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**Title of Paper:** **How minimum parking standards underpin car dependence: the new parking management paradigm**

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## **Abstract**

District plans continue to mandate the provision of vast amounts of parking for most new developments. Parking standards are based on the demand for free parking at the peak hour of each individual site, which creates an oversupply and fails to recognise the value of land used for car parks. This approach reduces the supply and thus drives up the price of urban land available for economically productive uses (residential, commercial and retail) and distributes the costs throughout the economy. Minimum parking standards undermine sustainable city development by inhibiting compact growth and subsidising single-occupant vehicle trips. In this paper, we outline the history of minimum parking requirements and their unintended consequences on our sprawling urban form. We refer to a case study in a New Zealand town centre, and explain the negative impacts – economic, social and environmental – of the current approach to parking management, including how district plan parking requirements act as a barrier to the goals of sustainable growth and transport strategies. We present a number of regulatory responses that can reform parking standards and result in low cost, “win-win” approaches to parking management – which will facilitate smart growth and sustainable transport modes, reduce compliance costs, and provide a range of modest benefits to everyone, even those looking for a convenient car park. Finally, parking is often a contentious political issue. We consider the difficulties of implementing parking reform in an environment where people are accustomed to ample free parking. Public education and involvement in the process of instituting new parking management policies will be essential to ensure that communities understand the benefits and welcome a sustainable approach.

## **Introduction**

Since mass production first made cars affordable to the average household, New Zealand, like many comparable countries, has experienced steadily increasing rates of vehicle ownership and decreasing mode share for all other forms of transport. The corollary of rising vehicle use has been sprawling urban development; which has made public transport, walking and cycling comparatively inefficient, unaffordable, impractical and unpleasant. In the last decade, research has made it ever clearer that a host of problems stem from this vehicle dependency – our

profligate use of private vehicles is detrimental to our cities, economy, health and environment (Burchell et al., 1998; Newman and Kenworthy, 1999; Litman and Laube, 2002; Banister, 2005; Shoup, 2005; Litman, 2006b; Ewing et al., 2007). Fragmented and often empty parking lots creates non-community cohesive ‘concrete jungles’ in urban areas (Alexander et al., 1977; Gehl and Gemzøe, 2000; Gehl, 2001; Gärling and Steg, 2007). Congestion is impacting economic growth and worsening air pollution. Greenhouse gas emissions are increasing with transport the fastest growing sector. Lack of incidental physical activity is responsible for rapid increases in obesity and chronic diseases, and most recently, petrol prices have stretched household budgets to their limit.

Local, regional and central government have grappled with these issues, searching for a means to battle sprawl and car dependency, and to encourage the use of other transport modes. Recent strategic growth documents proclaim the virtues of integrating land use and transport and pursuing “smart growth”, that is, mixed-use development at medium and high densities clustered around transit nodes (Auckland Regional Growth Forum, 1999; MOT, 2002; Ministry for the Environment, 2005). The rationale is that if development is more compact and oriented around train or bus lines, people can easily access public transport (PT), and the increased density and subsequent ridership will support the transport network. Likewise, if our neighbourhoods are zoned for mixed-use, people can walk or cycle to the shops, or work closer to home. These solutions are well-founded, and are certainly an important part of the journey towards less car-dependent development. Yet they have overlooked the one of the single biggest drivers of urban sprawl and single-occupant vehicle trips: minimum parking requirements (MPR).

#### **The origin of Minimum Parking Requirements (MPR)**

Most parking has been provided in accordance with city planning rules, which are based on traffic engineering standards (Shoup, 2005; Litman, 2006a). In the 1950s local authorities were grappling with the sudden increase in the number of vehicles on the road (Shoup, 2005). Illegal parking would at times obstruct the flow of traffic, create safety hazards, and spill over into residential neighbourhoods. This problem was defined as a deficit in off-street parking. Traffic engineers’ response to this problem was to require that each new development provide sufficient on-site car parks to cater for the demand it would generate (Shoup, 2005). Demand for parking was assumed to be a constant. Growth in car use could be expected, regardless of the supply of car parks or the price of using them. Thus it was thought that one could empirically study trip generation and accurately predict the amount of car park demand a development would generate based on the activity or the size of the development (Shoup, 2005). Taking this traditional conservative engineering approach meant designing so there would hardly ever be a shortfall of car park supply. Planning regulations in many countries have since followed the USA’s lead and have generally mandated that developments provide for the 85<sup>th</sup> to 95<sup>th</sup> percentile demand (Shoup, 2005). In other words, they must provide plenty of car parking that will only be utilised in full 5 – 15% of the time, if ever.

The Institute of Transport Engineers (ITE) has conducted research and published guidance on the relationship between land use and parking demand (ITE, 1987 & 2004; Shoup, 2005; Litman, 2006a). Similar research is conducted and published in Australia by the New South Wales Roads and Traffic Authority, called the *Guide to Traffic Generating Developments*. One shortcoming of the research approach used is that it links parking demand uniquely to the land use of each individual building, ignoring the supply of neighbouring developments that may have complimentary peak hours and failing to recognise the ease of access by other transport modes

(Shoup, 2005; Litman, 2006a). According to these standards, therefore, a cinema will generate the same level of demand for parking whether it is located in a town centre within easy walking distance of high density residential areas and a train line, or if it is located in a low density suburb with poor public transport services. Moreover, the new cinema must provide enough car parks to cater for its peak demand, even if there is an office park right next door that has a large supply of car parks that are empty and unused during the cinema's peak hours. A second mistake is the assumption that demand for parking is inelastic – that is to say, not influenced by price (Shoup, 2005; Litman, 2006a). Standards have been based on the demand for free parking, and thus reinforce the provision of parking at a higher rate than demand would be if parking were priced at its true cost. ITE trip generation rates and parking standards have thus become a self-fulfilling prophecy. Every few years, surveys are undertaken in suburban areas that have low PT and active mode shares, and the subsequent identified demand for “free” parking becomes the newest benchmark (Shoup, 2005). Developments have been required to provide more and more parking, irrespective of the existing supply. This has resulted in a vast oversupply of parking in most areas (Shoup, 2005), which will be illustrated in a New Zealand context below.

#### **What's the problem with MPR and free parking?**

We all relish getting something for free – and parking is certainly no exception. For example, in large companies, employer-provided car parks are often a sign of privilege, thus much sought after. But the old maxim, “there is no such thing as a free lunch”, is just as true with parking as with any other resource. The fact is that we are paying for parking, the question is, how?

MPR have led to an oversupply because they are based on the demand for free parking at peak hour, and they are required for each individual new building. This considerably undervalues the land required, and has three consequences:

1) It drives up the costs of land for dwellings, businesses and open space—

At a time when land values in our urban areas have become prohibitive for many residents and businesses and local authorities seeking to provide open space, MPR drive up the costs of land and redevelopment (Shoup, 2005; Litman, 2006a).

2) Because of high compliance costs, it pushes development to the urban fringe where land is cheaper, thereby exacerbating sprawl—

As previously mentioned, many growth strategies in New Zealand seek compact city form with mixed use and higher residential density. MPR are an active and considerable barrier to the type of intensification that is necessary for compact city development (Shoup, 2005).

3) It subsidises driving over other modes—

The cost of providing car parking is spread throughout the economy, in the form of higher cost for goods, services and rents (Shoup, 2005; Litman, 2006a). Therefore, we are all paying for free parking, even if we choose not to drive. Free parking is thus a significant subsidy to single-occupancy motor vehicles, and undermines transport strategies and policies that seek to reduce reliance on private vehicles (Shoup, 2005).

That there is an oversupply of parking in many urban areas in New Zealand becomes apparent upon the observation of the vast expanses of parking lots that go unoccupied for all but a few hours each day. A recent update of the 2004 New Lynn parking study (SKM, 2008) undertaken

for Waitakere City Council confirms this intuition. New Lynn, one of the fastest growing town centres in Waitakere City, is situated just west of Auckland City on the Western Train Line and has been identified as an area suitable for intensification (Auckland Regional Growth Forum, 1999). The parking study found the total off and on-street parking supply to be roughly 11,200 spaces. Over the town centre as a whole, the maximum (peak) occupancy was found to be approximately 6,100 spaces or 54% of the estimated available supply. Interestingly, the available supply is significantly lower than that which is required by existing Waitakere City district plan rules. In other words, even at peak hour, the demand for car parks is just over half the existing supply, and it would be even less than that if all the development in New Lynn complied with the current minimum parking regulations. The study also noted that the predicted maximum demand for “free” parking in 2021 was, in the most conservative projection, only slightly more than the current existing supply, despite forecasted increases in employment in the area.

This outcome is not surprising, given the shortcomings in the approach to predicting parking demand that were identified earlier in this paper. That there is usually no perceived cost to use a car park should not be surprising either, as economic theory suggests that when supply outstrips demand, prices fall. Given the high value of land in urban centres, it stands to reason that the land under a car park would have a much higher value if it was not compulsory for it to be used as a car park, and that this would stimulate the development of more economically productive uses of land (i.e., residential, commercial and retail), were the provision of parking left to developers to determine. Where the price of parking reflects its true cost, demand for single-occupant vehicles falls (Shoup, 2005). Less public money is therefore required to manage traffic and expand road capacity. Public transport (PT) patronage increases substantially leading to reduced need for operating subsidies, and increased reliance on walking and cycling for short trips (Shoup, 2005). All of these outcomes support sustainable development goals and policies articulated by central government, regional and local authorities.

### **Regulatory responses for sustainable parking management**

Reform of parking management offers an unparalleled opportunity to achieve many of the goals of local authorities at low cost, while generating wider economic benefits. This section outlines the different strategies that are available and discuss the merits and disadvantages of each.

The strategies that follow are optimally implemented as a package of policies and initiatives. Local councils may want to develop a specific parking management plan that will identify the most suitable constellation of programmes to meet their development goals.

#### **1. Remove MPR**

Removing MPR allows developers the freedom to determine the marginal value of providing car-parks. In this way, the market is allowed to price out unnecessary demand and/or supply in favour of more efficient land uses. Removing parking requirements is expected to result in:

- The development of land into more productive activities, resulting in higher densities; and
- The adaptive reuse of older buildings, particularly in town centres.

Without a vast surplus of unused parking, it will be necessary to employ a number of management techniques to ensure that demand is appropriately managed, which are discussed in the following subsections.

## 2. Price Controls

Priced parking has been shown to be an extremely effective demand management strategy (Booz Allen Hamilton, 2001; Shoup, 2005). The advantage of pricing is that it provides for high priority customers while discouraging the inefficient use of convenient parking resources by long stay users such as commuters. Priced parking is most appropriately implemented in areas experiencing more than 85% maximum occupancy, in that pricing is first and foremost a demand management tool rather than a mechanism for gathering revenue (Litman, 2006a). The price level set will thus aim to keep occupancy levels high, but not saturated, resulting in a situation where a few car-parks are almost always available for those who are willing to pay for them.

The elasticity of demand response to price parking is in the order of 10-30%. However, the elastic response of parking demand to price varies significantly depending on length of stay. In the Auckland Regional Parking Study, Booz Allen Hamilton (Booz Allen Hamilton, 2001) suggests the following elastic response:

- 0-2 hours -0.1
- 2-4 hours -0.3
- 4-7 hours -0.5
- 7+ hours -0.9

These sample elasticities suggest that demand for long stay parking is highly elastic to price, while short stay demand is relatively inelastic.

Those discouraged from travelling by vehicle may respond to prices in a variety of ways, including the following:

<i>Short term</i>	<i>Long term</i>
Car-pooling	Move home or work to be more accessible to town centre by alternative modes.
Switch to alternative mode	
Travel outside of peak times	
Link trips with other errands	
Trip avoidance	
Discouraged from visiting	

It is important to emphasise that these elasticities are not necessarily constant over time. In many instances the short term impacts of those who are discouraged from visiting areas where parking is priced reduces over time as new behavioural patterns emerge. These delayed adjustments can be as simple as allowing time for people to familiarise themselves with PT timetables or coordinate car-pooling. For this reason, the number of people discouraged from visiting due to parking prices may reduce over time.

## 3. Shared Parking

Shared parking is a management strategy that seeks to ensure that parking resources are, where possible, accessible to a range of users. Catering for peak demand in a shared way allows for more efficient parking utilisation than can usually be achieved by parking provision by individual sites. Shared parking can be implemented in New Zealand towns and cities in two ways:

- Regulated through the District Plan; or

- Allowing a market for parking resources to emerge that encourages shared parking as an economically efficient mechanism.

The first, regulating shared parking through the District Plan, may be difficult due to the transient nature of access arrangements to parking owned by someone else. It may be impossible, for example, for a development to secure access to car-parks for longer than 12 months. In this instance, shared parking can be considered a relatively transient strategy.

Shared parking can emerge without regulation, whereby adjacent land uses with off-peak demand profiles may collaborate to minimise their need to provide parking resources. For example, in New Zealand city centres with scarce parking resources, car parks have been made available for retail customers during the day and then restaurant customers in adjacent restaurants at night. In this way both the restaurants and the retail businesses benefit from sharing parking resources. Local authorities can assist with this process through education and non-coercive incentives.

#### **4. Unbundled Parking**

Unbundled parking refers to the strategy of separating the costs of purchasing or leasing residential and commercial property from parking resources. For example, in a medium density residential development, dwellings may be purchased separately from the car-parks. This “unbundles” the cost of parking from the cost of living and supports the principle of consumer choice. Unbundled car-parks associated with residential development in Auckland City typically cost an additional \$50,000. Costs of this magnitude account for between 20-25% of the total purchase price of smaller dwellings. Unbundled parking is somewhat dependent on the availability of effective parking brokerage services so that in the event of a parking surplus (i.e. not all car-parks provided with a particular development are purchased) then the building owner or body corporate committee is able to lease the car-parks to other users. Opportunities for unbundling are therefore enhanced by the existence of a Transport Management Authority (TMA).

#### **5. Overflow and Spill-over Parking Plans**

Overflow and spill-over parking plans seek to manage the effects of excessive parking demands that may arise during special events and peak retail season, such as Christmas and Easter, or as a result of changes in parking management in adjacent areas.

These plans can help mitigate the potential negative effects associated with excessive parking demand, such as increased vehicle congestion; unsafe and/or illegal parking on streets, footpaths, and grass verges; and driver frustration.

Overflow parking plans should involve some of the following components:

- Signage to identify when parking areas are full, as well as to direct vehicles to alternative parking areas. This increases the utilisation of existing parking resources;
- Identification of appropriate temporary parking that may be shared, such as opening up parking at a local high school for the period immediately before Christmas when schools are out. This temporarily increases the supply of parking through identifying shared parking opportunities;
- Including the cost of PT passes in the ticket price for special events, such as sports and cultural events. This encourages the use of PT for travel to major events.; and

- Retailer funded reimbursement of PT travel costs. This encourages the use of PT for travel during high retail seasons.

Residential Parking Permits (RPP) are a possible tool for managing the impacts of spill over and overflow parking in residential areas adjacent to town centres and growth corridors in those areas where residents can demonstrate a reliance on on-street parking. RPP allows residents to park on-street in areas where other vehicles are subject to parking regulations and pricing. RPP create additional administration costs, which should ideally be recouped by annual fees paid by residents for the privilege of the parking permit. It is emphasised that RPP should only be implemented in areas where residents have priority over employees and visitors. These are another example of a parking management strategy that could be developed and administered by TMA.

## **6. Directional Signs**

Directional signs provide real time information on the location and availability of parking resources. These signs should be placed on key access roads into town centres and inform drivers of the locations, availability, and potentially the price and maximum duration of stay associated with off-street parking facilities. This information allows drivers to, firstly, identify the nearest available parking facilities and, secondly, evaluate the relative value associated with different parking areas.

## **7. Transport Management Associations**

Transport management associations (TMA) are usually formed to manage the provision of transport within a particular geographical area. They frequently involve both public and commercial stakeholders so as to connect strategic directions with on the ground community interests.

Possible functions of TMA may include:

- Parking brokerage services – designed to connect demand for parking with surplus private off-street parking resources. The availability of parking brokerage services is crucial to the viability of demand reduction strategies, such as financial incentives (parking cash-out, subsidised PT passes) and unbundled parking.
- Input into the allocation of parking revenues – TMA provide an interface through which community projects can be identified and funded using parking revenues.
- Overseeing the management and implementation of travel plans and overflow plans for times of peak demand, such as special events and seasonal shopping patterns.

A market for parking brokerage services may emerge as the value of car-parking transactions increases. However TMA would be expected to deliver more rapid benefits due to its higher level of coordination and community involvement.

Lloyd District in Portland, Oregon, has had a TMA operating for approximately 10 years ([www.lloydtma.com](http://www.lloydtma.com)). This encompasses 650 business and 21,000 employees. The Lloyd TMA lists the following headline accomplishments for the period 1997 to 2006:

- Single-occupant vehicle trips have reduced from 60% to 42%; and
- PT mode share has almost doubled from 21% to 39%.

The reduction in single occupant vehicle trips has significant implications for the amount of parking required to support land use in the Lloyd District. The increased efficiencies catalysed both by the reduced demand for parking and the increased transport accessibility has facilitated the addition of 20,000 employees and 4,000 housing units, thus resulting in substantially higher economic activity.

#### **8. Car-share Organisations**

Car-share organisations manage a pool of vehicles parked at numerous locations around a community, which provide an alternative to private vehicle ownership. Auckland's first car-share operation (City Hop, [www.cityhop.co.nz](http://www.cityhop.co.nz)) has recently been established in the CBD and inner city suburbs such as Parnell and Newmarket, as is planning to expand to Wellington and Christchurch. Members of the organisation are able to book vehicles online and then gain access to the vehicles via electronic swipe cards. One car-share vehicle is typically utilised by a large number of people, thereby distributing the costs of car-ownership, such as maintenance and parking, across a larger number of people. Membership to a car-share organisation is considered most attractive to households that do not rely on vehicles for home-to-work commuting, or small to medium sized companies that do not need to manage their own pool car fleet. In this way, car-share vehicles are frequently used for commercial purposes during the day and residential needs during off-peak hours.

Numerous studies have indicated that members of car-sharing organisations have more sustainable travel patterns, with higher reliance on walking, cycling, and PT. As discussed above, residential use of vehicles is typically reduced to off-peak trips, such as grocery shopping and recreational visits. By sharing vehicles, car-sharing organisations may reduce demand for residential and commercial parking by 5 –10% (Litman, 2006a). The emergence of commercial car-sharing organisations is thus considered to strengthen the case for removing MPR altogether, particularly in town centres. In other words, MPR act as a serious impediment to the expansion of efficient market responses such as car-share.

#### **9. Travel Plans**

Travel plans are a management tool designed to assist organisations and businesses reduce inefficient travel demands associated with both home-to-work and work-based travel. Travel plans help to address organisational issues affecting how people choose to travel, such as company cars and free parking. In many instances changes in company policy have been shown to catalyse large reductions in employee vehicle use (Shoup, 2005; Litman, 2006a). Travel plans typically audit home-to-work and work based travel demands, and recommend ongoing management strategies to reduce demand for private vehicle travel, including:

- Parking cash-out – provides commuters who normally receive free parking to take cash instead;
- Company car cash-out – as per parking cash-out except for company cars;
- PT passes – provides employees with a subsidised PT pass in place of a free car-park; and
- End of trip facilities for cyclists, including showers and lockers;

Travel plans thus support other parking strategies by undertaking a detailed assessment of the institutional barriers to shifting mode. The motivation to conduct travel plans is best provided by the accurate realisation of the costs associated with vehicle travel. For this reason, the use of

travel plans is expected to increase when the perceived value of parking reflects its true costs. The removal of MPR may encourage existing property owners to use travel plans to free up land to provide redevelopment opportunities.

### **Implementing regulatory parking reforms in a political environment**

Parking can be a contentious, impassioned issue and, for this reason, special care is required to ensure reforms are politically viable. This section provides recommendations for adopting reforms in a way that will ensure more public acceptability and political success.

Fuel prices have been steadily increasing for nearly a decade. Authorities must therefore be sympathetic to the fact that car users may already feel anxiety about the cost of driving. It is recommended (and probably only viable) to phase in parking reforms in conjunction with perception-shift campaigns. That is – begin with marketing/travel awareness campaign, undertake community consultation and then begin to institute reforms. These reforms will reduce the supply of parking over a period of time, allowing people to adjust mode choice, and for complementary land use planning and development to occur.

#### **Marketing / Travel Awareness campaign**

Jepson & Ferreira (1999:14) suggest a “well thought out education and information campaign” as a means of mitigating adverse public perception when travel space is reallocated. Travel awareness campaigns should include the following:

- Focus on providing information about the adverse effects of car-use
- Promotion schemes such as walk-to-school week or leave-the-car-at-home days
- Communicate how communities will benefit from reforming parking regulations
- Highlight the effectiveness of promoting modal shifts through parking regulations
- Explain that regulatory reforms are removing the subsidies to parking, establishing the true market prices of parking and promoting an equitable transportation market
- Demonstrate case studies where parking reform has been effective in influencing travel behaviour change (e.g. Calgary)
- Invite politicians or other well-known members of communities to step out of their cars to be role models

If such marketing campaigns are well-executed, they will lead to increased levels of knowledge about the adverse effects associated with driving and stimulate a perception shift, providing the foundation for transitional parking reforms and travel behaviour change. As an analogy, anti-smoking campaigns have led to huge reductions in smoking rates and made increased taxes on tobacco seem more logical.

#### **Community Consultation – Travel Blending**

Local authorities and government agencies should be transparent and communicative with the public when adopting the proposed parking strategies. Consultation is critical. This proactive approach will ensure that the community will not have an adverse, reactive response. Ampt (1997) explains three ways that people be approached to reduce car use; regulation, awareness and understanding. To this we would like to add pricing and incentives. Regulation and pricing alone may bring about change, but with it a sense of resentment and lack of clear understanding.

One means of undertaking consultation is through a process called Travel Blending, which Ampt (1997) suggests is the key to making regulation more palatable. Travel blending focuses on getting people to understand their current behaviour by measuring their current car use, giving them personalised options to change, and then observing actual change (reduction) in the use of the car. The process involves (Rose and Ampt, 1997 as cited in Ampt, 1997):

- 1) *thinking about activities and travel in advance* (i.e. in what order can activities be done, who should do them, where should they be done etc.) and then
- 2) *blending modes* (i.e. sometimes car, sometimes walk, sometimes public transport etc.), or
- 3) *blending activities* (i.e. doing as many things as possible in the same place, or on the same journey), or
- 4) *blending over time* (i.e. making small sustainable changes over time on a weekly or fortnightly basis).

Travel Blending creates a climate where people understand the need for change in a way that is more tangible – in terms of something that affects their everyday life, thereby making change more acceptable or even desirable. For example, research has revealed that if people think about things that annoy them about travelling (as travel blending allows them to), then it is likely that some will find parking annoying and will try to find ways around this (occasionally working at home, or consolidating trips, etc.). Hence it is vital for people to think about changing travel behaviour for reasons other than simply abiding by new regulations or pricing, and for us to assist people to identify travel arrangements that will suit their lifestyles.

Blending emphasises making sensible choices about journeys for which the car will remain appropriate (sometimes the only option), and those for which other modes are possible or even more logical. This approach makes change less intimidating and gives individuals the chance to make small achievements immediately. Travel Blending should be the over-arching approach taken for community consultation. The process involves empowering people and providing a stronger sense of autonomy than regulatory changes alone.

## **Conclusion**

Current parking standards have unintended negative consequences that affect infrastructure provision, for transport and other services, and will inhibit sustainable land use and transport patterns. It is urgent that MPR be rolled back, and that local authorities adopt new techniques for managing parking demand and resources. This paper has covered the current best practice principles and strategies of the new parking management paradigm, but each community will determine the package that will best achieve their goals. This will enable communities to achieve sustainable development goals at low cost. Consultation and education campaigns will be an essential part of parking reform, and techniques such as travel blending have been demonstrated to be effective in travel education.

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