	72	72	
73	73	73	73					
75	75							
77	77							
78	78	78	78					
79	79							
82								

Data Set, n		82
Minimum Value		46
Lower Quartile, Q_L	¼ (n+1) = 21st value	63
Median, m	½ (n+1) = 42nd value	68
Upper Quartile, Q_U	¾ (n+1) = 62nd value	72
Maximum Value		82
5-Figure Summation of Raw Data	**58 62 64 71 81**	
Interquartile Value, Q_I	$Q_U - Q_L$	9
Right Hand Whisker	$Q_U + Q_I$	81
Left Hand Whisker	$Q_L - Q_I$	54



The long right-hand and left-hand whiskers show that the data has a wide spread.
The location of the median shows that the data values are skewed to the right.
The 46km/h, 48km/h and 49km/h, 53km/h, 82km/h values are outlie values.

85th Percentile DRY Weather Speed on Distributor Roads

RAW DATA: 85th Percentile Dry Weather Speed (km/h)								
34								
38	38							
41	41							
42	42							
43	43	43	43	43				
44	44							
45	45	45						
46	46	46						
47	47	47	47					
48	48	48						
49	49	49						
51	51							
52	52							
53								
54	54							
55	55							
56								
57	57							
58	58	58	58	58				
59	59	59	59	59	59	59		
60	60	60						
61	61	61						
62	62	62	62	62	62	62	62	62
62	62							
63	63	63	63	63	63			
64	64	64	64					
65	65	65	65	65	65			
66	66	66	66					
67	67							
68	68	68	68	68	68	68	68	68
69	69	69	69					
70	70							
71	71	71	71					
72	72							
73	73	73						
74								
76								
77								

Data Set, n		110
Minimum Value		34
Lower Quartile, Q_L	¼ (n+1) = 28th value	49
Median, m	½ (n+1) = 56th value	60
Upper Quartile, Q_U	¾ (n+1) = 83rd value	65
Maximum Value		77
5-Figure Summation of Raw Data	**34 49 60 65 77**	
Interquartile Value, Q_I	$Q_U - Q_L$	16
Right Hand Whisker	$Q_U + Q_I$	81
Left Hand Whisker	$Q_L - Q_I$	33

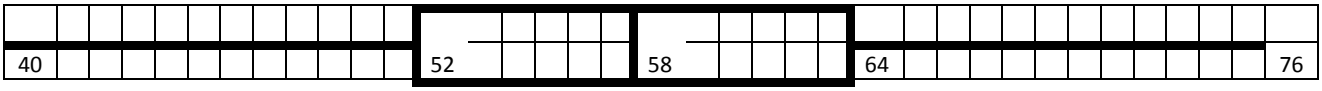
33								49							60		65							81

The long right-hand and left-hand whiskers show that the data has a wide spread.
The location of the median shows that the data values are very skewed to the right. There are no outlie values.

85th Percentile DRY Weather Speed on Local Roads

RAW DATA: 85th Percentile Dry Weather Speed (km/h)								
45								
46								
49								
51	51	51						
52	52	52	52					
53								
56	56	56						
57	57	57						
58	58	58						
59	59	59						
61	61	61						
63	63							
64	64							
65								
67	67	67						
69	69							
71								
80	80							

Data Set, n		39
Minimum Value		45
Lower Quartile, Q_L	¼ (n+1) = 10th value	52
Median, m	½ (n+1) = 20th value	58
Upper Quartile, Q_U	¾ (n+1) = 30th value	64
Maximum Value		80
5-Figure Summation of Raw Data	**45 52 58 64 80**	
Interquartile Value, Q_I	$Q_U - Q_L$	12
Right Hand Whisker	$Q_U + Q_I$	76
Left Hand Whisker	$Q_L - Q_I$	40

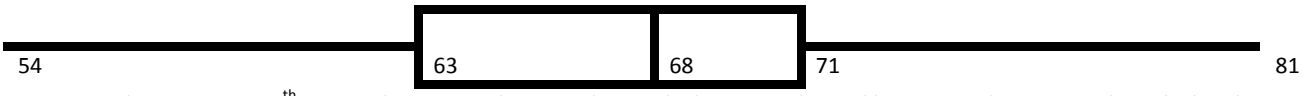


The long right-hand and left-hand whiskers show that the data has a wide spread.
The location of the median shows that the data values are not skewed.
The 80 km/h value is an outlie value.

1.13.1 Analysis of Speed Survey Data

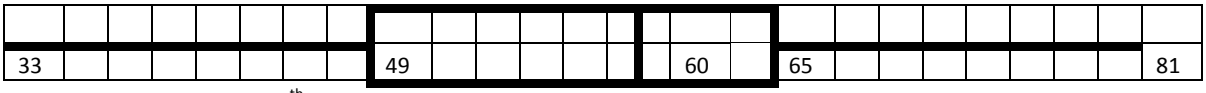
From the above statistical analysis of the 85thPercentile Dry Weather Speed for Arterial, Distributor and Local Council roads, the following can be concluded based on the diagrammatic summary:

Arterial Roads



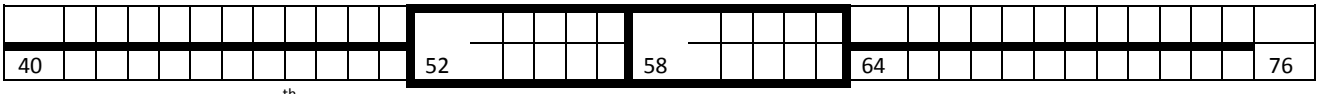
- The maximum 85th Percentile Dry Weather Speed exceeds the national speed limit as can be seen on the right-hand whisker of the box-plots. This shows that there is indeed an over speeding problem on such roads which needs to be addressed.
- The range of speed values between the lower quartile and upper quartile speeds, hence between 63km/h and 71km/h are considered to be the identified speed range of vehicle drivers for arterial roads.

Distributor Roads



- The maximum 85th Percentile Dry Weather Speed exceeds the national speed limit as can be seen on the right-hand whisker of the box-plots. This shows that there is indeed an over speeding problem on such roads which needs to be addressed.
- The lower quartile speed, the median speed, and the upper quartile speed for arterial roads exceed those for distributor roads as is expected since distributor roads are designed for less speeds.
- The range of speed values between the lower quartile and upper quartile speeds, hence between 49km/h to 65km/h, are considered to be the identified speed range of vehicle drivers for distributor roads.
- The minimum speed for distributor roads is less than that for arterial roads as expected and as shown in the left-hand whisker of the box plots.

Local Roads



- The maximum 85th Percentile Dry Weather Speed exceeds the maximum speed limit outlined by law for such roads as can be seen on the right-hand whisker of the box-plots. This shows that there is indeed an over speeding problem on such roads which needs to be addressed.
- The range of speed values between the lower quartile and upper quartile speeds, hence between 52km/h to 64 km/h, are considered to be the identified speed range of vehicle drivers for local roads. Such values are higher than the speeds stipulated by law for local roads.
- The minimum speed and lower quartile speed for local roads is greater than that for distributor roads but less than that for arterial roads It is expected that such value is less than that for both arterial and distributor roads however it is not the case as shown in the left-hand whisker and lower quartile representation of the box plots.

Three Year Assessment of Road Traffic Accidents – Ranking of Roads with highest Accident Rates

Rank	Locality	Road	Road Type	Injury Accidents 2007-2009			Weighting
				Slight Injuries	Serious Injuries	Fatalities	
1	Naxxar	Coast Road	Arterial (Rural)	67	24	6	217
2	Gzira / St. Julian's Msida	Regional Road / Triq M.A. Vassalli	Arterial (Rural / Urban)	59	15	0	134
3	Tarxien / Zejtun / St.Lucija	Tal-Barrani Road	Arterial (Rural)	52	16	0	132
4	B'kara	Triq Dun Karm (B'kara bypass)	Arterial (Rural / Urban)	56	11	1	116
5	Gzira / Msida	Rue D'Argens	Access (Urban)	40	14	0	110
6	Hamrun	St. Joseph High Road	Access (Urban)	29	13	3	109
7	St. Paul's Bay	Burmarrad Road	Distributor (Rural)	44	10	0	94
8	Zebbug	Mdina Road	Distributor (Rural)	27	13	0	92
9	Floriana / Hamrun	National Road	Arterial (Rural)	28	11	0	83
10	Ghajnsielem / Xewkija / Rabat	Mgarr Road	Arterial (Rural / Urban)	31	4	3	66

Step by Step Approach for Setting Local Speed Limits

STAGE 1: Determine the road length to be considered

1. A minimum length of 600m is to be considered over which a speed limit change is to be effected
2. Start and end point of the speed limit are to be well examined as existing road configurations may provide automatic thresholds.
3. Speed limits of 30km/h are to be implemented over an area-wide zone and not on an individual road unless it is at least 500m long.

STAGE 2: Measure the Operating Mean Speed and Collision Rate

Operating Mean Speed: A mean speed for a 200 reading dataset is to be established

Collision rate per 100 million vehicle kilometres

$$= \frac{\text{Number of collisions x 100,000,000}}{\text{Number of days in period x AADT x Length of route}}$$

STAGE 3: Establish the Road Tier

Upper tier roads – less than 35 injury accidents per 100 million vehicle kilometres (calculation in Stage 2)
Lower tier roads – less than 60 injury accidents per 100 million vehicle kilometres (calculation in Stage 2)

STAGE 4: Calculate the Posted Speed Limit

The value for the mean speed of the road and the value for the Collision rate per 100 million vehicle kilometres are used to establish the speed limit as per graphs at Fig.1 and Fig.2 (Surrey County Council, 2006).

Posted Speed Limits are to be established in factors of ten, hence 10km/h, 20km/h, 30km/h, 40km/h, 50km/h, 60km/h, 70km/h and National Speed Limit (80km/h).

Fig.1: Speed Limit Zones in terms of Mean Speed and Accident Rate for Upper Tier Roads

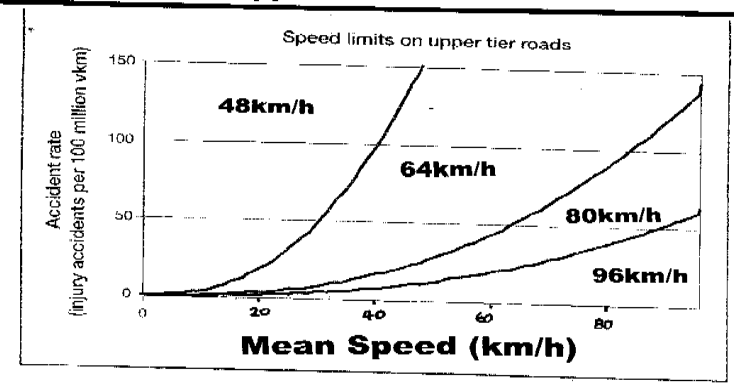
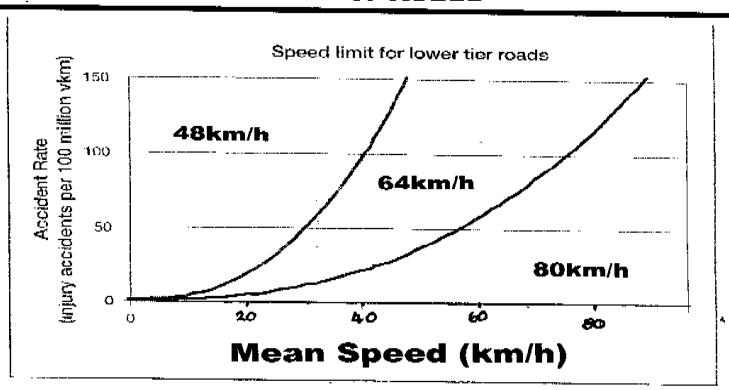


Fig.2: Speed Limit Zones in terms of Mean Speed and Accident Rate for Lower Tier Roads



Source: Surrey County Council, 2006

STAGE 5: Confirm the Speed Limit

The Posted Speed Limit is confirmed further to verification in relation to the following:

- Lane widths
- Road type and condition
- Topography (vertical and horizontal curves)
- Parking conditions
- Land uses along the road
- Type and widths of access points and intersection roads
- Mean Speeds
- Test runs
- Traffic volumes
- Pedestrian Volumes and Behavioural Settings
- Accidents involving pedestrians.

STAGE 6: Compare Posted Speed Limit with Maximum Recommended Speed Limits

Speed Limits for Arterial, Distributor and Rural Roads with linking function

1. The table below gives the maximum speed limits in rural or urban areas for roads with flow and distribution functions. There may be cases where the type of road does not fit perfectly into one of the descriptions and hence this would need to be discussed in more detail with the police.
2. The default highest national speed limit in rural areas is 80km/h although lower speeds apply to certain types of vehicles. However, this maximum speed may be reduced where there is a strong road safety case.
3. The default highest national speed limit in urban areas is 50km/h. However, higher speed limits may be applied if there is a low level of direct frontage / access and formal pedestrian crossings have been provided.

Category	Definition of Types of Arterial and distributor Roads in Rural and Urban Areas	Maximum Posted Speed Limit
RURAL 1	Arterial and distributor single or dual carriageway roads with adequate street lighting and few bends, junctions and accesses in rural areas	80km/h
RURAL 2	Arterial and Distributor single or dual carriageway roads with adequate street lighting and a relatively high number of bends, junctions and accesses or concealed accesses but with little roadside development usually in rural areas	70km/h
RURAL 3 URBAN 1	a) Arterial and Distributor single or dual carriageway roads with inadequate street lighting levels and/or high number of bends, junctions and accesses in rural areas b) Arterial and distributor single or dual carriageway roads with roadside development but with few direct accesses and with formal crossing places for pedestrians (Pelican crossings) in urban areas	60km/h
RURAL 4 URBAN 2	a) Low Quality Rural roads b) Arterial and distributor roads single or dual carriageway roads with roadside development, with many direct accesses and informal pedestrian crossings (zebra crossings and refuges) in urban areas	50 km/h

Speed Limits for Access, Access only and Urban Roads with linking function in Urban Areas

1. The table below is a guide outlining the maximum speed limits in urban areas.
2. Although the default speed limit in urban areas is 50km/h there may be strong safety reasons where this speed limit is lowered.
3. In specific areas 30km/h zones (Home Zones) may be considered to enable a safe shared area by vehicles, pedestrians and cyclists.
4.

Category	Definition of Type of Access and Access-only Roads in Urban Areas	**Maximum Posted Speed Limit**
URBAN 3	a) Spine roads in villages where the through traffic is essential but adequate facilities for vulnerable road users and cyclists are provided such as pedestrian crossings, footways and cycle lanes. b) Roads with linking function where the movement of traffic has priority but adequate facilities for vulnerable road users and cyclists are provided such as pedestrian crossings, footways and cycle lanes.	50km/h
URBAN 4	Shopping Areas and town centres with access to public transport, schools and commercial outlets. Where pedestrians and cyclists have priority over traffic.	40km/h
URBAN 5	Home Zones are specially identified residential streets where the road space is shared between vehicles, vulnerable road users and cyclists. Low speed is attained through road design and road space designation rather than by the installation of speed limit signs only.	30km/h

(Leichhardt Road Safety Committee)

STAGE 7: Comparing the Posted Speed Limit with Mean and 85th percentile Operating Speeds.

1. After determining the posted speed limit of a road an assessment in relation to the mean operating speeds is necessary. Speed measurements will determine if there is a speed-related concern.
2. In cases where the posted speed limit is less than the operating limit it is to be assessed if the difference is such that speed reduction measures are required to support the posted speed limit.
3. If the mean operating speeds are considerably higher than the posted speed limit, implement other speed management measures to lower speeds closer to the posted limit.
4. When the posted speed limit is higher than the operating speed limit, this is to be addressed with caution since raising the speed limit might pose road safety risks.
5. Carry out test runs

STAGE 8: Monitoring

1. Following the implementation of new speed management measures, adequate monitoring is important to ensure that the new measures are effective.
2. In the case that the new speed management measures have not achieved the desired speed reduction, additional measures should be considered.
3. Monitoring is to include the carrying out and the assessment of speed surveys and accident data.

Results of application of the Step by Step Approach to determining speed limits for Arterial and Distributor roads in Malta

Location	Street Name	Road Section	Road Classification	Road Type	Speed Limit Guideline Category	AADT	HGV % Morning Peak	HGV % Mid-day peak	85th% Speed (km/h)	Mean Speed (km/h)	Accidents per 100 million vehicle km	Recommended Posted Speed Limit (km/h)
Attard	Notabile Road	NA15 – petrol station roundabout	WS1/D1	Arterial	RURAL 2	26512.67	WA9 14%	WA9 13.9%	67	57	35.76588745	70
Attard	Notabile Road	petrol station roundabout - WA9	Arterial	D1 / D2	URBAN 2							50
Attard	Mdina Road	WA7 - WA8	Arterial	D2	URBAN 1	30015.36	WA7 9.2%	WA7 8.2%	62	56	46.26466272	60
Attard	Triq Nutar Zarb	WA8 - WA9	Arterial	S2	URBAN 2	26702.59	WA9 14%	WA9 13.9%	64	59	20.05894357	50
Attard/Zebbug	Triq H'Attard	WD11 - WA9	Distributor	WS2	RURAL 3	18432.46	WD11 12.4%	WD11 14.3%	64	53	3.929047799	60 to 50 on approach to WA9
B'Bugia	Triq Kalafrana	SA27 - SA27a - SA27b	Arterial	S2	RURAL 3	1464.299	SA27 12.9%	SA27 15.4%	69	63	0	60 reducing to 50 near ETC
Birgu	Triq San Dwardu	SD8b - SD6a	Rural	WS2	URBAN 2	1219.321	SD8b 18%	SD8b 16.7%	62	55	0	30 (restricted)
B'Kara	Triq Dun Karm	EA16-EA22-WA2-WA1	Arterial	D2	URBAN 1	21429.57	WA2 15%	WA2 15.3%	58	51	39.06521939	60
B'Kara	Triq il-Wied	WD4 - WD3	Distributor	WS2	URBAN 2	18188.58	WD3 12.5%	WD3 15.5%	52	40	107.9479509	50
B'Kara	Triq Fleur de Lys	WD5-WD4 (20)	Distributor	S2	URBAN 2	18188.58	WD4 13.7%	WD4 21%	50	38	45.46144164	50
B'Kara/Balzan	Naxxar Road	WD3 - WA2	Distributor	S2	URBAN 2	13793.18	WA2 15%	WA2 15.3%	48	36	67.56085987	50
B'Kara/Balzan	Triq Wied/Birbal/Vjal de Paule	WD3-WA8	Distributor	D1 FOR VJAL DE PAULE AND S2 FOR TRIQ BIRBAL AND TRIQ IL-WIED	URBAN 2	8145.839	WD3 12.5%	WD3 15.5%	64	54	31.84984966	50
Bormla	Triq San Nikola/Surta San Gwann t'Ghuxa	SD3 - SD1	Distributor	S2	URBAN 2	8485.144	SD1 8.8%	SD1 12.5%	62	55	60.92170264	50
Bormla / Fgura	Polverista	SD4 - SD3	Distributor	S2	URBAN 2	13395.83			54	48	92.75314672	50
Bormla	Triq Immakulata/Gdida	SD3 - SD2	Distributor	S2	URBAN 2	9522.448			67	60	51.84006541	50

Location	Street Name	Road Section	Road Classification	Road Type	Speed Limit Guideline Category	AADT	HGV % Morning Peak	HGV % Mid-day peak	85th% Speed (km/h)	Mean Speed (km/h)	Accidents per 100 million vehicle km	Recommended Posted Speed Limit (km/h)
Bormla	Triq San Frangisk	SD2 - SD1	Distributor	S2	URBAN 2	9950.605	SD1 8.8%	SD1 12.5%	52	44	483.0396188	50
Bormla/Birgu	Triq Cottonera	SD5-SD8a-SD8b	Distributor	WS2	URBAN 2	3602.289	SD8b 18%	SD8b 16.7%	66	55	284.8507236	50
Bormla/Birgu	Triq Gublew tal-Fidda	SD5-SD6-SD6a	Distributor	WS2	URBAN 2	14075.09			53	41	0	50
Bormla/Paola	Triq Tlett Ibliet/Telgha ta' Ghajn Dwieli	SD1 - EA9	Distributor	WS2	URBAN 2	9782.594	SD1 8.8%	SD1 12.5%	48	41	99.07828526	50
Dingli	Rabat Road	ND17 - ND16a	Distributor	WS2	RURAL 3	1286.134			53	48	207.2584643	50 in village 60 on approach to ND16a
Fgura/Zejtun/ Tarxien	Triq Dejma/San Anard	SD9a - SA12	Distributor	WS2	URBAN 1	19225.19	SA12 9.39%	SA12 11.7%	59	51	33.10267841	60 reduced to 50 on approach to SD9a
Floriana	Triq Sant'Anna	EA5 - EA6	Arterial	D3	URBAN 1	20466.79	EA5 12.2%	EA5 10.7%	58	52	57.86542546	60
Floriana	Triq Indipendenza	ED4 - EA5	Distributor	D2	URBAN 1	38166.44	EA5 12.2%	EA5 10.7%	60	50	0	60
Ghaxaq	Triq tal-Barrani	SA12b - SA12a	Arterial	S2	URBAN 2							50
Ghaxaq	Triq tal-Barrani	SA11 - SA12	Arterial	D2	RURAL 2	13212.10	SA13 11.1%	SA13 16.1%	69	60	40.80378684	70
Ghaxaq	Triq Ghar Dalam	SA12a - SA13	Arterial	WS2	URBAN 1							60
Ghaxaq	Triq tal-Barrani	SA12 - SA12b	Arterial	D2H	RURAL 2	32485.80	SA12a 13.4%	SA12a 13%	68	57	55.75232054	70 (reduce speed at lights)
Ghaxaq/B'Bugia	Triq Zejtun	SD13 – built up area	Distributor	S2	RURAL 3	4509.820	SD14 20.7%	SD14 15.9%	63	54	165.9842058	70
Ghaxaq/B'Bugia	Triq Zejtun	Built-up area -SD14	Distributor	S2	URBAN 2							50
Gudja	Vjal Avjazzjoni	WA24 - WA25	Arterial	D2H	URBAN 2	34486.21	WA24 13.7%	WA24 12.8%	75	69	88.27122602	60
Gudja	Dawret Hal-Ghaxaq	SA12a - SA13a	Arterial	D2	URBAN 2							50
Gudja	Dawret Hal-Ghaxaq	WA24-SA13a	Arterial	WS2	RURAL 3							60

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Gudja	Dawret Hal-Ghaxaq	SA13a-SA13	Arterial	WS2	URBAN 1 URBAN 2	3230.153	SA13a 8.5%	SA13a 16.1%	63	59	88.54892304	60 50 in central part
Gudja/Safi/Zurrieq	Hal Far Road	SA27-WA26-WA26a-WA26b-WA26c	Arterial	WS2	RURAL 3							60 (reduce speed at barracks)
Gudja/Safi/Zurrieq	Hal Far Road	WA26-WA24-WA25	Arterial	WS2	RURAL 2	14297.80	SA27 12.9%	SA27 15.4%	63	56	21.35621983	70 (reduce speed at bends)
Hamrun/Floriana	National Road	EA7 - EA5	Arterial	D3	URBAN 1	42940.44	EA7 10.2%	EA7 8.9%	64	60	145.9544172	60
Hamrun/Santa Venera	Santa Venera Tunnels	WA18 - WA17	Arterial	D2	RURAL 3	18763.07	WA17 11.2%	WA17 9.76%	67	62	56.89643154	60
Kalkara	Triq Santa Liberata/San Rokku/Missjoni Taljana	SD6a - SD7	Distributor	WS2	RURAL 4	1920.849	SD6a 9.7%	SD6a 11%	60	53	144.6561356	50
Kirkop	Triq Industrija	WD19 - WD18	Distributor	D2	URBAN 2	12371.38	WD19 9.1%	WD19 8.9%	65	57	61.31137739	50
Kirkop/Luqa	Kirkop Tunnels	WD18 - WA24	Distributor	D2	RURAL 2	20522.46	WD18 11.79%	WD18 14.6%	74	67	35.457863	70
Lija/Iklin/Naxxar	Mosta Road	WA2- Lija cemetery	Arterial	WS2	URBAN 2							50
Lija/Iklin/Naxxar	Mosta Road	Lija Cemetery - NA21	Arterial	WS2	URBAN 1	23548.68	WA2 15%	WA2 15.3%	67	61	27.80001577	60
Luqa	Triq Kunsill ta l-Ewropa	WA22 - WA23	Arterial	D2	RURAL 2	16990.82	WA22 15.1%	WA22 14.9%	69	63	127.7097234	70
Luqa	Dawret il-Gudja	WA23 - WA24	Arterial	D2	RURAL 2	15549.17	WA23 14.45%	WA23 14.8%	73	67	36.14307652	70
Luqa	Qormi Road	WA23 - WA27	Arterial	WS2	RURAL 3	15088.5	WA27 15.1%	WA27 17.6%	72	66	59.3124871	60
Qormi	Luqa Road	WA27 - WA13	Arterial	WS2	URBAN 2		WA13 12.29%	WA13 11.6%				50
Marsa	Triq is-Sebh	WA6 - WA18	Arterial	D2	URBAN 2							50
Marsa	Triq is-Sebh	WA18 - WA19 - WA19a	Arterial	D2	RURAL 3							60
Marsa	Triq is-Sebh	WA19a - EA20	Arterial	D2H	RURAL 3	83658.79	WA19 6.8%	WA19 6.7%			21.31736983	60
Marsa	Triq Labour	EA20a-EA21	Arterial	D4	RURAL 3							60+ reduced speed

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Marsa	Triq Aldo Moro	EA20 - EA20a	Arterial	D4	RURAL 3	93522.68	EA20 8.2%	EA20 11.6%	78	68	38.49970312	60
Marsa	Triq Dicembru 13	EA7a - EA7	Arterial	D2H	RURAL 3	50081.28	EA7 10.2%	EA7 8.9%	72	68	43.19476755	60
Marsa/Luqa	Triq Garibaldi	WA22 - EA20a	Arterial	D2H	RURAL 2	16600.60	EA21 10.3%	EA21 10.8%	77	67	16.86209429	70 to 40 at Industrial Estate
Marsascala	Triq Sant' Antnin tal-Plier	SD8-Triq Latmija	Distributor	WS2	URBAN 2							50
Marsascala	Triq Sant' Antnin tal-Plier	Triq Latmija -SD15a	Distributor	D1	RURAL 3	10500.64	SD15 11.6%	SD15 8.5%	62	54	6.650784448	60
Marsascala	Triq Sant' Antnin tal-Plier	SD15 - SD15a	Distributor	D1H	URBAN 2							50
Marsaxlokk	Tas-Silg to Power Station	SD17 - SD16	Distributor	D1H	RURAL 4	2767.137			51	45	0	50
Marsaxlokk	Triq Bir Rikka/Melqart	SD16 - SD16a	Distributor	1-WAY 1-LANE	URBAN 2	3029.623			59	52	0	50
Marsaxlokk/Zejtun	Triq Zejtun/Marsaxlokk	SD16a - SA13	Distributor	WS2	RURAL 3	4743.663	SA13 11.1%	SA13 16.1%			13.96071796	70 (reduce speed at traffic lights)
Mdina/Rabat	Srina to Saqqajja	NA14 - NA15	Distributor	WS2	RURAL 3	12304.57	NA14 7.7%	NA14 8.3%	69	62	71.0614388	60
Mellieha	Cirkewwa Road	NA1 - NA2	Arterial	WS2	RURAL 3	4552.564	NA1 34.3%	NA1 32.2%	70	64	121.5754261	60 (reduced speed) To be reviewed when reconstructed
Mellieha	Marfa Road	NA2 - NA3	Arterial	WS2	RURAL 3	6633.737			72	67	134.865244	60 To be reviewed when reconstructed
Mellieha	Mellieha Bay	NA3 - NA4a	Arterial	D2	RURAL 2	6454.886			54	49	0	60
Mellieha	Mellieha By Pass	NA4a-NA5	Arterial	WS4	RURAL 3							60 30 on hairpin bend
Mellieha	Mellieha By Pass	NA5-NA5a-NA6	Arterial	WS2H FROM NA6 TO NA5 AND D1 FROM NA5 TO NA4	RURAL 1	6313.973	NA6 17.3%	NA6 18.5%			15.43082137	80
Mellieha	Mistra Road	NA6 – Mistra Village rbt	Arterial	WS2	RURAL 3	3289.77	NA7 11.28%	NA7 13.2%	68	62	9.384738375	60 40 at hairpin bend

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Xemxija	Xemxija Hill	Mistra Village Rbt- NA7	Arterial	S2	URBAN 2							50
Mgarr	Triq Ghajn Tuffieha	NA7 - NR9-NR8	Rural	S2	RURAL 2							70
Mgarr	Gnejna Road	ND20a - NR22-NR21	Rural	S2	RURAL 4 URBAN 2							50
Mgarr	Triq Banjijiet Rumani	NR11 - ND20	Rural	S2	URBAN 2							50
Mgarr	Triq Sir Temi Zammit	NR11 - ND19	Rural	S2	RURAL 2 URBAN 4							70 50 in built up area
Mgarr	Triq Ghajn Tuffieha	NR9 – Built-up area	Rural	S2	RURAL 3							70 (reduced Speed at bend)
Mgarr	Triq Ghajn Tuffieha	Built-up area-NR11	Rural	S2	URBAN 2							50
Mgarr	Triq Zebbiegh	ND19 - ND20	Distributor	WS2	URBAN 2	1948.688	ND20 16.1%	ND20 15.8%	68	61	464.0045041	50
Mgarr	Triq Fisher	ND20 - ND20a	Distributor	S2	URBAN 2	1909.714	ND20 16.1%	ND20 15.8%	42	38	0	50
Mosta	Valletta Road	NA21 - NA22	Arterial	D2	URBAN 1	29098.47	NA21 9.4%	NA21 13.4%	67	60	81.44774175	60
Mosta	Qlejja to Targa Gap (Missjunarji Maltin)	ND12-ND12a-ND3	Distributor	S2	RURAL 2							70
Mosta	Qlejja to Targa Gap (Missjunarji Maltin)	ND12 - ND13	Distributor	WS2	RURAL 3	14741.63	ND12 19.8%	ND12 21.4%			60.37995235	60
Mosta	Triq Millbrae	ND3 - ND3a	Distributor	WS2	RURAL 4		ND3 14.5%	ND3 12.8%				50
Mosta	Triq Difiza Civili	ND3a - ND2	Distributor	WS2	RURAL 3	6790.909	ND3 14.5%	ND3 12.8%	56	47	0	70 reducing speed to 50 at bend
Mosta	Vjal Indipendenza	NA22 - ND11	Distributor	WS2	URBAN 2	16643.96	NA22 11.6%	NA22 12.6%	57	50	53.79340593	50
Mosta	Triq Kbira	ND11 - ND12	Distributor	WS2	RURAL 3	2232.924	ND12 19.8%	ND12 21.4%	43	39	377.6446687	60
Mosta	Triq Kungress Ewkaristiku	NA22 - ND5	Distributor	1-WAY 1-LANE	URBAN 2	4628.440	ND5 19.6%	ND5 18.4%	52	40	232.8152655	50
Mosta	Triq Kostituzzjoni	ND3-ND4-ND5	Distributor	S2	URBAN 2	7495.472	ND3 14.5%	ND3 12.8%	53	41	181.8494735	50
	Triq il-Kbira	ND11 to Constitution Street	Rural	S1	URBAN				43	39		40

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					2							
Mosta/St Paul Bay	Triq Burmarrad	ND1-ND1a-ND2	Distributor		URBAN 2							50
Mosta/St Paul Bay	Triq Burmarrad	ND3 - ND1	Distributor	WS2H	RURAL 1	20681.65	ND2a 7.69%	ND2a 3.3%	62	47	66.42437409	ND1 - ND1a 50km/h
Mosta/Mgarr	Triq Xifer il-Kief/il-Mosta (Imselliet)	ND12 - ND19	Distributor	WS2	RURAL 2	4471.269	ND12 19.8%	ND12 21.4%	68	61	0	70 (reduce speed near school)
Mqabba	Triq Qrendi/Konvoj ta' Santa Marija	WD20 - WR4	Distributor	WS2	URBAN 1 URBAN 2							60 50
Mqabba	Triq Qrendi/Konvoj ta' Santa Marija	WD20 - WD19	Distributor	WS2H	URBAN 4	4742.255	WD19 9.1%	WD19 8.9%	67	55	18.30565352	60
Msida	Triq Psaila	WD4-WA17	Distributor	S2	URBAN 2							50
Msida	Triq Wied	ED3 – EA16a	Arterial	WS2	URBAN 2	15049.43	EA16a 12.4%	EA16a 13.6%	50	39	178.9173288	50
Birkirkara	Regional Road	EA16 - WA17	Arterial	D2	RURAL 3	58984.00	WA17 11.2%	WA17 9.76%	66	53	68.62216671	60 on approach to EA16 40 approach to Msida bridge
Msida	Triq MA Vassalli	ED3a-EA16-EA15-EA-14-EA12-EA16a	Arterial	D2	URBAN 1							60
Mtarfa	Triq Ghajn Qajjiet	ND13 - ND21	Arterial	D1	RURAL 2	6436.238	ND13 13.1%	ND13 13.1%	68	55	0	70 reduce speed to 50 at ND21
Mtarfa	Mtarfa By Pass	NA15 - ND13	Arterial	D2	RURAL 2	2639.080	NA15 10.5%	NA15 9.96%	66	61	0	70
Naxxar	Triq il-Kosta	NA8-NA9-NA9a-NA10a-NA10b	Arterial	S2	RURAL 2							70
Naxxar	Triq il-Kosta	NA10a - NA10	Arterial	S2	URBAN 2	30800.26	NA9 7.56%	NA9 7.2%	72	67	40.43518303	50
Naxxar	Triq Parrocca	ND9 - ND8	Distributor	S2	URBAN 2	14765.48	ND9 11.9%	ND9 11.3%	51	40	32.55251095	50
Naxxar	Telgha t'Alla w Ommu	NA9a- built-up area	Rural	S2	RURAL 2	18000.30			60	47	0	70 (reduce speed near NA9a)
Naxxar	Telgha t'Alla w Ommu	Built-up area	Rural	S2	URBAN 2							50
Naxxar	Telgha t'Alla w Ommu	Maghtab Access Roundabout	Rural	D1	RURAL 4							50

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Naxxar	Birguma Bypass	Roundabout-ND9	Rural	S2	URBAN 1							60
Naxxar	Triq Labour	ND8 - NA21	Distributor	WS2	URBAN 2	19481.31	NA21 9.4%	NA21 13.4%	65	53	18.97888607	60
Paola	Triq Buhagiar	AE9-Roundabout	Arterial	WS2	URBAN 2							50
Paola	Triq Buhagiar	Roundabout -EA23	Arterial	"S2	RURAL 3							60
Paola	Triq Kordin	EA8 - EA9	Arterial	D2	URBAN 1	13717.31	EA8 7.7%	EA8 9.4%	54	50	69.95713701	60
Paola	Sir Paul Boffa Avenue	EA8 - EA21	Arterial	D2	URBAN 1	44756.04	EA21 10.3%	EA21 10.8%	68	63	48.142197	60
Paola	Vjal St Lucija	EA21 - SA11	Arterial	D2	RURAL 2	25261.31	SA11 10.8%	SA11 13.8%	69	64	108.5232275	70
Paola/St Lucija	Luqa Road	SA11 - WA22	Arterial	S2	URBAN 1	12367.80	WA22 15.1%	WA22 14.9%	77	71	68.43400323	60 (reduce speed near school)
Pembroke/Naxxar	St Andrews Road	NA10-NA11a-NA11	Arterial	WS2	RURAL 2	26133.89	NA11 10.9%	NA11 12.9%	66	61	23.37440863	70
Pembroke/Naxxar	St Andrews Road	NA11-NA11a-EA12	Arterial	WS2	URBAN 1							60
Pieta	Triq Marina	ED4 - ED3	Distributor	D2	URBAN 2	42860.00	ED3 9.4%	ED3 10%	65	58	42.75192494	50 (dangerous bend)
Qormi	Mriehel bypass	WA6 - WA7	Arterial	D2H	RURAL 1	26201.50	WA7 9.2%	WA7 8.2%	69	62	17.6836971	80
Qormi	Triq Manuel Dimech	WA13 - WA12	Arterial	S4	URBAN 1	14243.02	WA12 10.5%	WA12 13%	53	48	120.6282354	60
Qormi	Triq Qormi	WA12 - WA19	Arterial	D2	RURAL 3		WA19 6.8%	WA19 6.7%				60
Qormi	Triq Imdina	WA13 - WD14	Distributor	D2H	URBAN 1 RURAL 2	22426.80	WA13 12.29%	WA13 11.6%	63	50	112.0206231	50 eastbound 60 westbound
Rabat	Triq Hal Tartani	ND16 - ND16a	Arterial	WS2	URBAN 2	4086.677	ND16 12.1%	ND16 13.4%	58	53	176.6546318	50
Rabat	Triq Dingli/Vjal Haddiem to Dingli	ND16a - ND21b	Distributor	WS2	URBAN 2	3763.751			53	54	78.52472769	50

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Rabat	Triq Ghajn Qajjet	ND21a - ND2	Rural	WS2	URBAN 2	2522.159			58	54	0	50
Rabat	Triq Gheriexem/Triq Tabija	NA14a-ND16a-ND21b	Distributor	WS2	URBAN 2	2538.862	ND21 18.3%	ND21 19.5%	51	48	24.35377427	50
Rabat	Triq Infetti	NA14 - ND13	Distributor	WS2	RURAL 3	9083.450	NA14 7.7%	NA14 8.3%	63	58	0	60
San Gwann	Triq Naxxar/Vjal Rihan	EA14 - ED1-ED2	Distributor	S2	URBAN 2	21462.09					28.63485811	50
San Gwann	Triq Tal-Balal	ED1 - ED2	Distributor	D2	RURAL 2	7565.929	ED2 9%	ED2 9%			25.71464465	50
Santa Venera/ Birkirkara	Psaila Street	WA17 - WD3	Distributor	S2	URBAN 2	12226.88	WD4 13.7%	WD4 21%	53	39	51.80353992	50
Santa Venera	Triq Kanun	WA6 - WD5	Distributor	S2	URBAN 2	20199.29	WD5 10.6%	WD5 10.2%	56	42	19.02310315	50
St. Paul's Bay	St. Paul's Bay Bypass	NA7 - NA8	Arterial	D2	RURAL 1	10450.53	NA7 11.28%	NA7 13.2%	78	72	19.54968746	80 50 Reduce Speed at Tal-Fjuri
St. Paul's Bay	Kennedy Drive	NA8 - NA9 - NA9a	Arterial	S2H	RURAL 2	25223.37	NA8 13.8%	NA8 14.3%	57	50	16.62740549	70
Zabbar	Triq Labour	SD8 - SD8a - SD8b-SD9-	Distributor	WS2	URBAN 2	35000.55	SD8b 18%	SD8b 16.7%	57	45	87.70493277	50
Zabbar	Triq 10 Settembru	SD9a - SD9	Distributor	D2	URBAN 2	24242.408	SD8b 18%	SD8b 16.7%	60	51	4.756472071	50
Zebbug	Triq Imdina	WD11-WD15	Distributor	S2H	URBAN 1							60
Zebbug	Triq Imdina	WD11-NA15	Distributor	D2	RURAL 2							70
Zebbug /Siggiewi	Triq Siggiewi	WD16 - WD15	Distributor	WS2	RURAL 2	19212.90	WD15 11.8%	WD15 14.4%	65	58	24.31341872	70 Reduced speed near WD15
Zurrieq	Triq Belt Valletta	WD22-WD21	Distributor	WS2	RURAL 3							60
Zurrieq	Triq Belt Valletta	WD21-WD19	Distributor	WS2	RURAL 2	8514.380	WD19 9.1%	WD19 8.9%	69	60	64.18837731	70
Zurrieq/Kirkop/Safi	Triq Dun Guzepp Barbara/San Gwann	WD21 - WD23	Distributor	S2	RURAL 3	8059.123			49	46	57.52171633	60 reduced speed at bend

Results of application of the Step by Step Approach to determining speed limits for Arterial and Distributor roads in Gozo

Location	Street Name	Road Section	Road Classification	Road Type	Speed Limit Guideline Category	AADT	HGV % Morning Peak	HGV % Mid-day peak	85th% Speed (km/h)	Mean Speed (km/h)	Accidents per 100 million vehicle km	Recommended Posted Speed Limit (km/h)
Mgarr	Triq ix-Xatt	GA38 – GA37	Arterial	WS2	URBAN 3							40
Mgarr	Triq Sant'Antnin	GA37 – GA37b	Arterial	S2	URBAN 3							40
Ghajnsielem	Triq Sant'Antnin	GA37b – GA45	Arterial	S2	URBAN 3							50
Ghajnsielem	Triq in-Nadur	GA45 – GA46	Arterial	S2	RURAL 2							60 reduce speed on approach to GA46
Qala	Triq Mgarr/Triq 28April 1688	GA45 – GD9	Distributor	S2	RURAL 2				58	45		60 reduce speed to 40 on approach to GD9
Qala	Triq Nadur/Triq il-Qala	GD9 – GD8	Distributor	S2	RURAL 2							30 Triq in-Nadur increasing to 50 in Triq il-Qala
Qala	Triq San Gwann	GA46 – GD8	Arterial	S2	URBAN 2							50
Qala	Triq it-Tigrija	GD8 – GA44	Distributor	S2	RURAL 2							50
Nadur	Triq Hanaq/Triq ir-Ramla	GA44 – GD7a	Distributor	WS2	RURAL 2				62	54		50 in Triq Hanaq increasing to 60 in Triq ir-Ramla
Nadur	Triq ir-Ramla	GD7a – GD7	Distributor	WS2	RURAL 2				62	54		60
Nadur	Triq ir-Rabat	GA44 – GA42	Arterial	S2	RURAL 2							60
Xewkija	Triq ta' Hamet/Triq San Anard	GA42 – GA34	Arterial	WS2	RURAL 2							60
Xewkija/Xaghra	Triq ta' Hamet	GA42 – GA42a	Arterial	S2	RURAL 2				60	51		60
Xaghra	Triq ta' Hamet	GA42a – GA43	Arterial	S2	RURAL 2				60	51		40
Xaghra	Triq ta' Hamet/Vjal 8 ta' Settembru	GA43 – GA43a	Arterial	S2	URBAN 3				60	51		40 in Triq ta' Hamet to 60 in Triq Vjal 8 ta' Settembru

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Xewkija	Triq il-Madonna tar-Rummiena	GA42 – GA35	Distributor	S2	RURAL 2							60
Ghajnsielem	Triq Mgarr	GA37 – GA37a	Arterial	S4	RURAL 1	7193.44						60
Ghajnsielem	Triq Mgarr	GA37a – GA36	Arterial	WS2	RURAL 1							50
Ghajnsielem/ Xewkija	Triq Mgarr	GA36 – GA35a	Arterial	WS2	URBAN 2				59	51		50 in Ghajsielem to 60 in Xewkija
Xewkija	Triq Mgarr	GA35a – GA35	Arterial	WS2	URBAN 2				59	51		60
Xewkija	Triq Mgarr	GA35 – GA34	Arterial	WS2	RURAL 2				64	53		60
Xewkija	Triq il-Mithna/Triq Hamrija	GA35 – GD13	Distributor	S2	URBAN 2							30 in Triq il-Mithna to 50 in Triq Hamrija
Xewkija	Triq ta' Sannat/TRiq Xewkija	GD13 – GD11	Distributor	S2	RURAL 3				59	50		60 with REDUCE SPEED at bend
Sannat	Triq ta'Sannat	GD11 – GD11a	Distributor	S2	RURAL 2				70	60		60
Sannat	Triq ta'Cenc	GD11a – GD12	Distributor	S2	RURAL 3							50
Xewkija/Rabat	Triq Ta' Sannat/Triq Tabib Tabone	GD11 – GD10	Distributor	S2	RURAL 2/ URBAN 3				70	60		60 in Triq ta' Sannat to 40 in Triq Tabib Tabone
Sannat	Triq Marsiena	GD11 – GD15	Distributor	S2	RURAL 2				59	60		60
Sannat/Rabat	Triq San Duminka	GD15 – GD14	Distributor	S2	RURAL 2/ URBAN 3							50 in Sannat to 40 in Rabat
Xlendi/Rabat	Triq Xlendi	GD17 – GD16	Distributor	S2	RURAL 2				48	41		60 in Xlendi to 40 in Rabat
Rabat	Triq l-IsptarSan Giljan	GD16 – GD14	Distributor	S2	URBAN 3							40
Rabat	Triq Ghajn Qatet	GD13 – GD21	Distributor	S2	URBAN 3							40
Rabat	Triq Archisqof Pietru Pace	GD21 – GD34	Distributor	S2	URBAN 3							40

Location	Street Name	Road Section	Road Classification	Road Type	Speed Limit Guideline Category	AADT	HGV % Morning Peak	HGV % Mid-day peak	85th% Speed (km/h)	Mean Speed (km/h)	Accidents per 100 million vehicle km	Recommended Posted Speed Limit (km/h)
Rabat	Triq Fortunato Mizzi	GA34 – GA33	Arterial	WS2	URBAN 4	18795.59						40
Rabat	Triq Fortunato Mizzi	GA33 – GA32	Distributor	WS2	URBAN 4							40
Rabat	Triq ta' Viani/Triq Ewropa	GA33 – GA40	Arterial	S2	URBAN 3							40
Rabat	Triq Kapuccini	GA40 – GA32	Arterial	S1	URBAN 3							40
Rabat	Triq Vassallo/Triq ta' Wara s-Sur	GA40 – GA39	Arterial	S2	URBAN 3							60
Rabat	Triq l-Imghallem	GA31 – GA39	Arterial	S2	URBAN 4							50
Rabat/Xaghra/ Marsalforn	Triq Kapuccini/ Triq Marsalforn	GA40 – GA41	Arterial	S2	RURAL 2				50	43		60
Rabat/Zebbug	Triq l-Imghallem	GA39 – GD4	Distributor	S2	RURAL 2				50	43		60 REDUCE SPEED on approach to GD4
Zebbug	Triq il-Knisja	GD4 – GD5	Distributor	S2	RURAL 2/URBAN 3				61	53		60
Zebbug	Triq iz-Zebbug	GD4 – GD3	Distributor	S2	RURAL 3				51	44		60
Ghasri	Triq Dun K.Caruana	GD3 – GA29	Distributor	S2	RURAL 2				51	44		60
Rabat	Triq Repubblika	GA32 – GA31	Arterial	S2	URBAN 4	29488.697						40
Rabat	Triq Sant'Orsla	GA31 – GA30	Arterial	S2	URBAN 4							40
Rabat	That Putirjal	GA32 – GD21	Arterial	S2	URBAN 4							40
Rabat	Triq Enrico Mizzi	GD21 – GD10	Distributor	S1	URBAN 4							40
Rabat	Triq Enrico Mizzi	GD10 – GD14	Distributor	S1	URBAN 4							40
Rabat	Triq tal-Ghajn	GD16 – GD19	Distributor	S1	URBAN 4							40
Rabat	Triq il-Wied/Triq Kercem	GD19 – GD18	Distributor	S2	URBAN 3							40
Rabat	Triq Gedrin	GD19 – GA30	Distributor	S1	URBAN 3							40

Location	Street Name	Road Section	Road Classification	Road Type	Speed Limit Guideline Category	AADT	HGV % Morning Peak	HGV % Mid-day peak	85th% Speed (km/h)	Mean Speed (km/h)	Accidents per 100 million vehicle km	Recommended Posted Speed Limit (km/h)
Rabat	Triq Papa Gwanni II	GA30 – GA29	Arterial	WS2	RURAL 2				55	47		40 increasing to 60 towards GA29
Ghasri/Gharb	Triq Gharb	GA29 – GA28	Arterial	S2	RURAL 2							40 increasing to 50 towards GA28
Gharb	Triq Gharb/Triq Frangisk Portelli	GA28 – GD1	Arterial	S2	RURAL 2							50
Sa Lawrenz	Triq Duluri/Triq Gebla tal-General	GD1 – GD2	Arterial	S2	RURAL 2							50 with REDUCE SPEED at bends

ANNEX 2

Technical Guidance to making sure people actually know the speed limit in force

(Section 6)

a. Traffic Calming guidelines

MEASURE	PHYSICAL PROPERTIES	USAGE
Bar Markings	• Yellow transverse bar markings.	• To draw attention to an approaching junction; • On high speed roads; • Used prior to a change in speed-limit.
Pinch Points	• An extension of the footway at the side of the road; • May include landscaping.	• Narrowing of carriageway; • Re-organisation of on-street parking; • A reduction in speed; • May include a raised pedestrian crossing and a central refuge.
Chicanes	• May include one or more build outs on alternate sides of the road; • May include a deflection in road alignment; • May include landscaping.	• Narrowing of the carriageway; • A reduction in speed; • May include a raised pedestrian crossing and a central refuge; • May have speed cushions; • Spacing distance of 10m-15m.
Entry Treatment	• Change in surface or raised area or a combination of both.	• A reduction in speed; • May include a raised pedestrian crossing.
Islands and Pedestrians Refuges	• Usually a longitudinal island built in the carriageway.	• To improve lane discipline; • Restrict overtaking; • A reduction in speeds; • May be used as a pedestrian refuge.
Mini Roundabouts	• A small roundabout (diameter[4meters)either painted or constructed as a raised round area; • Mountable; • External diameter [28m; • Speeds [48km/h; • Conventional roundabout is used where the external diameter exceeds 39meters.	• On straight roads to break up the road into sections; • At tee-junctions, crossroads or Y-junctions; • Regulate conflicting movements; • A reduction in speeds.
Road Hump	• Transverse raised section of the road.	• A reduction in speed.
Home Zones	• Scope is to strike a balance between vehicular traffic and vulnerable road users • Promote speed reduction through physical alterations of streets. • Reduced speed to 20km/h	• In residential areas • Areas which generate high pedestrian and cycling traffic • Main commercial and recreational areas.

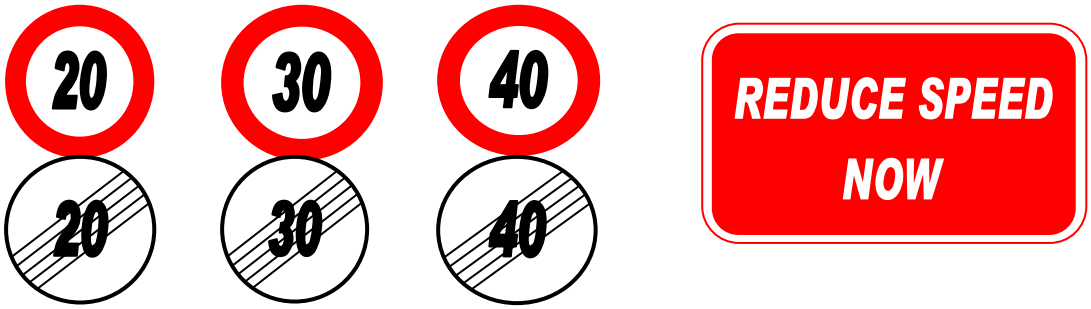
SPEED LIMITS

Aims of Measure:
To improve road safety by establishing the speed limits.

Implementation of Measure:

- identification the extent of the area of influence
- determination of the revised speed limit
  - not exceeding 80km/h for arterial/distributor roads
  - not exceeding 60km/h on roads with linking function
  - not exceeding 40km/h for local access roads
  - not exceeding 30km/h for village core and road widths less than 3.0m
- implementation of SPEED LIMIT sign and the corresponding END OF SPEED LIMIT sign (as per Traffic Signs and Carriageway Markings Regulations, Subsidiary Legislation Section 65)
- implementation of speed roundels (advisory)
- implementation of REDUCE SPEED NOW signs (advisory)
- SLOW road markings (advisory)

SIGNAGE



ROAD MARKINGS

Constraints:

- location of school access
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads

DRAGONS' TEETH

Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas or prior to a change in speed limit.

Implementation of Measure:

- identification of the speed sensitive locations
- implementation of Dragons' Teeth road markings
- complement speed reduction measures
- may be used a part of a gateway design
- the dimensions of the Dragons' Teeth have a width of 750mm and they increase in height in the direction of traffic from 600mm to 1000mm but retain the centre-to-centre spacing of 1500mm

DRAGONS' TEETH

Constraints:

- site of speed sensitive location
- road layout configuration
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads

YELLOW BAR MARKINGS

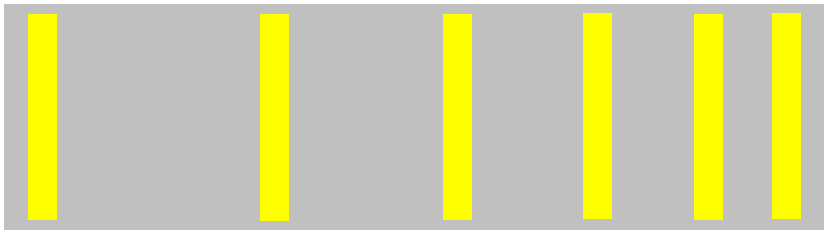
Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas or prior to a change is speed limit.

Implementation of Measure:

- identification of the speed sensitive locations
- implementation of Yellow Bar Markings
- complement speed reduction measures
- may be used a part of a gateway design
- the Bar Markings have a width of 200mm and their centre-to-centre spacing decreases in the direction of traffic

Spacing of YELLOW BAR MARKINGS on the road									
Bar No	Distance from D1 (m)	Bar No	Distance from D1 (m)	Bar No	Distance from D1 (m)	Bar No	Distance from D1 (m)	Bar No	Distance from D1 (m)
D1	0.00	D21	60.10	D41	133.75	D61	224.70	D81	338.15
D2	2.75	D22	63.45	D42	137.85	D62	229.80	D82	344.65
D3	5.50	D23	66.80	D43	142.00	D63	234.90	D83	351.35
D4	8.25	D24	70.15	D44	146.15	D64	240.10	D84	358.30
D5	11.05	D25	73.60	D45	150.40	D65	245.40	D85	365.50
D6	13.90	D26	77.05	D46	154.65	D66	250.70	D86	373.20
D7	16.80	D27	80.55	D47	158.95	D67	256.10	D87	380.90
D8	19.70	D28	84.10	D48	163.35	D68	261.50	D88	388.60
D9	22.60	D29	87.65	D49	167.75	D69	267.00	D89	396.25
D10	25.55	D30	91.30	D50	172.25	D70	272.60	D90	403.95
D11	28.55	D31	94.95	D51	176.75	D71	278.20		
D12	31.60	D32	98.65	D52	181.30	D72	283.90		
D13	34.65	D33	102.40	D53	185.95	D73	289.60		
D14	37.70	D34	106.15	D54	190.60	D74	295.45		
D15	40.80	D35	110.00	D55	195.35	D75	301.30		
D16	43.95	D36	113.85	D56	200.10	D76	307.25		
D17	47.15	D37	117.75	D57	204.90	D77	313.30		
D18	50.35	D38	121.70	D58	209.80	D78	319.35		
D19	53.55	D39	125.65	D59	214.70	D79	325.55		
D20	56.80	D40	129.70	D60	219.70	D80	331.75		

YELLOW BAR MARKINGS



Constraints:

- site of speed sensitive location
- road layout configuration
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads

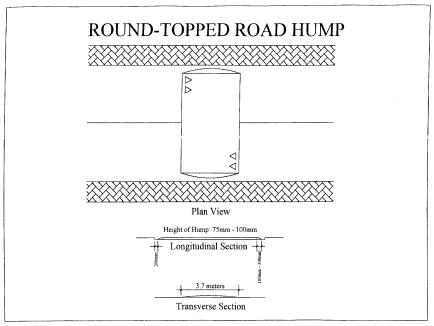
ROUND TOPPED ROAD HUMPS

Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas.

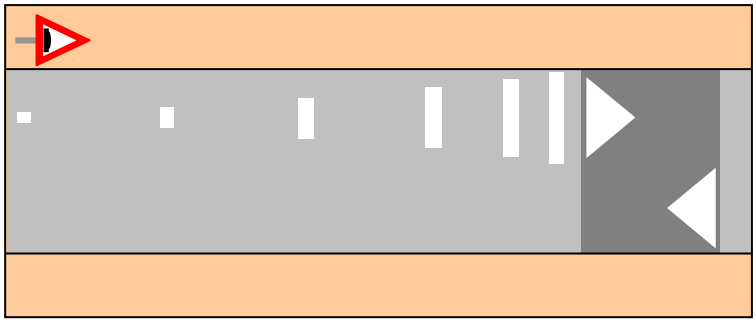
Implementation of Measure:

- identification of the speed sensitive locations
- implementation of Round Topped Road Hump
- complement speed reduction measures
- for two-way roads, the road hump should not be implemented within the 15m distance from the corner
- for one-way roads, the road hump should not be implemented within the 5m distance from the corner
- if the street is a bus route, the crest of the hump is not to exceed 50mm
- if the street is not a bus route, the crest of the hump is not to exceed 100mm
- the hump width is to be 3.7m
- the hump is not to impede or obstruct access to garages
- adequate width is to be allowed between the edge of the carriageway and the edge of the hump to permit unimpeded flow of rainwater drainage

SPECIFICATIONS FOR HUMP



LINE MARKINGS AND SIGNAGE FOR HUMP



- site of speed sensitive location
- road layout configuration
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads
- underground structures and/or services
- structural condition of adjoining buildings

ROAD THUMPS

Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas.

Implementation of Measure:

- identification of the speed sensitive locations
- implementation of Road Thump
- complement speed reduction measures
- for two-way roads, the road thump should not be implemented within the 15m distance from the corner
- for one-way roads, the road thump should not be implemented within the 5m distance from the corner
- if the street is a bus route, thumps are not to be implemented
- the thump is not to impede or obstruct access to garages
- adequate width is to be allowed between the edge of the thump and the edge of the thump to permit unimpeded flow of rainwater drainage
- thumps are to have a circular profile
- the height of the thumps is to be from 37mm to 50mm.
- the width of the thumps is to be from 900mm to 1500mm.
- thumps are ineffective in roads where the speed exceeds 50km/h
- spacing between thumps is not to be less than 50 meters
- for thumps higher than 37mm, a channel gap of 750mm to 1000mm is to be left so as to enable cyclists to avoid the thumps
- **thumps are considered only in roads where the total width does not exceed 3.0 meters or in parking/vehicle circulation areas.**

Constraints:

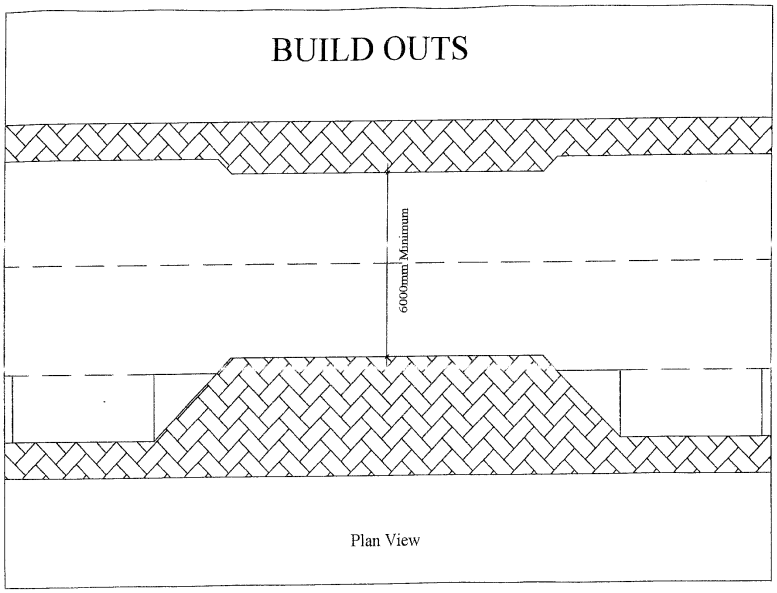
- site of speed sensitive location
- road layout configuration
- traffic volumes of the road
- 85^{th} percentile speed limit of the road
- underground structures and/or services
- structural condition of adjoining buildings
- road width

BUILD-OUTS/PINCH POINTS

Aims of Measure:
To reduce vehicular speeds on the approach to speed sensitive areas.

Implementation of Measure:

- narrowing of the road
- re-organisation of on-street parking
- may include a pedestrian crossing
- identification of the speed sensitive locations
- implementation of the pinch point/build-outs
- complement speed reduction measures
- effective road width to be determined depending on the road classification
- the pinch point/build-out is not to impede or obstruct access to garages
- the pinch point/build-out is to permit unimpeded flow of rainwater drainage
- may include soft landscaping not exceeding 50mm in height
- may include a raised pedestrian crossing depending on the location of the measure and the vehicle flow direction of the road



Constraints:

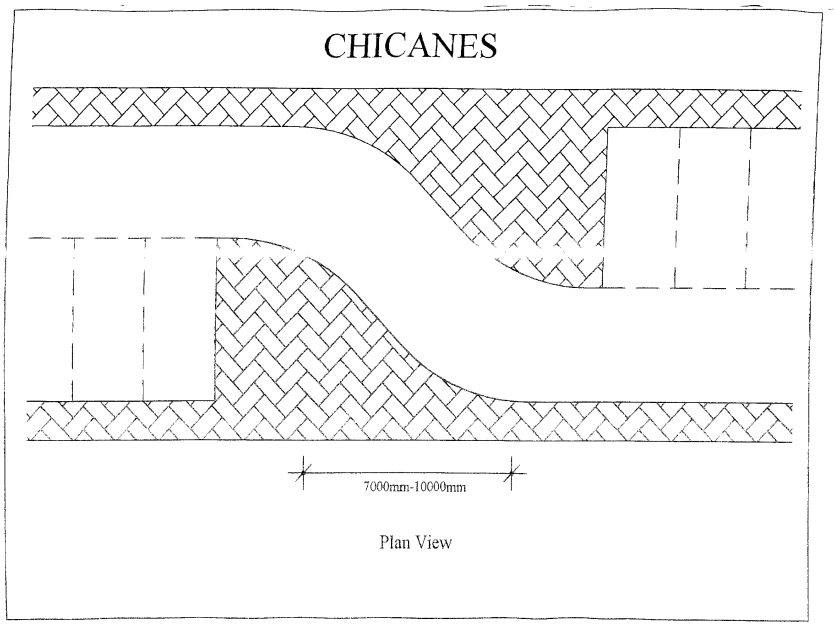
- road la
- traffic volumes of the road
- 85th percentile speed limit of the road
- existing road width
- existing storm water provisions.

CHICANES

Aims of Measure:
To reduce vehicular speeds on the approach to speed sensitive areas.

Implementation of Measure:

- identification of the speed sensitive locations
- implementation of the pinch point/build-outs
- complement speed reduction measures
- effective road width to be determined depending on the road classification
- the pinch point/build-out is not to impede or obstruct access to garages
- the pinch point/build-out is to permit unimpeded flow of rainwater drainage
- may include soft landscaping not exceeding 50mm in height
- may include a deflection in the road alignment
- narrowing of the road
- on-street parking arrangements with the chicane will depend on the dimensions of the chicane, the 85th percentile vehicle speed and the traffic volumes



Constraints:

- road la
- traffic volumes of the road
- 85th percentile speed limit of the road
- existing road width
- existing on-street car parking provision
- existing storm water provisions.

MINI ROUNDABOUTS AND TRAFFIC ISLANDS

Aims of Measure:
To reduce vehicular speeds on the approach to speed sensitive areas and junctions and to regularise and manage vehicle movements.

Implementation of Measures according to standard specifications:

- measure can be implemented on straight roads to break up the road into sections
- measure can be implemented at T-junctions, Y-junctions and at crossroads
- the mini roundabout, with a diameter not exceeding a maximum of 4.0meters, may be either painted or constructed as a mountable round area with a crest height not exceeding a maximum of 100mm
- the mini roundabout is recommended for locations where the external diameter does not exceed 28meters

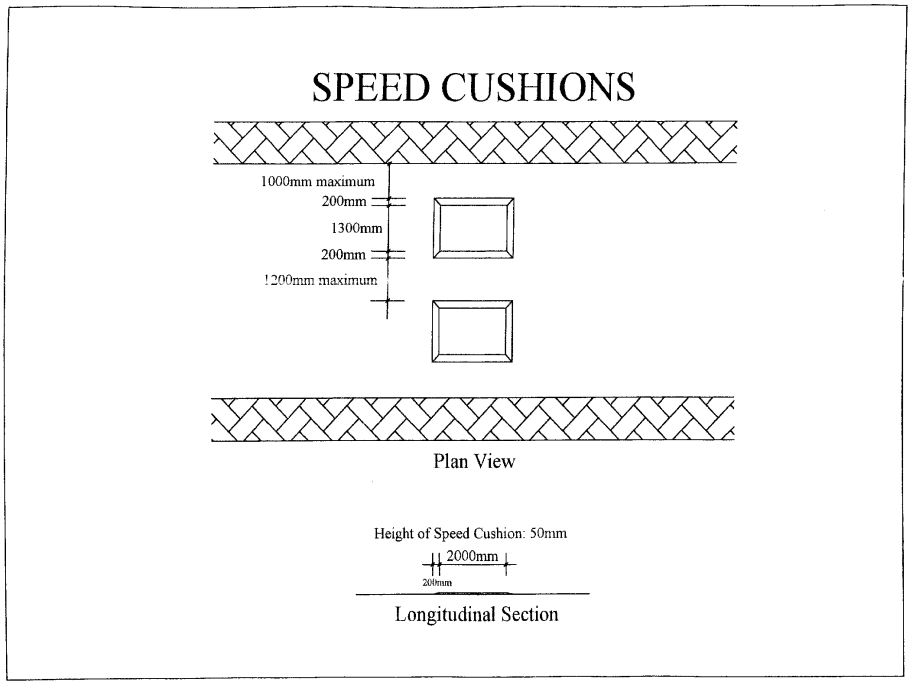
Constraints:

- road layout configuration
- traffic volumes of the road
- 85^{th} percentile speed limit of the road
- existing road width
- swept path of vehicles permitted through the area
- road gradient
- mini roundabout is not recommended where the gradient of the road exceeds 4%
- measures recommended for locations where the speed does not exceed 50km/h

SPEED CUSHIONS

Aims of Measure:
To reduce vehicular speeds of passenger cars on the approach to speed sensitive areas and junctions.

Implementation of Measure:
- the speed cushions are to be constructed as per dimensions outlined in the illustration
- the distance between the speed cushions is such that the axle of the passenger vehicle is effected by the cushions however, the wider axle of heavy vehicles and public transport vehicles is not effected



Constraints
- He
- ro
- percentage of heavy vehicles and public transport vehicles
- traffic volumes of the road
- 85th percentile speed limit of the road
- existing road width

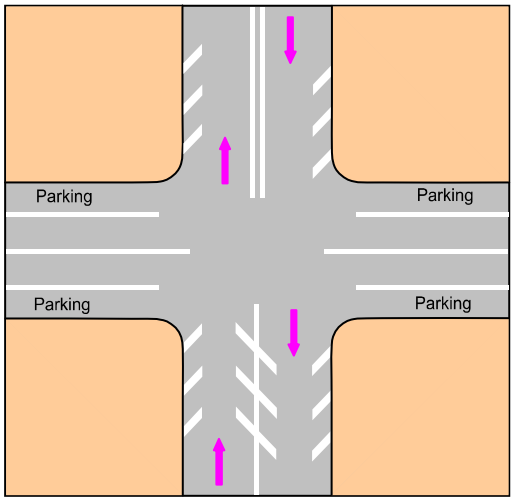
LANE NARROWING

Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas or prior to a change in speed limit.

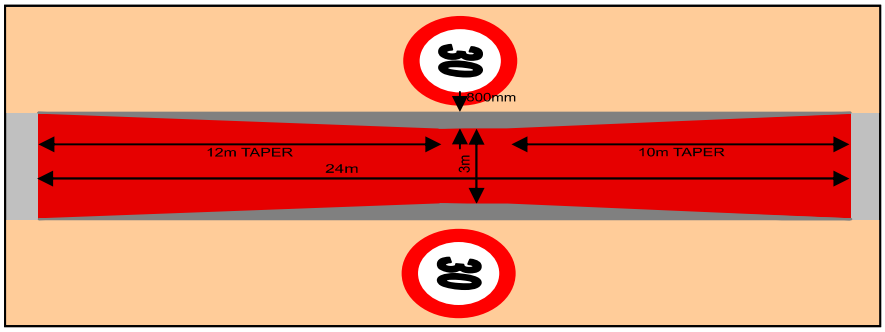
Implementation of Measure:

- identification of the speed sensitive locations
- implementation of edge and centre hatching lines
- implementation of road narrowing lines
- complement speed reduction measures
- may be used a part of a gateway design

HATCHING



PINCH POINT



Constraints:

- site of speed sensitive location
- road layout configuration
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads
- existing road width

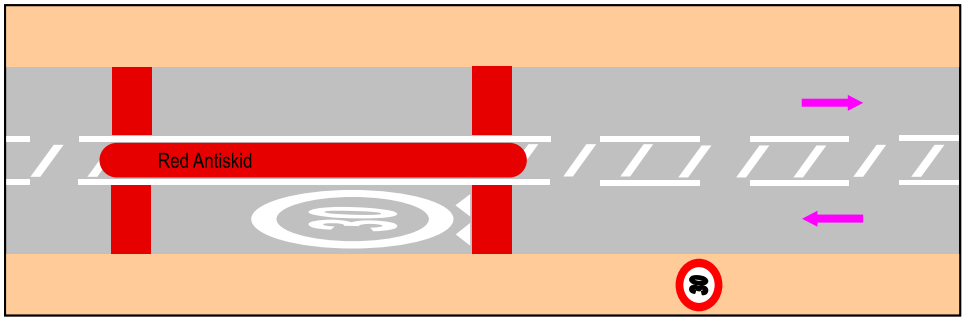
GATEWAYS

Aims of Measure:
To reduce the speed of vehicles proceeding towards speed sensitive areas or prior to a change in speed limit.

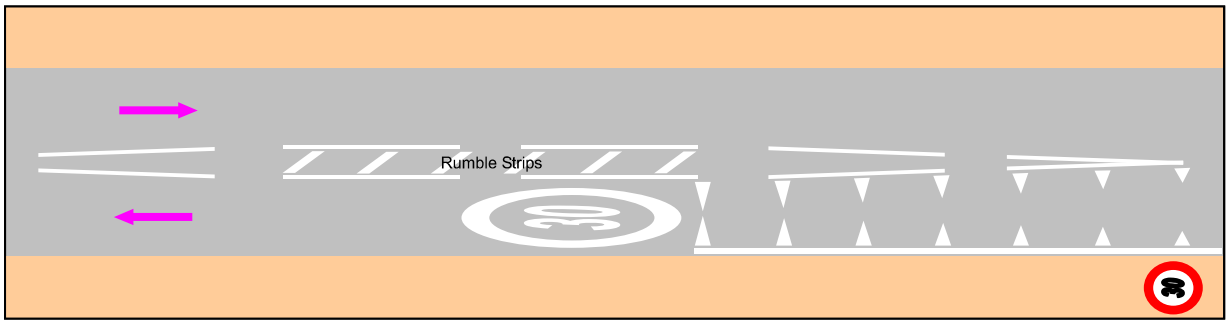
Implementation of Measure:

- identification of the 85th percentile speed of the road
- identification of location for gateway
- recommended for implementation on arterial and distributor roads, roads with linking functions and roads within the village which have high traffic volumes
- gateways are a combination of road safety measures complementing each other for maximum effectiveness

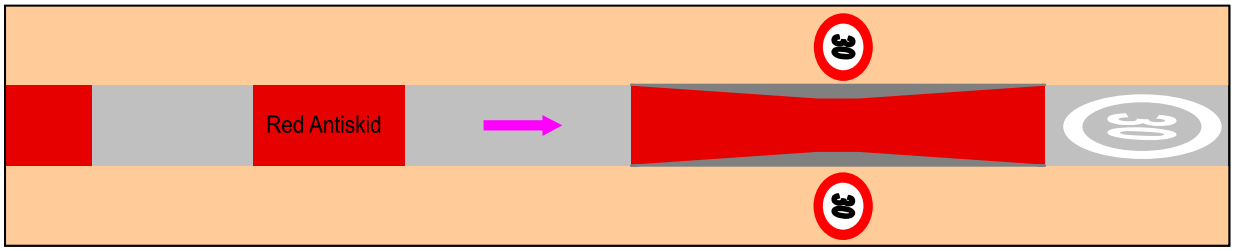
EXAMPLE OF GATEWAY INCLUDING
HATCHING, ANTI-SKID MATERIAL, SPEED LIMIT AND CENTRAL ISLAND



EXAMPLE OF GATEWAY INCLUDING
HATCHING, DRAGONS'TEETH, SPEED LIMIT, RUMBLE STRIPS AND CENTRAL ISLAND



EXAMPLE OF GATEWAY INCLUDING
ROAD NARROWING, ANTI-SKID MATERIAL AND SPEED LIMIT



- road layout configuration
- traffic volumes on adjoining roads
- 85th percentile speed limit of adjoining roads
- existing road width

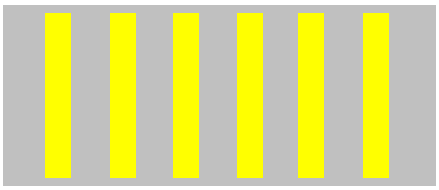
RUMBLE STRIPS

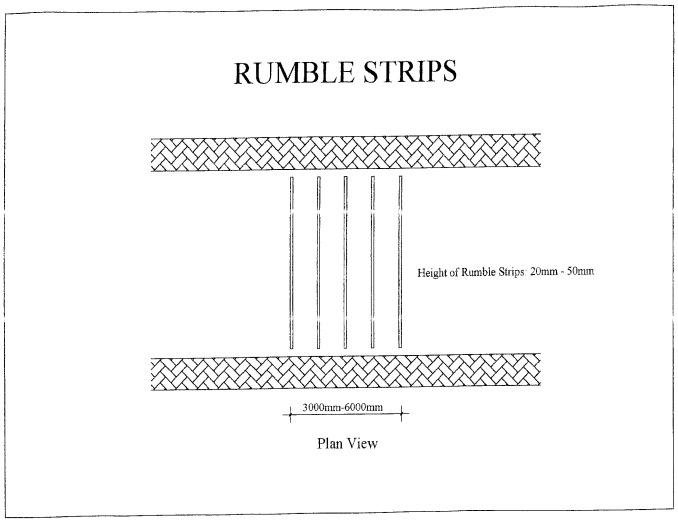
Aims of Measure:
To alert the driver that he is approaching a traffic sensitive area

Implementation of Measure:

- survey of existing traffic patterns and traffic volumes in the area
- identification of locations where rumble strips can be effective
- Rumble strips are to be located at 200m on the approach to the traffic sensitive area;
- the length of the rumble strips depends on the width of the road;
- for the safety of cyclists, a clear gap of 75mm-1000mm is to be left between the rumble strips and the footway;
- for rumble strips sited 200m away from a residential area, they are not to exceed 10mm in height and no vertical face is to exceed 6mm in height;
- for rumble strips sited within a residential area, they are not to exceed 5mm in height and no vertical face is to exceed 4mm in height;

RUMBLE STRIPS





Constraints:

- locatio
- location of residential areas
- widths of approach roads
- traffic volumes

b. Vehicle Activated Signs

The most widespread educational speed management measure using digital systems are the Vehicle Activated Signs (VAS). VAS are roadside digital signs that display a message when they are approached by a driver exceeding the speed limit. VAS are normally used to reduce a driver's speed by displaying a message. They are not used for enforcement purposes but only for educational purposes.

Types of VAS Sites can be permanent, semi-permanent, temporary, mobile or displayed from the back of a vehicle. Power supplies for VAS vary including mains supply, solar powered charging internal batteries or battery powered.

Site Selection

The general site selection criteria include:

- Investigation of the nature of the road safety/collision problem including current vehicle speeds
- The proportion of vehicles exceeding the speed limit in free-flowing conditions
- The proportion of different collision types.

Speed cameras are not to be operated on roads where the maximum speed limit is less than 50km/h.

Examples of when to use different types of VAS

Examples of when to use different types of VAS (possible situations and solutions) Problem	Sign Plates	Type of VAS
Persistent speed / collision problem on straight stretch of road – long term traffic calming measures may have been requested.	Speed limit roundel + 'Slow Down' plate + wigwags	Permanent / Semi-permanent
Persistent speed / collision problem on approach to a bend - long term traffic calming measures may have been requested.	'Bend ahead' warning sign + 'Slow Down' plate + wigwags	Permanent / Semi-permanent
Persistent speed / collision problem on approach to a t-junction - long term traffic calming measures may have been requested.	'T-junction ahead' warning sign + 'Slow Down' plate + wigwags	Permanent / Semi-permanent
Persistent speed / collision problem outside a school - long term traffic calming measures may have been requested.	'School ahead' warning sign + 'Slow Down' plate + wigwags	Permanent / Semi-permanent
Collision(s) involving HGV's and low bridges.	'Maximum height' warning sign + 'Over height Vehicle – Turn Back' plate + wigwags (to activate, over height vehicles break laser beams emitted over carriageway)	Permanent
Complaints about Safety camera location being inconspicuous and / or high level of offences committed	Speed limit roundel + Safety Camera Logo	Permanent / Semi-permanent
No speed / collision problem but residents have a perception of inappropriate speeds.	Speed Limit Roundel – possibly with 'Slow Down' plate and wigwags	Temporary or Mobile

Source: Surrey County Council, 2009

Installation of VAS (Source: Surrey County Council, 2009)

40 / 50 / 60 / 70 /80 (km/h) Roundel + Wigwag Lights and / or 'Slow Down' Plate (both optional but recommended).

Roundels to be 600mm unless the average speed of the location is low enough to suit a 450mm Roundel. 300mm Roundels can be used as a repeater / reminder type VAS.

- **Warning Sign + Wigwag Lights and / or 'Slow Down' Plate (both optional but recommended).**
  Signs to be 600mm unless the average speed of the location is low enough to suit a 450mm Sign.

- **Safety Camera Logo + Wigwag Lights and / or Speed Limit Roundel (both optional but recommended).**
  Roundels to be 600mm unless the average speed of the location is low enough to suit a 450mm Roundel. It is recommended that the Safety Camera Logo be used in conjunction with the Speed Limit Roundel. <u>The safety camera logo cannot be used with a 'Slow Down' plate.</u>

- **VAS with wording 'Over Height Vehicle – Turn Back' + Wigwag Lights. Activated when over height vehicle breaks beam omitted over the carriageway.**
  Sign may display wording on its own or with Maximum Height Warning Sign.

Good Practice for the Installation of VAS (Source: Surrey County Council, 2009)

- All VAS should be compliant with the national Traffic Signs Regulations.
- The VAS should have a facility for collecting and recording data e.g. driver speeds, unless separate radar or laser counters are available.

- VAS should display the speed limit, not the speed of the driver. Displaying the driver's speed does not educate them as to whether they are exceeding the speed limit or driving too fast for the conditions.
- The speed at which the signs are triggered should be based on those used nationally.
- Semi-permanent / temporary VAS to be at a location for a minimum of 1 month to ensure maximum benefit. There is no minimum site duration for Mobile VAS.
- VAS should be clearly visible to drivers (a minimum 3 second view) and should not be obstructed by trees or other road signs.
- Consideration should be given to nearby homes and businesses when finding a suitable location for VAS as the light emitted from the signs can sometimes intrude.
- VAS should not be used as a substitute for a standard sign plate or speed limit repeater sign. Where standard signs will warn all drivers of a speed limit or hazard, VAS will only display the warning to drivers exceeding the speed limit or driving inappropriately for the conditions.
- VAS should be used to reduce speeds where there is a poor safety record or where a survey has identified inappropriate speeds. VAS can also be considered when residents have raised concerns about speeds in their area. There may not be records of poor safety or inappropriate speeds, but the VAS will help to reassure concerned residents. In these cases, mobile or temporary VAS may be sufficient.

ANNEX 3

Technical Guidance to enforcing to control the intentional speeder

(Section 8)

a. Existing speed Camera Legal Framework

The Motor Vehicle Regulations, Subsidiary Legislation Section 65 states the following in respect of speed monitoring devices and enforcement:

'… (3) Photographs, film, video-recordings, electronic images or any other record produced by a prescribed speed monitoring device, including any record of a measurement made by the device, shall be admissible in evidence and shall constitute proof of their contents if they are accompanied by a certificate signed by a police officer or local warden (in the same or in another document) as to the circumstances of date, time and place in which the photograph, film, video-recording, electronic image or other record was produced.

(4) Any device referred to in sub regulation (1) shall be a device prescribed by order of the Minister responsible for Transport who may in any such order lay down any conditions as to the purposes for which, and the manner and other circumstances in which, the device is to be used.

(5) A document purporting to be a document, record or signed certificate of the kind mentioned in sub-regulation (1) shall be deemed to be such a document, record or certificate signed as aforesaid unless the contrary is proved.

(6) The owner of the vehicle which is identified in any document, record or signed certificate referred to in sub-regulation (1) shall be responsible for any offence proved by the same document, record or signed certificate unless the driver of the vehicle when the offence was committed is shown to have been stopped and identified by the police immediately after the commission of the offence.

(7) Any image recorded by any means referred to in sub regulation (3) may be converted from one format to another, transmitted, stored or reproduced by electronic or any other means that allows the recorded image to be reproduced in intelligible form including, without limitation, electronically.

(8) Where a recorded image has been stored in electronic format as provided in sub-regulation (7), the recorded image may be reproduced in paper format which shall have the same effect for all purposes as if it were an original document if the reproduction is certified to be such in the certificate mentioned in sub-regulation (3).

(9) Any device prescribed under sub-regulation (3) shall be deemed to have been functioning accurately and correctly in all respects at the time that any document or record referred to in the said paragraph was produced by it unless the contrary is proved.

(10) The person against whom a certificate under sub-regulation (3) is produced may require the attendance of the police officer or local warden who purportedly signed the certificate for the purpose of cross-examination.

(11) For the purposes of sub-regulations (3) to (6), ''speed monitoring device'' means a device prescribed under sub-regulation (3) that is capable of photographing or capturing the image of a motor vehicle while simultaneously measuring and recording its speed…

b. Existing Speed Camera Consideration Framework

The basic principles applicable to the Speed Camera Management are:

- The power of administering and operating roads, as well as deriving any benefit resulting from such, is invested in Transport Malta by law.
- Local Councils have been delegated, by Central Government, the function of enforcing offences listed in the Schedule of the Commissioners for Justice Act.

The Speed Camera Consideration Framework is managed as follows:

- Whenever a Local Council wishes to install a speed camera on a road within its locality, it shall submit an application, which application must include a site plan clearly indicating the proposed location of the speed camera.
- Whenever Transport Malta receives a written application for the installation of a speed camera all the necessary transport related assessments are carried out. Subsequently, Transport Malta may grant to the applicant Local Council the authorization to install the speed camera as requested subject to any conditions that the authority may deem fit at its discretion. The Authority shall not withhold such authorization unreasonably and shall act on and decide the request within four calendar weeks from the receipt of the application. The Authority shall also provide the Local Council with a copy of the assessments carried out at no cost.
- The applicable speed limit shall be determined by Transport Malta. Unless a particular speed limit is set, the general speed limits specified in the Motor Vehicle Regulations shall apply.
- The Local Council which will have applied for and obtained the authorization of Transport Malta for the installation and operation of a speed camera on a road, hereafter the Authorised Local Council, shall be solely responsible for the supply, installation and maintenance of such speed camera.
- The Authorised Local Council shall, on the fifteenth day of every month, forward to the authority, at no cost, a copy of all the reports and statistics generated by the speed camera/s during the previous month. Such report shall include report of all the charges issued.
- The Authorised Local Council shall, on the fifteenth day of every month, forward to the authority, at no cost, a detailed account of all the fines collected by it in relation to over speeding offences detected by the speed camera/s. Together with the said account, the Authorised Local Council shall pay eleven Euros and sixty-five cents (11.65 Euros) for every fine collected in connection with the said offences. Increases in the relative penalties provided for by law for over speeding offences shall bring about proportional increases to the amount due to the authority in terms of the above for each fine collected.
- The authority shall utilize the money, passed on to it in virtue of the above, in order to fund media campaigns promoting road traffic safety.
- The Authorised Local Council shall utilize its share of the collected fines in order to fund the installation and operation of the speed camera/s. The Authorised Local Council shall dedicate any surplus funds entirely to road maintenance and improvement within its locality.
- The Authority and the Local Councils shall not divulge any information acquired through the provisions of the above without each other's consent, except when they are expected to do so by law.
- The over speeding penalty is issued by the Local Wardens to the offender within forty-eight hours of the offense being committed. The penalty is paid at any Local Council offices. The offender may forward a petition to the Board of Petitions, PO Box 41, Valletta prior to the Local Tribunal hearing. If the petiti8on is not upheld by the Board of Petitions, the citation may be contested at the Local Tribunal. If the ruling of the tribunal is not to the satisfaction of the offender, the case may be taken to court.

c. Proposed Assessment Framework for Speed Cameras

ANNEX

Site selection criteria

Rule		*Fixed speed camera sites*	*Mobile speed camera sites*	*Routes*	*Red-light or combined red-light speed*
1	Site or route length requirements	Between 0.4 km and 1.5 km	Between 0.4 km and 5km	Between 5 km and 20 km	From stop line to stop line in direction of travel
2	Number of KSI (killed or seriously injured) collisions	At least 3 KSI collisions per km in the baseline period.*	At least 1 KSI collision per km (average) in the baseline period.*	A minimum of 3 existing core sites within the length. (There are no further requirements.) OR Has at least 1 KSI collision per km (average) in the baseline period* and meets the PIC total value below.	At least 1 KSI collision within the junction in the baseline period.* Selection must be based upon a collision history of red-light running.
		*The baseline period is the most recent 36-month period available when proposal is submitted, where the end date is within 12 months of the date of submission.			
3	Total value required	Built-up 22/km; Non-built-up 18/km	Built-up 11/km; Non-built-up 9/km	Built up 8/km; Non built up 6/km	10
		For sites up to 1 km, the above value is required. For sites longer that 1 km, the value is per km.			
4	85th percentile speed at proposed sites	Speed survey shows free-flow 85th percentile speed is at or above ACPO enforcement threshold in built-up areas and 7km/h over maximum speed limit in non-built-up areas. This can apply to all vehicles or a vehicle class but must be compared consistently.			Not applicable
5	Site conditions that are suitable for the type of enforcement proposed	Loading and unloading of camera can take place safely.	Location for mobile enforcement is easily accessible and there is space for enforcement to take place in a visible, legal and safe manner.	The location of collisions in the baseline period will determine the length of route.	Loading and unloading the camera can take place safely.
6	Suitability of site for camera enforcement	The highway authority must undertake a site survey, demonstrating the following: (a) the speed limit has been reviewed, confirming that camera enforcement is the right solution; (b) there is no other cost-effective engineering solution that is more appropriate; (c) that the Traffic Regulation Order (where applicable) and signing are lawful and correct.			
New camera sites will be selected using an assessment that includes the level of fatal, serious and slight collisions. The combined level of collisions will be expressed as a numerical scale (see below) and assessed relative to the road classification for the site – whether it is either a 'built-up' or 'non-built-up' area and according to the type of site, i.e. route, fixed, mobile or red-light. Fatal or serious injury collision = 5 (i.e. 2 serious collisions = 10) Slight injury collision = 1 (i.e. 5 slight collisions = 5) **'Built-up area'** is defined as a road with a speed limit of 65km/h or less. **'Non-built-up area'** is defined as a road with a speed limit of 80km/h or more.				

Source: DfT Circular 01/2007

d. Signage for Fixed Speed Camera Sites (as adapted from the DfT Circular 01/2007)

- A co-located speed limit and speed camera sign must be placed not more than 1km from the speed camera location
- The recommended distances between consecutive co-located speed camera and speed limit repeater signs and between the first/last co-located speed camera and speed limit repeater signs and the start/end of a co-located speed camera and speed limit are as follows:

Type of Road	Max. distance between consecutive signs on the same side of the carriageway	Max. distance between consecutive signs on alternate sides of the carriageway	Max. distance between start/end of length of road to be signed & first/last repeater
Road over 250 metres in length with 50km/h limit	400m	250m	200m
Road over 350 metres in length with 60km/h limit	500m	350m	250m
Road over 350 metres in length with 70km/h limit	600m	350m	300m
Road over 450 metres in length with 80km/h limit	700m	450m	350m

(as adapted from the Suffolk Constabulary Policies and Procedures, 2006)

- The speed camera and the approach signs must be positioned to be visible.
- Where permissible, carriageway roundel markings may be used
- Where possible, on dual carriageway roads an additional speed camera approach warning sign should be placed on the central reserve.
- Where possible, the speed limit signs and the speed camera signs should be co-located
- For mobile speed camera sites, advance speed camera warning signs must be placed in advance of the point of entry of the site or route in the direction of traffic flow which is being enforced.

Co-locating signs *(as adapted from DfT* 2006/07*)*

When co-locating camera signs with a speed limit sign

- The two signs may be located individually on the same post, with the speed limit sign above the camera sign
- They may be co-located on a rectangular yellow or grey backing board with the speed limit sign above the camera sign - the backing board must **not** have a border
- They may be located near each other on different posts, so long as they are on the same side of the carriageway and both can be seen in the same view as the fixed camera by the driver.

For fixed cameras

- there should be a co-located speed limit and camera sign not more than 1 km from the camera; and
- there should be a co-located speed limit and camera sign within the same view as the camera.

For mobile cameras

- there should be a co-located speed limit and camera sign in advance of the point of entry to the site or route
- there should be camera signs at regular intervals of around 1 km throughout the site or route; and
- these camera signs should be co-located with the regularly spaced speed limit repeater signs throughout the site.

	**Co-Located Signs** Used only on roads where there is a system of carriageway lighting and the speed limit is 50 km/h
	*Speed limit repeater sign with safety camera warning sign co-located* Mounted on a yellow or grey rectangular backing board. The backing board must not have a boarder. Speed limit above the camera sign

	*Signs co-located separately on a post* Speed limit above the camera sign

Source: DfT 2006/07

Site Conspicuity

- Fixed speed camera housings located on a road with adequate street lighting are to be coloured yellow on the front and back using paint colour No. 363 Bold Yellow of BS 281C: 1996. Alternatively, the housing may be covered at the front and back with retro-reflective sheeting which meets the requirements of BS EN 12899-1:2001 or a suitable micro-prismatic sheeting conforming to BS 8408 or an equivalent European Union Standard.
- Fixed speed camera housing located on a road without adequate street lighting must be covered in retro-reflective sheeting as above.

Site Visibility

- The speed camera housing including tripod-mounted cameras or mobile cameras and camera operator or the mobile enforcement must be visible from the viewpoint of a driver at the following minimum visibility distances:
    - at 60m, where the speed limit is 60km/h or less
    - 100m at all other speed limits.