To support development of the Regional Transportation Strategy, TransLink commissioned the following set of working papers on Parking Management:

**Part A:** The purpose of the Global (A) paper is to provide TransLink with a global perspective of the leading practices, policies, and metrics for parking management to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management.

**Part B:** The purpose of the Local (B) paper is to provide TransLink with a local perspective of the practices, policies, and metrics for parking management undertaken by Metro Vancouver municipalities to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management in the region. While land use planning and development regulation in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink works with the municipalities and Metro Vancouver to coordinate regional land use and transportation strategies and plans to support regional objectives. As part of these regional planning coordination efforts TransLink has an opportunity to help shape parking regulations and guidance at the municipal level in support of mutual municipal and regional objectives.
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Summary: The purpose of the Global (A) paper is to provide TransLink with a global perspective of the leading practices, policies, and metrics for parking management to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management.
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EXECUTIVE SUMMARY

Parking supply and management is a key component of land use planning as parking directly impacts the physical form of the built environment. In addition, managing parking demand is key to creating transit-oriented and supportive communities as it is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. More specifically, the price and availability of parking are two very important factors in any individual’s choice of travel mode.

Parking management encompasses a wide range of policies and strategies which can be grouped into five key categories:

1. **Parking Regulations/Standards and Incentives**: creative regulatory strategies can encourage more efficient use of existing resources. This may include mandates concerning how much parking can/must be provided or offering incentives to encourage particular travel behaviour. Includes the following strategies:
   - Zoning, parking maximums, tailored minimums, shared parking, off-site parking, unbundled parking, parking benefit districts, residential parking benefit districts, in-lieu fees, and parking cash out.

2. **Demand Management**: strategies can influence the behaviour of those traveling to the destination with the intent of balancing the number of vehicles at levels the parking supply can handle. Time limits and parking pricing are two of the most common demand management measures. Includes the following strategies:
   - Parking tax/levy, demand-responsive pricing, in-lieu fee structure, time limits, and parking pricing equity versus alternative modes.

3. **Supply Enhancement**: strategies can enhance the existing supply through increasing the capacity of existing parking facilities, improving parking availability information presented to the driver, and making more efficient use of existing facilities with excess capacity. Includes the following strategies:
   - Intelligent parking systems, remote parking, valet, diagonal parking/reverse angle parking, and tandem and stackers.

4. **Monitoring and Enforcement**: strategies can improve the enforcement of parking regulations and allow regulatory bodies to monitor the use of parking facilities. Includes the following strategies:
   - Curbside sensors, automated license plate reading technology, and handheld units.

5. **Payment Technology**: parking payment technologies can be utilized to help streamline the payment process reducing the burden on the user as well as enabling a more efficient monitoring and enforcement. Includes the following strategies:
   - Multi-space pay and display meters, multi-space pay by space meters, pay by cell phone, smart cards, in-car meters.

A total of nine case studies were selected to illustrate the parking tools and strategies described, and to highlight locales throughout North America and Europe who have been at the forefront of innovative parking policies and strategies.
1. Arlington, VA (WMATA): Using shared parking policies to enable public off-street parking to be provided by the private sector.

2. San Francisco, CA (SFpark): Using new parking technologies and demand responsive pricing to reduce congestion and more effectively manage parking demand.

3. Santa Monica, CA: Using in-lieu fees to create shared parking facilities and a park once district in Downtown.

4. Pasadena, CA: Establishing a Parking Benefit District to create a vibrant downtown that is a destination throughout the region.

5. Toronto, Canada: Using parking maximums to encourage shared parking facilities and the use of non-auto modes to access downtown.

6. Halifax in Canada: Creating context sensitive parking policies to better reflect the unique needs of different locales.

7. Hayward, CA: Using parking requirements to create new development that is transit supportive.

8. Sydney, Australia: Using parking taxes to encourage the use of non-auto modes.


A key lesson learned from the case studies is that clear communication is critical when implementing new policies to ensure that developers understand how new zoning regulations and incentives may affect their projects and that the general public understands why parking management measures such as pricing are necessary and may in fact benefit them. Once a new policy is in place, tweaks may need to be made to ensure that a program or policy is functioning as intended and may require more oversight and management in the beginning when kinks are still be worked out. Lastly, flexibility should be built into new policies and programs in order to efficiently adapt to needs that may change over time as well as to address areas of the policy or program which may need adjustment.

Another key lesson learned is the need for ongoing oversight of parking policies. While more attention is needed in the beginning when a program or policy is launched, ongoing monitoring and evaluation enables a jurisdiction to determine if the policy or program is in fact meeting the intended goals and objectives and if there are other unintended outcomes.

As TransLink moves forward with the development of the Regional Transportation Strategy, language regarding desired parking policies and strategies should be included as it is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. These ideas should be reinforced through education and outreach and in coordinated planning efforts with local municipalities and other agencies.

While land use planning, development regulation, and parking enforcement in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink has an opportunity to help shape parking policies and regulations at the municipal level by providing guidance via the Regional Transportation Strategy as well as TransLink’s Transit Oriented Communities Design Guidelines or through other future guidelines. TransLink in conjunction with Metro Vancouver and the local municipalities may find it useful to create a set of parking guidelines to help provide guidance on parking policies to municipalities. In addition, TransLink has the opportunity to apply some of the policies and tools discussed in this report at its park and ride facilities.
1. INTRODUCTION

1.1. REGIONAL TRANSPORTATION STRATEGY

In order to support the development of more evidence-based plans, policies, and strategies – including an update to the Regional Transportation Strategy in 2013 – TransLink has commissioned a series of working papers. The papers are designed to help illuminate and explore key issues from a global context (A-series papers) and from the local context of Metro Vancouver (B-series papers).

This paper sets the global context for parking management.

1.2. PURPOSE & SCOPE OF THIS REPORT

While land use planning and development regulation in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink works with the municipalities and Metro Vancouver to coordinate regional land use and transportation strategies and plans to support regional objectives. As part of these regional planning coordination efforts TransLink has an opportunity to help shape parking regulations and guidance at the municipal level in support of mutual municipal and regional objectives.

Parking regulations are a key component of land use planning as parking directly impacts the physical form of the built environment. In addition, managing parking demand is key to creating transit-oriented and supportive communities as it is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. More specifically, the price and availability of parking are two very important factors in any individual’s choice of travel mode.

The purpose of this report is to provide TransLink with a global perspective of the leading practices, policies, and metrics for parking management to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management.

1.3. METHODOLOGY

Historically, “solving the parking problem” almost always meant increasing supply. Unfortunately, constantly increasing parking supply simply encourages more auto use, as people are encouraged to drive to places that offer “plenty of free parking.” While providing adequate parking supply is important, there are a number of tools available that can help manage parking demand while also making the most efficient use of the current parking supply. This report therefore provides a wide range of potential tools that address parking management from various different angles and not just from the supply side. Best practices from a number of international sites were considered and the larger list of policies was streamlined to focus on those that are most appropriate for Metro Vancouver to help support future growth and the creation of transit supportive communities. The collection of strategies presented in this report include incentives, demand management tools, technology, land use regulations, and supply enhancements.
2. BACKGROUND

2.1. THE ‘PARKING PROBLEM’ AND LINKS TO SUSTAINABLE TRANSPORTATION

Parking is increasingly recognized as not just a piece of land use but as a central part of how the transportation system operates. Previously, abundant parking was supplied with little thought to the impact on travel behaviour and land use formation. Research has shown that the availability of plentiful and free parking at the end destination can increase the attraction of making the trip by car. The oversupply of parking also has other knock-on impacts, including:

- increased congestion from drivers ‘circling’ as they look for a free parking space;
- increased housing costs as parking construction costs add to the total development costs;
- increased vehicle ownership
- inefficient use of land that could be put to better and higher value land uses, especially in key destinations (e.g. Downtown and near transit stations);

Yet, it is important to recognize that parking is a necessity from the economic viewpoint, in particular for businesses. Therefore addressing the ‘parking problem’ must reconcile the economic needs of developers and traders with wider goals for reducing automobile use and creating more compact communities.

Parking management is now a commonly used tool in Travel Demand Management and to achieve land use goals. S sensitively developed parking management policies can address issues including:

- timing and permits – when parking spaces are used and by whom;
- pricing – whether parking is priced, how much it is priced at and whether the structure of the pricing can impact travel behaviour;
- incentives for smarter travel choices -
  - the regional component – how consistent regional policy can overcome local variances which may impact competitiveness;
  - economic vitality and viability – ensuring optimal supply to meet the local business needs;
  - access – parking can improve people’s access to key destinations, including to transit through park and ride and other informal arrangement;
  - affordability – parking is estimated to account for approximately 10% of housing costs

2.2. PARKING MANAGEMENT

There are myriad management strategies employed in the operation of parking. This chapter contains an overview of these strategies and how they can be applied in practice. Not all strategies will be appropriate to all environments. For example, the scale of certain strategies – such as computerized real-time parking availability signs – are good for an urban core setting but may not fit in with the character of a neighbourhood main street. The policies and strategies are grouped by five major categories:
1. Parking Regulations/Standards and Incentives
2. Demand Management
3. Supply Enhancement
4. Monitoring and Enforcement
5. Payment Technology

For each category of strategies a discussion of the expected outcomes is provided. These categories are not mutually exclusive and some strategies will serve multiple purposes.

2.3. PARKING REGULATIONS/STANDARDS AND INCENTIVES

Zoning and incentive strategies generally use creative regulatory strategies to encourage more efficient use of parking resources. This may include mandates concerning how much parking can or must be provided or offering incentives to encourage particular travel behaviour.

2.3.1. Parking Maximums/Flexible Parking Standards

Parking Maximums
Parking maximums are designed to use regulatory frameworks to set an absolute upper limit on how much parking may be provided at any given building or site. Removing minimum parking standards can overcome a significant barrier to in-fill development, effectively reducing the cost by not requiring parking. Implementing parking maximums also prevents developers from oversupplying parking for a particular land use, as developers must meet the standard minimum parking rates even though there may not actually be the need for that much parking. In addition, there are environmental benefits due to the reduction in area devoted to paved surfaces. Likewise, developers can see a benefit in some cases as the provision of less parking allows for a greater area for built form, maximizing the developable area.

Flexible Parking Standards
Traditional parking standards set a minimum parking requirement by land use that is often applied to all new development regardless of location and do not take into account the local context. By analyzing actual vehicle ownership and/or parking occupancy for a certain district or type of development as well as the level of accessibility to destinations by transit (relative to accessibility by auto) and how walkable and transit-oriented the area is, flexible parking standards can be utilized to enable new development to be more context and site specific. The standards should reflect how the level of parking demand generated by a project will vary greatly depending on the mix of land uses as well as other transportation programs that may be offered such as car sharing or on-site amenities. Flexible parking standards also allow for reductions to be made in those developments that will generate less parking demand such as low income housing, development near transit, and some mixed-use projects.

2.3.2. Shared Parking/Park Once

In mixed-use areas, it may be redundant to provide designated off-street parking for the wide range of users. For instance, many retail or office establishments will not need off-street parking overnight during the hours that residents have a high demand. Mixed-use settings offer the opportunity to share parking spaces between various uses, thereby reducing the total number of spaces required compared to the same uses in stand-alone developments. This is a primary benefit in mixed-use neighbourhoods of moderate-to-high density. Shared parking operations offer many localized benefits to the surrounding...
community, including a more efficient use of land resources. In addition, providing shared parking facilities for multiple land uses allows visitors to park their car once and access multiple locations without having to re-park.

2.3.3. Allowing Off-Site Parking
Allowing buildings to meet their minimum parking requirements through the full or partial use of off-site parking can help encourage vibrant commercial areas, by allowing change of uses or new uses to join the existing urban fabric without having to provide all of their required parking on-site. This can help in cases where no additional parking can be provided on-site and where the new use may require more parking spaces than the previous use.

2.3.4. Unbundled Parking
Many residential and commercial leases in buildings that include off-street parking often assume that the tenant will want parking spaces, and will therefore include the cost of those spaces in the total cost of the lease. Unbundling this means the cost of the facility and parking are separate, ensuring that prospective residents who do not wish to own a vehicle do not pay a premium for a parking space that they do not need. This measure is most feasible in medium to high density locations where there are viable public transit options.

2.3.5. Parking Benefit Districts
A Parking Benefit District is designed to take revenues from paid parking in the District to fund public improvements that benefit the District itself. If parking revenues are otherwise directed into general revenue, where they may appear to produce no direct benefit for the District, there will be little support for installing parking meters, or for raising rates when District merchants and property owners can clearly see that the monies collected are being spent for the benefit of their blocks, on projects that they have chosen, they often become willing to support market rate pricing. The structure of Parking Benefit Districts varies and can be managed by a municipality or a private entity such as a Business Improvement District. Typically, they serve a downtown or neighbourhood.

2.3.6. Residential Parking Benefit Districts
A residential parking benefit district is designed to protect local residents from parking difficulties in areas near major destinations. This is usually accomplished by issuing residents permits that allow them to park for free, while offering non-residents paid parking, either through a fee or by offering a finite number of permits. Permits can be purchased by any non-resident but it is usually employees and commuters whose utilization patterns are less likely to conflict with residents. A portion of the revenue from the visitor permits or on-street fees within the district are often reinvested in public improvements chosen by the residential parking benefit district.

2.3.7. In-Lieu Fees
Many municipal codes require property owners to provide off-street parking for those persons who will use the facility. In-lieu fees allow developers to pay for parking improvements elsewhere instead of providing parking onsite. This allows more development in central areas where space for additional parking is restricted. This program can provide funding to help develop shared parking facilities such as municipal garages or to fund public transit services. The procedures for implementing and collecting cash-in-lieu generally must be defined through a by-law. Though fees are often used to construct new
parking, some cities are now including provisions for the fees to be used for other benefits such as streetscaping, bicycle facilities, etc.

2.3.8. Expected Outcomes

An oversupply of free parking creates an implicit subsidy for drivers because it ensures cars have simple and convenient access at most destinations at the expense of similar access for transit, walking, cycling, and goods movement. By reducing or eliminating off-street parking requirements and implementing related strategies such as shared parking arrangements, municipalities can reduce these implicit subsidies. The result can be less driving and more transit, walking and cycling use. Lower parking requirements also make it easier for new development to provide a transit-supportive built form. The use of creative and context specific zoning and incentive strategies can encourage more efficient use of existing parking resources and minimize the amount of new parking that is required.

The policies discussed above provide local jurisdictions with increased flexibility in meeting parking requirements and offer an opportunity for parking requirements to be more context specific and reflective. Policies such as unbundled parking offer an opportunity to affect individual vehicle ownership rates and travel behaviour by requiring individuals to acknowledge the cost of parking rather than having this cost subsumed in their housing costs. The impacts of some of these policies such as flexible parking standards, unbundled parking, and in-lieu fees may not be noticeable immediately as they typically can only be applied to new development, however measures such as shared parking, allowing off-site parking, parking benefit districts and residential parking benefits districts can be utilized by both new and existing developments.

2.4. Demand Management

Demand management strategies focus on influencing the behaviour of those traveling to the destination with the intent of balancing the number of vehicles at levels the supply can handle. As an example, parking fees can be adjusted to maintain occupancy levels of 85 percent for short-term retail parking and 90 percent for long-term commuter/residential parking.

2.4.1. Parking Tax/Levy

Parking taxes or levies are a tool that municipalities and regional agencies can utilize to influence the pricing of privately managed off-street parking. This strategy is used when parking is seen as underpriced and thus is encouraging auto use. By increasing the price of parking through the application of a tax, some auto use can be discouraged as the cost of the taxes or levies are sometimes passed on to the customer.

1 There is no definitive parking occupancy target and the local parking supply and demand, as well as land use character must be considered before establishing a target. The 85%-90% occupancy target is commonly used by planners and further information can be found at: http://www.seattle.gov/transportation/parking/docs/2012/DDOT%20-%20Harvey%20and%20Dey.pdf
2.4.2. Demand-Responsive Pricing

Demand responsive pricing involves altering the cost of parking according to level of demand using market principles. In other words, drivers pay what they are willing to pay. In areas with higher demand such as downtowns, commercial districts, and event locales, parking has a higher price but in areas with lower demand, the price is lower. For some places, the market rate for parking is free. Prices generally will not change in real time based on current occupancy, but will instead be adjusted a few times a year based on periodically updated occupancy data. By refining the price of parking periodically, it is possible to keep parking occupancy rates relatively close to the optimal 85 percent for retail parking and 90 percent for long-term parking. In order to ensure that parking pricing is set at a prices which achieves these occupancy rates, periodic monitoring is necessary in order to determine if parking prices are set at the ideal level or need to be adjusted upward or downward to achieve occupancy targets.

2.4.3. Time Limits

Time limits are a common tool for encouraging the turnover of parking spaces in commercial areas. A wide range of time limits are used for varying circumstances from 10 minute loading and commercial zones to four or six hour zones. Time limits can be effective in commercial areas where there is concern over employees parking all day long in prime front door locations that businesses would prefer be made available to customers.

2.4.4. Expected Outcomes

Parking pricing is one of the most effective tools for effectively managing the existing parking supply as well as encouraging the use of transit, walking and bicycling. By using appropriate parking prices to manage both the supply of on-street and off-street parking in areas with high levels of parking demand, such as urban centres and retail districts, cities can better ensure parking availability at all times of day. In addition, parking taxes on off-street parking can be used influence the cost of off-street parking. These strategies promotes parking turnover, and reduces traffic congestion that results from drivers circling in search of available on-street parking. When on-street parking is well-managed, the need to require developers to build off-street parking is reduced.

2.5. Supply Enhancement

Traditionally, a municipality faced with demand for parking that is in excess of supply might initially attempt to increase capacity by building more parking facilities. While the construction of new facilities will certainly improve the overall ratio of occupied spaces to vacant spaces, without appropriate parking management measures, demand for parking spaces in key locations will remain. As described below, supply can be enhanced through:

1. Moderately increasing the capacity of existing facilities;
2. Improving availability information presented to the driver; and
3. Making more efficient use of existing facilities with excess capacity.

2.5.1. Intelligent Parking Systems (Guidance)

Intelligent Parking Systems such as real-time space availability displays are digital wayfinding signs that direct drivers to available capacity at nearby parking facilities. Using data from sensors in the parking facilities, these signs allow drivers to proceed directly to locations that have parking available; and reduces the amount of “hunting” required to find a space. Once at the desired parking facility, motorists
may be further aided in finding an open space by coloured lights positioned over each space which indicate whether the space is free. This is particularly helpful in parking lots with multiple aisles, as drivers can quickly locate a free spot.

### 2.5.2. Remote Parking

Remote parking is offering additional parking off-site, a common solution to a lack of parking and space at a major destination. Remote parking facilities are commonly connected to the primary destination by shuttle buses, though this strategy may also be employed using valet parking (see below). Remote parking can be provided at a wide range of locations such as special event parking lots, beach or other recreational area parking lots, or office parking lots during the evening or weekend. Generally speaking, motorists prefer to park near their destination as opposed to taking a shuttle from a remote location, but in high parking demand locations this has been a very effective way of handling overflow at times of extreme demand. Shuttles are commonly free in an effort to reduce the inconvenience of remote parking, with shuttle operation funded through money collected from priced parking at the destination. If remote parking is not available, construction of remote parking facilities may be funded using money collected from priced parking or in-lieu fees.

### 2.5.3. Valet

Valet parking allows drivers to go directly to their destination and have an attendant park the car. The attendants bring the drivers’ vehicles to less convenient locations—such as remote parking facilities or spaces the establishment leases nearby—and retrieve the vehicle for the departing customers. This strategy can address parking supply limitations and is particularly employed by restaurants and clubs. Valet parking can also be useful in locations where there are no large public or private garages but rather a number of small private lots overseen by individual operators. Individual operators of small lots can also share parking amongst each other enabling one operator to take advance of vacancies at other operator’s facilities.

### 2.5.4. Diagonal Parking/Reverse Angle Parking

Reverse angle parking, or “back-in, head-out” angle parking is a parking design that increases parking supply and can add up to twice the number of spaces accommodated by parallel parking. This type of parking is similar to parallel and standard angle parking, as the driver backs into the stall, but when leaving, the driver can simply pull out of the stall. Instructive signage is typically provided to guide the driver in how to correctly park in a reverse angle space. The design also has safety benefits because the driver has a better view of oncoming traffic, and both cyclists and drivers can see each other.

### 2.5.5. Tandem and Stackers

Tandem parking is a technique and stackers are equipment that allows more cars to be parked on a smaller surface area by reducing the area devoted to aisles per car parked. Generally applied in garages or parking lots, both techniques require keys to be available or an attendant to be on duty to move cars if a blocked-in car owner wishes to leave. These work well with valet systems and remote parking.

*Tandem parking* involves parking two or more cars nose to tail which allows more cars to fit into the lot by reducing the number of aisles required. However this prevents all but the outermost car from leaving the parking facility independently.

*Stackers* perform a similar function, but add vertical capacity. A hydraulic lifting apparatus raises the first car up, allowing a second car to be parked underneath. Depending on the parking stacker design, the
bottom car may need to be moved before the stacker can be lowered and the upper car released. There are also more advanced systems that provide for automated movement of vehicles to add to parking efficiency. Typically, these types of facilities are used in urban areas where there is limited land on which to construct parking and where land costs are high.

2.5.6. **Peer to Peer Parking Space Rentals**

Private property owners often have parking spaces on-site that they may only utilize for a portion of the day. Peer to peer parking space rental programs such as ParkatmyHouse.com enable property owners to rent out parking spaces when they are not being used. This provides additional parking supply while also providing a financial incentive for private property owners to open up underutilized parking spaces to the general public.

2.5.7. **Expected Outcomes**

The cost to provide an additional parking space can range from $4,000 to $10,000 per space in a surface parking lot, $25,000 to $50,000 per space in a structured parking garage, and $30,000 to $100,000 per space in an underground parking garage\(^2\). In addition to the high costs of providing parking, land constraints can make it difficult to provide the required amount of parking on-site. The parking supply enhancement measures discussed above provide municipalities and developers with a number of options for increasing the supply of parking without constructing new parking facilities. This enables more efficient use of existing resources and reduces the barriers to new development with respect to cost and land constraints. However, it should be recognized that these measures will not change driver behaviour.

2.6. **MONITORING & ENFORCEMENT**

Most parking management systems rely heavily on enforcement to ensure that the desired policy goals of the regulations are met. However, every regulation and parking strategy can be undercut by those who attempt to exploit the system, reducing the efficacy of parking policy. Improved enforcement and monitoring can be very helpful in reaching the parking goals set by the regulatory framework. This consists of technologies that simplify or streamline the enforcement procedures in some way, either tools that enhance the enforcement officers’ ability or automating monitoring procedures.

2.6.1. **Curbside Sensors**

Curbside sensors are embedded in the pavement and linked with advanced parking meters (single-head or multi-space) enabling the parking system to monitor when a car is actively occupying the space. This provides several advantages over regular meters in terms of revenue generation and improved enforcement. As the meter can determine when a car leaves, it is able to reset the paid time on the meter to zero even if the previous occupant had paid time remaining, thus increasing revenues. In the case of time-limited paid parking, since the meter is able to determine the vehicle’s length of stay, curbside sensors can help reduce the problem of “meter feeding” by preventing patrons from returning to add more money once the time limit has been reached. The cost per space for this technology is

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between $250 and $800 for the sensor and up to $150 per meter for data management\(^3\). The range of accuracy varies as other objects that omit electromagnetic fields can cause interference with the sensor, reducing accuracy.

### 2.6.2. Automated License Plate Reading Technology

Automatic license plate readers, also sometimes referred to as “digital chalk” allow a moving vehicle to scan the license plates of both parallel and diagonally parked cars and check for vehicles that overstay the maximum time or are not allowed to park in a specific location. This allows a single enforcement officer to check for parking compliance much faster than on foot. Automated license plate readers are capable of processing 2 vehicles per second at 30 mph/50 km/h and 1,500 to 3,000 parallel parked vehicles per shift in typical city situations. It significantly improves the enforcement officer’s range and productivity (typically 3 to 5 times better than walking with a handheld), thereby reducing enforcement cost and incidences of illegal parking. As vehicle photos facilitate quicker and more accurate appeal resolution, overall revenue from tickets generally increases.

### 2.6.3. Handheld Units

Handheld ticketing units are small, computerized devices that aid parking enforcement officers in issuing accurate and legible citations. Units can improve recordkeeping and reduce errors by directly communicating with central records; account for more complicated regulatory structures such as fines that escalate with each additional violation; and print the citations which improves legibility over handwritten notices. Handheld units work well in combination with payment and enforcement by license plate and as part of an overall parking management system.

### 2.6.4. Expected Outcomes

Monitoring and enforcement are key components in ensuring that the desired outcomes of the enacted parking policies are being met. The range of technology options also help streamline the monitoring and enforcement process, and can increase the productivity of existing personnel resources.

### 2.7. Payment Technology

There are a number of parking payment technologies that can be utilized to help streamline the payment process that are typically used in tandem with multi-space meters, but are increasingly available on single space meters. Parking meters can provide more convenient payment options for customers, including bills, credit/debit cards and payment by telephone.

### 2.7.1. Multi-Space Pay and Display Meters

Pay and display meters allow drivers to purchase a “certificate” for paid parking time which can then be displayed on their dashboard to prove compliance. Since pay and display is typically done on a block or zone basis, this eliminates the need to paint individual stalls, which may increase the parking supply by as much as 20 percent. Unless remote payment technologies are available, pay and display can be less convenient than pay-by-space stations because the driver must return to the car to place the certificate in the vehicle and again when the time has expired.

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2.7.2. Multi-Space Pay by Space Meters

Pay by space meters allow drivers to pay for parking by entering their specific space number into the pay station when paying, rather than by providing a receipt for display on the dashboard. These stations allow customers to continue shopping or choose to stay for dinner without requiring drivers to return to their vehicle as time extensions can be paid remotely (i.e., another station, by cell phone, etc.). This technology is also available in a pay by license plate variant that is becoming increasingly common as it has inherent benefits for enforcement, as well as being user friendly.

2.7.3. Pay by Cell Phone

Paying for parking by cell phone is a strategy that allows customers to pay without cash while eliminating the need to install new credit-card capable revenue collection infrastructure on the street. The strategy allows people to receive text messages notifying them that their time is about to expire as well as extend legal parking time by paying remotely. Additionally, upon returning to their vehicle, a person may terminate the parking session and avoid paying for time that will not be used.

2.7.4. Smart Cards

Smart cards represent another alternative payment system for metered parking that eliminates the need to carry cash without using credit cards. Smart cards are stored-value cards that can be inserted in the meters to add time. Users insert the card when they first arrive at the meter and allow the meter to increase the time increment purchased in $0.25 steps; users remove the card when the amount of time displayed is adequate. Users are billed only for the time actually spent parking – rounded to the nearest minute by swiping the card again when they leave the space.

2.7.5. In-Car Meters

In-car meters are small devices which are loaded with pre-paid parking time. The user displays the meter in their car, often on the dashboard or hanging from the rear-view mirror, and activates the device when parked at a metered space. The digital display counts down the amount of paid parking time remaining, allowing a parking enforcement officer to see through the window that the car is legally paying for the parking time.

2.7.6. Expected Outcomes

The use of multi-space meters and any of the complementary payment options discussed above, increase the ease of payment from the user perspective which in turn increases the likelihood that users will pay for the time they spend using a given parking space rather than take their chances with the possibility of receiving a citation for non-payment. From the enforcement perspective these technologies increase monitoring efficiency by eliminating the need to physically check the meter at each individual parking space.
2.8. **SUMMARY**

The strategies discussed in this chapter have a wide range of outcomes and varying levels of impact on land use, parking demand, and the efficiency of enforcement and monitoring. Table 1 below shows the relative impact of each set of strategies as they relate specifically to meeting sustainable transportation goals.

**Table 1 - Impacts of Parking Management Strategies on Sustainable Transportation Goals**

<table>
<thead>
<tr>
<th>Parking Management Strategy</th>
<th>Optimising the supply of parking</th>
<th>Generating increased parking revenue</th>
<th>Ensuring the best use of land and promoting compact communities</th>
<th>Reducing private vehicle trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Regulations and Incentives</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Demand Management</td>
<td>◼</td>
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<td>Supply Enhancement</td>
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<tr>
<td>Monitoring and Enforcement</td>
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<td>Payment Technology</td>
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</tbody>
</table>

Of all of the categories of measures outlined zoning and incentives and demand management have the greatest potential to shape land use and effectively manage parking demand. Flexible parking standards and parking maximums can help reduce barriers to in-fill development by allowing for reductions in parking to be made in those developments that generate less parking demand. These measures also enable development to be more context and site appropriate by providing the amount of parking that reflects the level of demand generated by that specific location. Zoning and incentives measures such as allowing off-site parking and creating shared parking also encourage in-fill development by enabling new development to meet their parking needs off-site if necessary.

Demand management strategies are the most effective way to manage existing parking supplies and help reduce the need for additional parking supply. Demand management strategies such as demand-responsive parking pricing and parking taxes can be key tools for influencing travel behaviours to various destinations and can encourage the use of non auto modes, if available.

Given that the cost of constructing parking is high, supply enhancement strategies can help make the most efficient use of existing parking infrastructure potentially reducing the need to construct new parking. However, while these measures do have some impact on land use and parking demand, it is not as great as the impact that zoning and incentives and demand management may have.

Lastly, while monitoring and enforcement is key to ensuring that policy goals and regulations are met and payment technology enable easier payment from the user perspective, they are generally reactive measures.
3. LEADING PRACTICES

This chapter details innovative parking policies and strategies that have been implemented in North America as well as Europe. A total of nine case studies were selected, each highlighting several of the strategies discussed in Chapter 2.

3.1. SHARED PARKING IN PRIVATE FACILITIES AND FORM-BASED CODE: ARLINGTON COUNTY, VA

Arlington County, VA provides an example of how the collaboration with the private sector has led to effective shared parking agreements to the point where most of the public off-street parking in Arlington County is provided by the private sector. To ensure the best use of the parking supply in Arlington, parking spaces provided by the private sector (at appropriate times) are shared with other motorists, wherever possible. This has allowed the County to minimize the overall supply of parking spaces, allowing for infill and transit-oriented development, more pedestrian-friendly streets, and less motor vehicle congestion.

What was the policy?

The private sector provides most of the public, off-street parking in Arlington County. The County is reluctant to develop stand-alone public parking facilities, in part as a response to decades of minimum parking requirements that have created a consistent surplus of parking in transit accessible and commercial corridors. In most cases, market opportunities have led the owners of developments with excessive parking to find ways to open up their parking to the public, either during off-peak hours or peak-use hours when there has been capacity.

County Planning staff have responded by encouraging, and when possible rewarding or requiring such practices as a means of generating well-distributed public parking across its key commercial corridors without having to invest in new facilities. Developers cover the full cost of construction, maintenance and operation of the parking facilities. In cases where the County is a partner in the development process, the operations and maintenance costs are split between the County and developer, with net revenue also being shared.

How was it implemented?

The County has a substantial shared parking supply along the Rosslyn-Ballston Corridor. Some of these spaces were voluntarily opened to the public by garage managers, and others were required, particularly for permit exceptions for offices buildings.\(^4\)\(^5\) As a result the corridor has over 60 private garages currently open to the general public during regular business hours.\(^5\) Figure 1 illustrates the location and hours that garages are open to the public, either on weekdays and weekday evenings or a portion of the weekend.

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Within Metrorail corridors and through Site Plan Agreements, the County require that some or most on-site parking is shared and open to general public parking during specified times. Shared parking is allowed with developments that are as far as 1/8 of a mile apart. The County has also utilized Parking Development Agreements in conjunction with joint-development projects to ensure well-managed, public parking is included within facilities providing accessory parking to private development.

The Columbia Pike Initiative is arguably the area of the County where the policies and actions outlined above have been implemented first and most consistently. This initiative aims to transform this South Arlington neighbourhood to its original main street, pedestrian-oriented setting. Figure 2 illustrates key strategic areas along the corridor where shared parking will be important for future commercial development, although shared parking requirements apply to the full initiative area. This is proposed as a first step in the County’s efforts to create a parking system on Columbia Pike that provides adequate public parking, dispersed in locations where it is most needed.

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Off-street parking standards for private development within Columbia Pike are as follows:

1. Sites under 20,000 square feet in land area have no minimum parking requirements.
2. Sites over 20,000 square feet in land area have the following requirements:
   - A minimum of 1 and 1/8 parking spaces per residential unit, of which a minimum of 1/8 parking space per residential unit shall be provided as shared parking.
   - A minimum of one space per 1,000 square feet of non-residential Gross Floor Area (GFA) shall be provided as shared parking.
   - New on-street parking spaces created in conjunction with the development, which did not previously exist, may be counted toward the minimum requirement for shared parking.
   - A maximum of one space per 1,000 square feet of non-residential GFA or two spaces per residential unit may be made available for reserved parking.
   - Reserved parking above the maximum may be provided upon payment to the County.

Since the introduction of the new form-based codes, the Arlington Mill Community Center has been permitted. Together with a neighbouring residential building the two developments provide 16 shared-use parking spaces sited on the residential property parcel, illustrating the flexibility in negotiating the parking provision between multiple developers.

Lessons learned

The form-based code policy is still fairly new and a limited amount of new development has occurred since its implementation. Nevertheless, the County continues to seek the benefit of providing shared public parking within widely distributed facilities as its primary strategy for managing parking in its transit corridors. Qualitatively, the substantial amount of shared-parking supply, especially in the Rosslyn-Ballston Corridor, has helped the County to meet the demand from new development without

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having to add significantly to the supply. This has been an important policy decision for Arlington County where a limited supply of on-street parking exists.  

One of the challenges of managing existing shared-parking supply has been maximizing its use. According to the County’s Master Transportation Plan, lack of signage and marketing materials to inform the public on the availability of shared parking limits its effectiveness. Therefore for each new development project, the County’s Parking Manager must try to ensure that as many management issues (including pricing, physical, and operational issues) are addressed as early as possible in the planning process. In some cases, the impact of spaces built as shared parking can be undermined by access issues such as facility operating hours, staffing, configuration, and access management. In the most common scenario, parking facilities that primarily serve buildings with regular weekday operating hours (Monday – Friday, 9:00 AM – 5:00 PM) resist the added cost and liability of keeping facilities open to public parking after hours. However, this has not been a problem in Arlington County as garages with shared parking either have no gates, and those that do, remain open until 02.00 AM as required by the County.

3.2. **Demand-Responsive Parking Pricing: San Francisco, CA**

**What was the policy?**

San Francisco Municipal Transportation Agency (SFMTA) is the lead agency implementing SFpark, which uses new technologies and policies to improve parking in San Francisco. One objective is to reduce congestion by reducing the time drivers spend searching for a parking space. The technology collects and distributes real-time information of where parking is available so drivers can quickly find available spaces. To help achieve the right level of parking availability, both on-street and off-street publicly-owned parking rates are periodically adjusted to match demand. The real-time data and demand-responsive pricing work together to readjust parking patterns in the City so that parking ultimately will become easier to find.

**How was it implemented?**

In November of 2008, the SFMTA Board of Directors approved legislation that enabled the SFpark pilot project. The law defined pilot areas, specified rate and time ranges and limits, and parking availability targets. After approval, federal funding was secured to cover 80 percent of the project costs. Demand-responsive pricing and real-time parking data collection began in 2011, with data becoming publicly available in April of 2011. The new parking management system is currently tested at 7,000 of San Francisco’s 28,800 metered spaces and 12,250 spaces in 15 of 20 City-owned parking garages. SFpark’s pilot phase will run through the summer of 2012 with the official assessment of the scheme taking place between January and June of 2012.

**Public information sharing and monitoring:** Wireless parking sensors have been installed in on-street parking spaces and City-owned garages to track when and where parking is occupied. At each parking garage, entrance and exit gates track the total number of cars in the garage. The data is uploaded wirelessly to a SFpark data feed, making the information available to the public via the website, smartphone applications, and text message. The data can also instantly be used for tracking occupancy,

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8 Ibid.
availability, and turnover rate. This information allows parking managers to see where and when parking is generally available or hard to find. Sensors are also placed in three control neighbourhoods to provide baseline data for evaluation purposes.

**Pricing:** Parking meter prices are adjusted based on demand to encourage drivers to make trips in off-peak hours and to use parking lots and garages. Rates may vary by block, time of day, and day of week and are adjusted periodically (not more often than once a month) by reductions of up to 50 cents per hour and increases of 25 cents per hour. The goal of the pricing adjustments is in general to have at least one parking space available on every block. In areas and at times where it is difficult to find a parking space, rates will increase incrementally until at least one space is available on each block most of the time. In areas where available parking spaces are plentiful, rates will decrease until some of the empty spaces fill. This may result in free parking in under-utilized areas. The meter pricing can currently range from 25 cents an hour to a maximum of $6.00 an hour, depending on demand. Rate adjustments are listed on sfpark.org at least seven days before they go into effect. The revenue is spent on SFMTA transit services.

**New meters:** In late 2010, SFMTA replaced existing parking meters with new meters throughout the eight Sfpark pilot areas. The parking meters allow drivers to pay with coins, credit/debit cards, and SFMTA parking cards. The time limits on many meters were extended to allow drivers to stay in one space, which is reducing unnecessary re-parking and the need to issue parking tickets. The meters, like the sensors, communicate wirelessly with the Sfpark data warehouse. When pricing changes, new rate information will be sent wirelessly to the meters so they remain up-to-date.

**Communication:** The Sfpark project has gone above and beyond many other parking programs with its communications and outreach efforts. The website sfpark.org provides easy-to-understand language about how the program works, and contains a video demonstration of the program. Other Sfpark images, real-time maps, and smartphone applications have a user-interface and readability that helps all users understand how the program works, and how to use it.

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9 Sfpark recently published a book summarizing the implementation (available for free download on the web at [http://sfpark.org/resources-overview/](http://sfpark.org/resources-overview/) or for purchase in print edition)
Lessons learned

The pilot project has now implemented its third price change since inception and has just entered the evaluation phase, to end in mid 2012. The results revealed to date do show success across available metrics. The new meters, new payment options, and longer time limits led to 14% fewer citations and 27% more net meter revenue compared to the older meters.\(^{10}\) This combined increase in meter revenues and decrease in citations has resulted in 11% more net revenue than meters that were not upgraded.

SFMTA has published their lessons learned from the planning and implementation phases, though more lessons from the operation, evolution and evaluation will be released at the end of the pilot phase. An overarching lesson was that implementing the project in targeted pilot areas was a sound approach to reduce the level of risk and allow the project to evolve flexibly within an environment of many unknowns\(^{11}\).


\(^{11}\) A complete list of the key lessons is available at SFMTA. August 2011. SFpark: Putting Theory into Practice Post-launch implementation summary and lessons learned. Available from: http://sfpark.org/resources-overview/
3.3. **IN-LIEU FEE PARKING: SANTA MONICA, CA**

The City of Santa Monica, 16 miles west of downtown Los Angeles, is home to approximately 88,000 residents and 16,000 businesses. The area bounded by Second and Fourth Streets and Wilshire Boulevard and Broadway was identified in 1986 as both a special assessment district and a Developer Parking Fee (in lieu fee) zone. While the assessment district designation provided funding for the revitalization of the downtown, the in lieu fee zone was intended to both ensure funding for the existing municipal structures, as well as any necessary future expansion, and reduce the need for developers to provide on-site parking in this highly pedestrian-focused commercial district.

**What was the policy?**
The purpose of the city’s public parking strategy is to provide adequate supply to allow existing and future land uses to rely on a shared, efficient supply. The program is based on a “Park Once-Pedestrian First” concept, which encourages drivers to become and remain pedestrians while in downtown.

The efficiencies gained through this approach have allowed the City to establish a parking supply target of 2.1 parking spaces per 1,000 square feet of commercial floor area, which is markedly lower when compared to standards for general office, retail, and small restaurants (2,500 square feet or less) in the City of Santa Monica. That the downtown continues to thrive with this low level of supply attests to the potential benefits of the park-once management district model.

**How was it implemented?**

**Revenue:** Santa Monica’s parking program is made up of different components, many of which are managed by different departments. The City of Santa Monica collects revenue from parking fees as well as Bayside Assessment and Developer Parking (In Lieu) fees. All revenue goes into the City’s general fund. Funding for the Parking Office is provided via city budgets, with no direct source of revenue. The Developer Parking fees, however, are ear-marked exclusively for use in constructing or replacing public parking in the Downtown Santa Monica, Inc. (DTSM) District. The City’s Finance Department handles the collection and management of the in-lieu fees, while the DTSM—a quasi-public entity along the lines of a Business Improvement District—collects assessment fees.

**In Lieu Fee:** Developers that choose not to provide all required parking on-site are assessed an annual fee of $1.50 per square foot of building area for which parking is not provided. For example, if a 100,000 square foot project is developed but the developer only provides parking to satisfy the demand for 80,000 square feet of space, then the project is assessed an annual fee of $30,000 ($1.50 per square foot times the 20,000 square feet for which parking is not provided). The ability to collect these annual fees is scheduled to expire at the same time as the Bayside Mall Assessment District, in 2016. The in-lieu fee has not been adjusted since its inception in 1986 and the City is currently in the process of increasing the fee. To date, developers have been very receptive to this policy, as the in-lieu fee is much lower than the cost of providing the parking themselves, covering only about 10% of structure parking construction costs.

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12 The general standards for the City of Santa Monica are 3.3 spaces per 1,000 square feet for general office, retail, and small restaurants. Fast food restaurants have higher standards of 13.33 spaces per 1,000 square feet.

The in-lieu fee program has served the City’s needs in part because the shared supply was already in place and functional when the assessment and fee districts were initiated. For over 20 years, the income from these districts needed only to cover, along with parking fee income, the costs to maintain, repair, and replace a sufficient supply. Concluding that future supply increases are inevitable, however, the City is now assessing strategies for ensuring that the parking program is funded sufficiently to expand when necessary.

Parking is still being studied to meet projected demand and manage traffic in Downtown Santa Monica. The opportunity to re-address the supply has arisen as downtown parking areas are demolished and need to be rebuilt either to the same or higher capacity.\(^{14}\) There is also support from downtown merchants and the public to increase supply due to a perceived shortage of parking. The City is therefore studying alternatives to increasing supply through shared parking and experimenting with concentrating parking in specific downtown lots and providing free shuttle services to city center locations.

**Lessons learned**

In-lieu fees are especially suitable for adaptive reuse redevelopment projects such as vacant, underutilized, historic, or dilapidated building structures in downtown areas that would otherwise not be financially or architecturally feasible if all parking had to be provided on-site. The main limitation of in-lieu fees is that they rely on new development to occur in order to generate fee revenue, thus during times of recession when level of new construction typically decreases, revenues for maintaining, operating or constructing new parking declines as well.

One of the main lessons from Santa Monica’s experience is that in-lieu fees ordinances have to be written such that they can be adjusted on an annual basis to reflect the inflation index. In the case of Santa Monica, the initial cost of $1.50 per square foot of building area in 1986 dollars is now equivalent to just over $3 per square foot in current dollars.\(^{15}\) This means that annual revenue today could be double the $600,000 that the program collects today.

Determining the price elasticity or the point up to which developers are still willing to pay the fee for off-site parking over developing parking on-site themselves is another challenge.

**3.4. PARKING BENEFIT DISTRICTS: PASADENA, CA**

In contrast to the image of the City of Los Angeles itself, Old Pasadena has gained a reputation for being a pedestrian-friendly, vibrant downtown, that combines a mix of uses with easy access by the automobile. Much of the area’s success can be attributed to its parking management policies that have spawned a wide variety of streetscape improvements and new opportunities for increased transit ridership and development.

\(^{14}\) Personal communication with Travis Page, Associate Planner, Santa Monica, Transportation Management Division, January 18, 2012.

What was the policy?
Until 1993, Old Pasadena had no parking meters, and proposals by City staff to install them were opposed by local merchants, who feared charges would drive customers away. The compromise solution was to install the meters, but to spend all the revenue on public investments in the district. A relatively high rate of $1 per hour (including Sundays and evenings) was agreed.

How was it implemented?
The City provided $5 million in bond funding for street furniture, trees, tree grates and historic lighting fixtures, with the meter revenue stream being used to repay the debt. By 2001, approximately one-third of meter revenue went to debt service, with the remainder used to fund new services such as marketing, mounted police patrols, daily street sweeping and steam cleaning of sidewalks, which are provided through the Business Improvement District.

The merchant’s fear of driving customers away was not borne out. This example shows that charging for parking can actually increase business for local retailers. As Douglas Kolozsvari and Don Shoup point out: “If no curb spaces are available, reducing their price cannot attract more customers, just as reducing the price of anything else in short supply cannot increase its sales. A below-market price for curb parking simply leads to cruising and congestion. The goal of pricing is to produce a few vacant spaces so that drivers can find places to park near their destinations.”

What charging does in this case is provide a basis for rationalizing the parking supply. In a commercial district with free parking, employees, who park all day, will use the available spaces leaving none for customers. Even with enforced time limits, many employees perform the “two-hour shuffle”, moving their cars every couple of hours to circumvent time restrictions. By charging for parking, employees will seek free or cheaper spaces a little farther away leaving the most convenient spaces available for customers. In Pasadena, the introduction of parking meters has forced employees to park further away, freeing up prime “front door” spaces for customers. Similarly, compared to someone running a quick errand, someone with a long appointment is less inconvenienced by parking at a short distance instead of at the front door. Rather than being used all day by a single parker, metered parking can be used throughout the day by many customers who only use the spot for 15 or 30 minutes or an hour. So, while pricing cannot make more spaces it can make existing spaces more ‘productive’ by promoting turnover and making parking spaces more available.

Lessons learned
The metering is not only having the intended results on parking revenue but also on managing supply more efficiently. In 2001, net parking meter revenue (after collection costs) amounted to $1.2 million, all of which was used for public services in that part of the city. In terms of parking availability, the same study found the average occupancy rate for curb parking was 83%, which represents around the optimum balance between revenue/efficiency and availability.

17 Ibid.
Appropriate parking supply has in turn had a stimulating economic effect on the downtown businesses. Since implementation of the parking benefit district policy in 1993, sales tax revenue in Old Pasadena increased more than five-fold, to more than $2 million per year in 1999. In contrast, sales tax revenue at the adjacent shopping mall, Plaza Pasadena, which provided free parking, has been stagnant. According to Marsha Rood, former Development Administrator for Pasadena, “without the parking structures, revitalization of Old Pasadena would not have happened – period.”

3.5. **LONGSTANDING PARKING MAXIMUMS: TORONTO, ONTARIO**

Parking maximums limit the amount of parking provided at particular sites with the intention of reducing traffic demand by reducing the parking supply at the end of a trip, and are used mainly for commercial uses in high-density employment centres. Parking maximums have been in use in the City of Toronto for three decades, in conjunction with low parking minimums.

**Background**

In 1977, the City of Toronto commissioned a major Central Area Parking and Loading Study. The study was completed in part due to concerns about increasing congestion and the potential to use parking management as a tool to combat congestion. After reviewing several potential policy directions, the study concluded that parking requirements would be based on a policy of providing parking for visitors and customers who need to drive and for employees who satisfied one of three criteria: i) needing their car for transporting goods or as a condition of employment, ii) employees who arrive at work before 7 AM and do not have good transit accessibility and iii) employees who use their car for travel other than home to work. In effect, the policy sought to restrict non-essential parking for commuting purposes in the central area.

In 2007, the City completed a major review and update of its Parking By-laws and further expanded the concept of parking maximums to other areas of the City, varying the maximums according to transit

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18 Ibid.
accessibility. Parking maximums were also introduced for residential uses as a means of influencing auto ownership.

**Program Details**
Since the 1980’s the City of Toronto (former City of Toronto prior to amalgamation) has enforced a maximum parking standard of 0.82 spaces per 100 m² for office uses. This compares to a prevailing minimum of 3 spaces per 100 m² in most of the surrounding municipalities (i.e. other former City of Toronto municipalities and outer suburbs) and a market driven demand of 5.0 spaces per 100 m² in suburban locations. The maximum rate for retail in the former City of Toronto is 3.6 spaces per 100 m².

Conditions within Downtown Toronto which could in part be attributed to the introduction of maximum parking standards include:

- A high transit mode split; 60% of all trips to the Central Area are by transit and non-motorized modes; mode shares for the core area are in excess of 80%;
- A large portion of the parking supply is in the form of shared, publically accessible parking which is priced according to the market. The Toronto Parking Authority holds a significant amount of this parking and can therefore influence supply and pricing; and
- A general absence of large surface parking lots associated with private office buildings.

Although it was reported that there was some initial resistance to parking maximums, the industry has long since adjusted to these rates. For example, most office buildings rely entirely on underground parking and most retail is integrated into larger buildings, as opposed to the stand-alone retail stores seen outside of the City of Toronto. To a large extent, the cost of land also limits developers from over-supplying parking.

**Other Parking Management Initiatives**
In addition to the application of parking maximums, the City of Toronto also utilizes the following parking management tools:

- Minimum bicycle parking standards are included in the zoning by-law, along with requirements for showers and lockers for larger developments
- Shared parking provisions within the zoning by-law
- Allowance of off-site parking as substitution for on-site parking, up to 300 metres from a site on a case by case basis
- Reductions in required parking spaces where car-share vehicles are provide, at a rate of up to 4 spaces for each car-share vehicle on-site
- Comprehensive parking design guidelines
- Allowance for small car parking spaces

**Lessons learned**
The use of parking maximums has been successful to a large extent because of the conditions that exist where they have been implemented. Most importantly, parking maximums were first implemented in the central area (downtown Toronto) and subsequently North York City Centre, both of which are served by mass transit. Parking maximums were also set at a level that could meet reasonable parking demands and would not require an unreasonable shift in travel behaviour. Another important lesson
learned was that public parking would be essential in meeting some parking needs that would otherwise be accommodated on site. It is noteworthy that as of 2010, the Toronto Parking Authority operated some 38,100 off-street parking spaces and earned $79 million in the same year from off-street and on-street operations.

The roll-out of parking maximums has also been fairly gradual, starting with the central area in the 1980’s, North York City Centre in the 1990’s (at the time as a separate municipality) and most recently to the entire City of Toronto. Historically, maximums were also only applied to non-residential uses (retail and office) and only recently have been proposed for residential uses. Although City staff often deal with minor by-law exemptions, the development industry has largely responded well to the implementation of parking maximums. It is unclear, however, how much development was simply shifted to suburban locations which could provide market driven parking needs.

A final lesson learned is that parking maximums can be introduced as policy guidelines with a fairly high degree of success. For example, for almost two decades, the City of Toronto relied on an informal “Condo Parking Guideline” which includes suggested maximums for residential condominiums. Though not binding, City staff regularly used this as the basis for discussions with consultants and developers at the site plan stage. Similarly, the North York City Centre parking maximums were implemented as a policy guideline.

3.6. CONTEXT-SENSITIVE PARKING POLICIES: HALIFAX, NOVA SCOTIA

Halifax Regional Municipality (HRM) was created in 1996 as a single tier municipality with jurisdiction over all planning matters. However, until recently, parking policies governing the Region were extremely varied and inconsistent.

The Regional Municipal Planning Strategy for HRM aims to shape settlement in an efficient way such that transit and other alternatives to commuting will become more viable. The Plan outlines that this growth will be directed towards the Regional Centre (25%), suburban areas (50%), and rural areas (25%). A key aspect of the plan is the centres, envisioned as mixed-use transit oriented areas, which will accommodate much of this growth. In recognition of the goals of the Regional Plan, HRM realised that existing parking policies needed to be updated to better reflect the development goals for each growth area.

Program Details
One of the key recommendations of the 2007 Regional Parking Study was to update parking standards and align them with the geographies of future growth. In addition, revised standards also incorporated the following policies:

- Shared parking provisions and other mechanisms for flexibility in required parking;
- Reduced minimum parking requirements; and
- Maximum parking standards.

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19 Toronto Parking Authority, 2010 Annual Report
One of the challenges HRM faced was that parking standards across the Region are regulated by 21 individual land use by-laws, each applying to different communities, groups of communities, or specific areas. Moreover, these by-laws, which are left over from pre-amalgamation days, are not aligned with the geographies of the growth areas identified in the Regional Plan. Accordingly, HRM is working to update the parking standards in conjunction with sub-area plans that are being prepared for each growth area. HRM currently is regulated by 21 individual land use by-laws, each applying to different communities, groups of communities, or specific areas. It is the intension that these would become part of the individual land use by-laws for each area, or a future consolidated by-law. There is also a precedent for regulating parking through special site development standards, which is currently the case for several business parks.

Figure 6 summarizes the different geographies and the intent of the new standards. Although HRM, which is a single tier municipality and has the authority to implement new parking policies and by-laws, the former municipal by-laws still apply until new ones are adopted.
Table 2 - HRM’s Framework for Updating Parking Standards

<table>
<thead>
<tr>
<th>Area</th>
<th>Approach to Parking Management</th>
<th>Minimum Parking Standard</th>
<th>Maximum Parking Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown Halifax</td>
<td>Emphasize public parking and TDM</td>
<td>Private parking banned for non-residential development&lt;sup&gt;(1)&lt;/sup&gt; - mandatory participation in cash in lieu program.</td>
<td></td>
</tr>
<tr>
<td>Halifax Peninsula and Downtown Dartmouth&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>Emphasize public parking and TDM</td>
<td>Low minimum requirements for most developments above a certain size – cash in lieu available</td>
<td>Tight parking maximums for most uses</td>
</tr>
<tr>
<td>Regional Centre – Dartmouth</td>
<td>Allow flexibility in private parking provision/ emphasize public parking and TDM</td>
<td>Low minimum requirements for most uses – cash in lieu available</td>
<td>Parking maximums for most uses</td>
</tr>
<tr>
<td>Outer Urban</td>
<td>Allow flexibility in private parking provision</td>
<td>Mid-level minimum requirements for all uses with adjustment factors</td>
<td>No parking maximums</td>
</tr>
<tr>
<td>Outlying Areas</td>
<td>Require ample private parking/ Allow flexibility in private parking provision</td>
<td>Mid-level minimum requirements for all uses with adjustment factors</td>
<td>No parking maximums</td>
</tr>
<tr>
<td>Urban/Suburban District Centre</td>
<td>Allow flexibility in private parking provision/ emphasize public parking and TDM</td>
<td>Low minimum requirements for most uses – cash in lieu available</td>
<td>Tight maximum standards for surface parking</td>
</tr>
<tr>
<td>Urban/Suburban Local Centre</td>
<td>Allow flexibility in private parking provision/ emphasize public parking and TDM</td>
<td>Low minimum requirements for most uses – cash in lieu available</td>
<td>Maximum standards for surface parking</td>
</tr>
<tr>
<td>Rural Commuter Centre</td>
<td>Allow flexibility in private parking provision</td>
<td>Mid-level minimum requirements for most uses</td>
<td>Parking maximums for some uses</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Parking lots and structures are currently banned in Downtown Halifax and the Halifax Waterfront through the Land Use By-Law and may only be permitted through direct Council approval. It is proposed that this approach be maintained in tandem with mandatory cash in lieu contributions.

<sup>(2)</sup> In the Capital District, outside of Downtown Halifax, it is recommended that a minimum of 50% of required parking must be provided as short-term, public parking.
In addition to revising its Parking Standards, HRM is also working to implement other components of the parking strategy including improving signage and way-finding, upgrading parking payment and enforcement technologies, implementing a new parking governance model which utilizes an advisory committee approach.

Other Parking Management Initiatives

Other practices within HRM that are somewhat unique in Canada include the following:

- No minimum requirement for parking for commercial uses in the Downtown core, including office uses
- A Parking by Permit Only program for on-street spaces on the periphery of the Downtown that it is open to non-residents in addition to residents, space permitting. This program provides for a more efficient use of on-street parking.
- Reliance on private parking operators to provide publically accessible parking in the core areas, which in turn results in market rate pricing for commuter parking. This condition seems to have occurred through circumstance as opposed to a specific policy direction. In other words, the former City of Halifax and now Region of HRM simply chose not to get into the business of parking.

Lessons learned

During the completion of the HRM Parking Strategy in 2007, it quickly became clear that simply updating parking standards to account for different geographies and approaches (i.e. parking maximums, reductions for TDM, etc.) would not be a simple process. This was due to the fact that parking standards in HRM are imbedded within 21 different land use by-laws, and the geographies of these by-laws are primarily aligned with former political/jurisdictional boundaries as opposed to land use form. In the absence of completing an entirely new comprehensive land use by-law, the only way to quickly implement the new standards would be to update each of the individual land use by-laws, which would be an extensive process requiring a public approvals process.

The other challenge encountered related to the implementation of adjustment factors to account for various TDM measures. For example, an adjustment factor is being considered to reduce parking minimums for developments within 400 m of transit stop with at least 15 minute peak hour service. However, since transit service levels can change, there is a reluctance to formalize this through a zoning by-law. Hence, for the time being, these reductions are considered on a case specific basis.

3.7. Form-Based Code Parking Requirements: Hayward, CA

The form-based code for the Mission Boulevard Corridor Specific Plan is a model example of a regulatory framework that ensures that private and public development are developed in the highest quality and in context to its adjacent surroundings. This code helps the City create a vibrant Mission Boulevard Corridor and invest in and support development in the most appropriate areas. Parking requirements in the form-based code vary among zones, which means that the parking requirements are specific to the locations in the corridor based on how close or far the area is from the core. This is a more context-
sensitive approach to parking than a simplified zoning code requirement for an entire city or type of land use.

**What was the policy?**
The Draft Mission Boulevard Corridor Specific Plan includes a form-based code and long-term economic strategy for the project area in Hayward, CA. The project will result in a vision and implementation strategies that support goals to develop vibrant commercial uses, pedestrian-friendly neighbourhoods at sufficient densities to support public transportation, and a built form that will encourage such uses. A program-level Environmental Impact Report (EIR) will also be prepared. The project is expected to be completed by spring 2012.

The South Hayward BART/Mission Boulevard Form-Based Code was adopted by the Hayward City Council in October of 2011. The Mission Boulevard form-based code includes a regulating plan, standards, and procedures and outlays specific regulations for building disposition, building configuration, density standards, parking standards, architectural standards, and others to certain zones. The code divides the Plan area into transect zones for implementation.

**Figure 5 - South Hayward BART/Mission Boulevard Form Based Code Map**

**Parking standards:** Parking standards are specified by location within the project area. In general, parking provision requirements are allocated for two specific land-use densities; they are lower at the core around the South Hayward metro station (at about a 10 minute walking distance buffer from the station), and set at higher rate beyond this threshold. Bicycle parking requirements also increase closer to the core area. In general, non-residential land uses have no minimum parking requirements. If parking is provided, it must be masked from the frontage by a building or street screen. Tandem parking may be provided for multi-family residences when spaces are assigned to the same dwelling unit or for commercial use when a valet/attendant is on duty during the hours when the business is open.
Table 3 - Mission Boulevard Form-Based Code Parking Standards

<table>
<thead>
<tr>
<th></th>
<th>Urban General Zone (17.5 DU/Acre min; 35 DU/Acre max)</th>
<th>Urban Center Zone (35 DU/Acre min; 55 DU/Acre max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Maximums</td>
<td>For each rental dwelling unit, a maximum of 1.75 off-street parking spaces may be provided.</td>
<td>For each rental dwelling unit, a maximum of 1.5 off-street parking spaces may be provided.</td>
</tr>
<tr>
<td></td>
<td>For each Residential condominium, a maximum of 2.0 off-street parking spaces may be provided.</td>
<td>For each Residential condominium, a maximum of 1.8 off-street parking spaces may be provided.</td>
</tr>
<tr>
<td>Non-Residential Functions</td>
<td>Shall have no requirement for a minimum number of off-street automobile parking spaces</td>
<td>Tandem Parking may be provided for Commercial Functions when a valet/attendant is on duty during the hours when the business is open.</td>
</tr>
<tr>
<td>Multi-family Dwellings</td>
<td>Tandem parking may be provided for multi-family residences when spaces are assigned to the same dwelling unit.</td>
<td></td>
</tr>
</tbody>
</table>

Truck loading spaces and the access and manoeuvring areas serving loading spaces must be located on the same parcel as the activity served and must be exclusive of the area used for required parking spaces and manoeuvring areas. Truck loading spaces cannot interfere with on-street traffic, parking, or sidewalks.

Other specific parking requirements are also included, including parking maximums for specific uses, driveway standards, and parking locations.

The first major project planned and approved with the new form-based code for the South Hayward BART/Mission Boulevard area is a residential development, located on the South Hayward BART Station property and eastern overfill parking lot. The project will replace current parking lots from Dixon Street to the full depth of the lot on Mission Boulevard, featuring a mix of market rate and below-market rate family and senior housing with structured parking to support all planned uses. Initially, the scope of the project was for a much larger mixed-use development to cover all three surface lots, but due to funding constraints, the project scope was significantly reduced.

The development will be governed by the Planned Development District approved in March of 2009 and will follow basic guidelines that were outlined in the South Hayward BART/Mission Boulevard Concept Plan—adopted by the City of Hayward in June 2006 and the Form-Based Code.

The project will provide dense, urban and walkable transit-oriented development at the station to meet community needs in a currently underserved area of Hayward. It is anticipated that the project would stimulate future development along similar smart growth lines in the surrounding area.

Lessons learned
The city experienced three main challenges: first, a lack of familiarity with form based codes, not only amongst the public but amongst city staff; second, the task of convincing commissioners and city council members that generating the intended level of interaction on streets and in the public realm is more dependent on how buildings and street frontages are designed versus what goes on inside a building itself, and thus making the case for form-based codes instead of traditional zoning codes which only focus on separation of land-uses; and third, public concern regarding the higher densities called for in transit-oriented form-based codes.

To overcome these challenges, the city hired consultants to develop graphic models to illustrate how the developments might look. One example showed how the same building density could take on significantly different massing and form, and thus improve the attractiveness of the neighbourhood. The city also used a series of design charrettes to engage the community in the code design process.

The City’s first form-based code has been successfully received, and the city is now developing a form-based code for another area along Mission Boulevard Corridor (from Harter Road to the South Boundary of South Hayward) and running to the city limit north of downtown, but not including the downtown area itself. The city is expecting additional funding to develop a third form-based code for the downtown areas. The main impetus for expanding their use of form-based codes has been the desire to align development policies with the City’s Climate Action Plan and regional sustainability goals.

3.8. Parking Tax: Sydney, Australia

Sydney’s Parking Space Levy was first introduced in 1992 to discourage car use in commercial districts. The tax policy was developed by the state transportation agency (Transport for New South Wales) and the fees are collected and administered by the state government’s revenue collection agency (New South Wales Office of State Revenue). By imposing a tax on commercial and office parking, the policy effectively discourages car use and encourages the use of public transport to, from, and within commercial districts within the Greater Sydney Metropolitan Area. A parking tax may also decrease the supply of parking to a more optimal amount and encourage parking pricing.

What was the policy?

Sydney’s Parking Space Levy applies only to privately-owned, non-residential, off-street parking within the central business district (CBD). The state taxes business districts in the Greater Sydney Metropolitan Area at two rates. The rates reflect the level of congestion and the size of the business districts, differentiating between business districts which are on the order of 20 blocks in size to those which are closer to 200 blocks, like Sydney’s CBD. The higher Category 1 Rate of $2,100 AUD includes Sydney, parts of North Sydney and Milsons Point; the lower Category 2 Rate of $740 AUD includes Bondi Junction, Chatswood, Parramatta and St Leonards. A decade ago Sydney had two rates, $800 AUD for

20 Personal communication with David Rizk, City of Hayward, Development Services Director, January 19, 2012.
23 Personal communication with Rod Bradbury, NSW Office of State Revenue, Senior Technical Advisor, February 6, 2012.
its central business district and $400AUD for all other business districts. The tax is now the same for all taxable areas in Sydney and the rate is adjusted annually based on the consumer price index.\textsuperscript{25}

The tax is pro-rated for lots which are used on a part-time basis, as with church parking lots, for example. Facilities which have excessive unused parking or small facilities with five parking spaces or less are not exempt, in contrast to parking tax policies in other Australian cities (namely Perth and Melbourne). Exemptions are allowed for special parking types for persons with disabilities, loading and taxis, public and service functions, car sales, and bike and motorcycle parking. Charities and non-profit organizations with unpaid parking are also exempt from the tax. Category 2 areas have additional exemptions for clients of retail shops, patients of hospital facilities, and employee parking for persons who work in retail shops.\textsuperscript{26}

<table>
<thead>
<tr>
<th>For each parking space owned as of</th>
<th>Category 1 Levy amount</th>
<th>Category 2 Levy amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Jul-11</td>
<td>$2,100</td>
<td>$740</td>
</tr>
<tr>
<td>1-Jul-10</td>
<td>$2,040</td>
<td>$720</td>
</tr>
<tr>
<td>1-Jul-09</td>
<td>$2,000</td>
<td>$710</td>
</tr>
<tr>
<td>1-Jul-08</td>
<td>$950</td>
<td>$470</td>
</tr>
<tr>
<td>1-Jul-07</td>
<td>$930</td>
<td>$460</td>
</tr>
<tr>
<td>1-Jul-06</td>
<td>$900</td>
<td>$450</td>
</tr>
<tr>
<td>1-Jul-05</td>
<td>$880</td>
<td>$440</td>
</tr>
<tr>
<td>1-Jul-04</td>
<td>$860</td>
<td>$430</td>
</tr>
<tr>
<td>1-Jul-03</td>
<td>$840</td>
<td>$420</td>
</tr>
<tr>
<td>1-Jul-02</td>
<td>$800</td>
<td>$400</td>
</tr>
<tr>
<td>1-Jul-01</td>
<td>$800</td>
<td>$400</td>
</tr>
<tr>
<td>1-Jul-00</td>
<td>$800</td>
<td>$400</td>
</tr>
</tbody>
</table>

The revenue must be applied towards public transportation and transit facilities through the Transport Infrastructure Fund and cannot be applied to operating expenses.\textsuperscript{28}

How was it implemented?
The Office of State Revenue (OSR) sends a parking license registration to all non-residential property owners within the business area boundary. Owners must register as soon as they become owners of a taxable parking space, thus both existing and new parking developments are subject to the tax. Parking property owners are required to survey and report the number of marked parking spaces as well as

\textsuperscript{28} Personal communication with Kelvin Bannan, City of Sydney, Transportation Policy Analyst, on January 24, 2012.
unmarked land-use areas for motor vehicle parking on their initial registration, as well as on their annual parking tax return. This registration is only repeated if parking conditions change or property sales take place. In Sydney, the metric for converting parking land-use to stalls is 25.2 square meters per stall which takes into account spaces and access lanes. Based on this registration record, owners receive annual instructions on how to file online as well as the amount of taxes due.

The amount of tax is based on a formula where the amount of tax per space equals the base rate for that year for the facilities times the number of days that that the facilities and the space were taxable, then divided by the number of days in the year.²⁹ Per space taxes are summed to determine the annual fee for the entire parking facility.

Pro-rating of taxes for lots which are used infrequently require daily occupancy counts to record how often the spaces are in use. This information is recorded and reported to by the property owner.³⁰

Revenues deposited into the Transport Infrastructure Fund are used to fund city or regional public transportation projects within the Greater Sydney Metropolitan Area. Typical project types include³¹:

- Dedicated bus lanes;
- Interchanges for bus, rail and ferry services;
- Commuter car parking facilities and improved transport interchange facilities at key locations across the transport network;
- Improvement of public transport infrastructure, such as the development of rapid bus-only transitway bus stations and light rail (tram service), which provide services within or to/from districts where the levy applies; and
- Improvement of street electronic passenger information systems associated with transportation infrastructure.

Lessons learned

The levy has not dramatically affected the parking supply as much as it works to curb car usage.³² There are dramatic drop-offs in car usage at times when the fee is increased significantly, as was the case when the fee more doubled between 2008 and 2009 for Category 1 areas, and increased by about 50% for Category 2 areas. According to the Office of State Revenue (OSR), the parking supply is fairly constant due to parking standards in development ordinances, whereby supply that is lost is replaced by new supply.

Currently the annual revenue from the parking tax is about $100 million AUD, with 60-70% of the revenue coming from Sydney.³³ In 2010-2011, the state collected $97.3 million AUD in parking tax

³² Personal communication with Rod Bradbury, NSW Office of State Revenue, Senior Technical Advisor, February 6, 2012.
³³ Ibid.
revenue. An earlier figure (2001) showed the levy generated about $40 million AUD in Sydney alone. The agency uses revenue and the resulting projects to measure the success of the policy. Another more subtle metric of the policy’s success and public perception is the number of complaints which parliament members receive with the regards to the high cost of parking due to the tax.

Enforcement of the fee is achieved through monitoring of tax returns, regular site surveying, analyzing parking databases, and charging of interest and penalty fees. Every year, parking property owners must log a return with the number of parking spaces which are tracked by computer models which report variances above set tolerance levels. For example, if a property owner reports 100 spaces one year and 20 the next, staff are automatically notified to follow-up on that case. The OSR also has two dedicated staff members responsible for walking business districts to report breaches in compliance. The agency regularly references datasets from various agencies which provide them with up-to-date data on parking locations and spaces.

The agency has achieved a high compliance rate through constant monitoring and enforcement. Most parking owners comply with the law, with common non-compliers being owners of one to two spaces.

OSR reported two main challenges associated with the parking tax. The first was writing and continuously updating the law to consider all the exception cases for special parking types, and the second was responding to owners seeking to challenge the law to seek additional exemptions. For example, there are areas within Sydney where buses are parked when not in use, and while it is not the intention of the policy to charge for this kind of use, there is currently no clause to exempt these. Flexible parking spaces with multiple uses also make it difficult to clearly determine whether the spaces should be taxed or exempt.

3.9. **Edinburgh Parking Guidance and Information System**

The City of Edinburgh was one of the first jurisdictions to implement an intelligent parking information system. The first generation system was implemented in the late 1990’s and included real time information on parking lot occupancies in the core parking area. It also included advanced signage indicating the number of spaces available in nearby lots. Following the introduction of the initial system, which was not without challenges, the City introduced a second generation parking guidance system in 2006 as part of an overall Urban Traffic Management Control (UTMC) system.

**What was the policy?**

The City of Edinburgh is a major economic centre for Scotland and is also a major tourist area. Due to the historic evolution of the City, traffic congestion and parking capacity is a major on-going issue. In response to these concerns, the City implemented a route and car-park Guidance system with the aim of providing:

- Route & car park guidance to Edinburgh’s travelling public

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• Provide a UTMC platform for further ITS & real-time public transport information initiatives

The Route and Car Park Guidance System includes:

• Accident, event, incident and roadwork’s management
• Car park management
• Strategic Variable Message Sign (VMS) control
• Asset management
• Car park queue detection

The system is also linked to a public website which provides real-time car-park occupancy data. Complimentary travel assistance includes real time transit information and parking payment by cell phone.

Figure 6 – Real Time Parking Occupancy Web Map

Source: www.edinburgh.gov.uk/info/1265/parking_and_car_parks

How was it implemented?

The Edinburgh Route and parking Guidance Information System is an initiative lead by the City of Edinburgh Council with funding support from South East of Scotland Transport Partnership (SESTRAN).

The main feature of the route and guidance system is a series of signs placed around the City core with real-time information on parking availability, as well as directional signage.

36 Information gather from Mott MacDonald project summaries, www.cdmf.info/client_edin.htm
37 Based on review of www.edinburgh.gov.uk/info/1265/parking_and_car_parks
Unlike the original system, the second generation system was implemented as part of an overall Urban Traffic Management Control or UTMC programme. The UTMC programme is the main initiative of the UK Department for Transport (DfT) for the development of a more open approach to Intelligent Transport Systems or ITS in urban areas. UTMC systems are designed to allow the different applications used within modern traffic management systems to communicate and share information with each other. In other words, the parking system is integrated with and can draw on other data sources such as cameras, Variable-message signs (VMS), traffic signals, air quality monitoring stations and meteorological data.

**Lessons learned**

As noted above, Edinburgh implemented an initial car-park system in the late 1990’s, and then subsequently designed and implemented a newer system in 2007. There were several changes with the initial system including:

- Equipment failures and vandalism issues
- Challenges in collecting and ensuring accurate real-time information
- Lack of compatibility with UTMC components
- No real-time information on other travel options

It is also understood that the original system did not include the remote park and rides, which were under-utilized.

The newer system addresses a number of these issues and is a much more flexible and adaptable system. For example, the web-site functions continue to be improved and linked to the overall traveller information system.

**Key benefits of the system include**:

- Increased park and ride utilization
- Possible decreased City Centre congestion, due to reduced circulation by people looking for parking
- Ability to inform drivers of adverse conditions
- Ability for drivers to pre-plan journeys and parking choices

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38 Based on information provided by staff in IBI Group’s Glasgow office
39 [www.its-uk.org.uk/filelibrary/file/McLeod.pdf](http://www.its-uk.org.uk/filelibrary/file/McLeod.pdf)
4. CONCLUSION

4.1. IMPLICATIONS FOR TransLink

While land use planning, development regulation, and parking enforcement in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink has an opportunity to help shape parking policies and regulations at the municipal level by providing guidance via the Regional Transportation Strategy as well as TransLink’s Transit Oriented Communities Design Guidelines or through other future guidelines. TransLink in conjunction with Metro Vancouver and the local municipalities may find it useful to create a set of parking guidelines to help provide guidance on parking policies to municipalities. In addition, TransLink has the opportunity to apply some of the policies and tools discussed in this report at its park and ride facilities.

4.2. RECOMMENDATIONS FOR REGIONAL TRANSPORTATION STRATEGY

Historically, “solving the parking problem” almost always meant increasing supply. Unfortunately, constantly increasing parking supply simply encourages more auto use, as people are encouraged to drive to places that offer “plenty of free parking.” While providing an adequate parking supply is important, there are a number of tools available that can help manage parking demand while also making the most efficient use of the current parking supply. This report has provided background information on a number of viable parking strategies and profiled nine locales where these measures have been put into practice, illustrating a wide range of tools for managing parking demand and supply and creating transit-oriented and supportive communities.

The strategies discussed in this report have a wide range of outcomes and varying levels of impact on land use, parking demand, and the efficiency of enforcement and monitoring. Table 5 below shows the relative importance of each set of strategies as they relate specifically to TransLink’s larger long term land use goals.

<table>
<thead>
<tr>
<th>Parking Management Strategy</th>
<th>Optimising the supply of parking</th>
<th>Generating increased parking revenue</th>
<th>Ensuring the best use of land and promoting compact communities</th>
<th>Reducing private vehicle trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Regulations and Incentives</td>
<td>★</td>
<td>●</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>Demand Management</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>Supply Enhancement</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>○</td>
</tr>
<tr>
<td>Monitoring and Enforcement</td>
<td>○</td>
<td>★</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Payment Technology</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Of all of the categories of measures described in detail in Chapter 2, zoning and incentives and demand management have the greatest potential to shape land use and effectively manage parking demand.
Flexible parking standards and parking maximums can help reduce barriers and lower development costs to in-fill development by allowing for reductions in parking to be made in those developments that generate less parking demand. These measures also enable development to be more context and site appropriate by providing the amount of parking that reflects the level of demand generated by that specific location. Zoning and incentives measures such as allowing off-site parking and creating shared parking also encourage in-fill development by enabling new development to meet their parking needs off-site if necessary. Demand management strategies are the most effective way to manage existing parking supplies and help reduce the need for additional parking supply. Demand management strategies such as demand-responsive parking pricing and parking taxes can be key tools for influencing travel behaviours to various destinations and can encourage the use of non auto modes.

The case studies profiled in Chapter 3 focused on zoning and incentives as well as demand management strategies as these types of measures have the greatest potential impacts with respect to TransLink’s long term goals and the greatest impact on encouraging the use of non auto modes. The City of Arlington has implemented shared parking requirements for new development which has enabled the City to provide adequate parking while reducing the amount of public parking needed, thus in turn reducing public parking costs and increasing the amount of infill development near transit. The City of Toronto has found that the implementation of parking maximums in the downtown area has contributed to a high non auto mode share and a large pool of shared parking that is priced according to the market. The use of in-lieu fees in the City of Santa Monica has enabled the city to construct shared parking facilities which in turn reduce the amount of parking that must be constructed for each individual land use. The use of parking taxes in the city of Sydney has increased the usage of non-auto modes to the downtown and has provided a significant source of funding for transit projects.

These case studies provide insight on what are some of the challenges and key lessons learnt when implementing parking policies. A key lesson learned is that clear communication is critical when implementing new policies to ensure that developers understand how new zoning regulations and incentives may affect their projects and that the general public understands why parking management measures such as pricing are necessary and may in fact benefit them. Once a new policy is in place, tweaks may need to be made to ensure that a program or policy is functioning as intended and may require more oversight and management in the beginning when kinks are still be worked out. Lastly, flexibility should be built into new policies and programs in order to efficiently adapt to needs that may change over time as well as to address areas of the policy or program which may need adjustment.

Another key lesson learned is the need for ongoing oversight of parking policies. While more attention is needed in the beginning when a program or policy is launched, ongoing monitoring and evaluation enables a jurisdiction to determine if the policy or program is in fact meeting the intended goals and objectives and if there are other unintended outcomes.

As TransLink moves forward with the development of the Regional Transportation Strategy, language regarding desired parking policies and strategies should be included as it is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. These ideas should be reinforced through education and outreach and in coordinated planning efforts with local municipalities and other agencies.
Summary: The purpose of the Local (B) paper is to provide TransLink with a local perspective of the practices, policies, and metrics for parking management undertaken by Metro Vancouver municipalities to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management in the region. While land use planning and development regulation in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink works with the municipalities and Metro Vancouver to coordinate regional land use and transportation strategies and plans to support regional objectives. As part of these regional planning coordination efforts TransLink has an opportunity to help shape parking regulations and guidance at the municipal level in support of mutual municipal and regional objectives.
<table>
<thead>
<tr>
<th>Document Title</th>
<th>Parking Management: B. Local Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document #</td>
<td>3.222B</td>
</tr>
<tr>
<td>Date</td>
<td>April 19, 2013</td>
</tr>
</tbody>
</table>
| Authors              | **IBI Group:** Brian Hollingworth, Stuart Anderson, Laura Cham  
                        **Nelson\Nygaard:** Thomas Brennan, Jessica ter Schure, Francesca Napolitan |

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EXECUTIVE SUMMARY

Parking regulations are a key component of land use planning as parking directly impacts the physical form of the built environment. In addition, managing parking supply and demand is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. The purpose of this report is to provide TransLink with an overview of local practices, policies, and experiences on parking management to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management.

Local parking issues and analysis are based primarily on municipal zoning and/or parking bylaws and discussion with municipal staff. Discussion of residential parking is taken from the recently conducted Metro Vancouver Apartment Parking Study, while off-street non-residential parking supply and trends are based on data associated with the TransLink Parking Stall Tax. This data was collected in 2005 and includes all off-street non-residential parking that was taxable under the associated bylaw. This parking tax data does not include on-street parking, residential parking or estimates of utilization.

The scope of parking management is wide ranging among Municipalities in terms of:

- **Parking Operations and Management** – The majority of Municipalities do not own or operate public pay parking facilities. Only nine Municipalities operate pay on-street and/or off-street parking, while a few others own parking public facilities but are free to users. Generally, transportation and/or engineering municipal departments oversee parking-related issues (parking standards, traffic/parking bylaws, as a component of transportation planning). It is not common to have staff dedicated solely to public parking management unless the municipality is responsible for a significant amount of publicly-owned and operated pay parking, such as the City of Vancouver which has a dedicated city department responsible for parking management and operations.

- **Parking Standards** – Many Municipalities employ provisions in their zoning and/or parking bylaws to manage parking supply and allow for flexibility of required spaces to encourage more sustainable modes of travel (e.g. transportation demand management strategies, bicycle parking), although some Municipalities are shown to have high parking standards or do not include provisions for reduced requirements compared to their peers in the region.

- **Technologies** – The application of parking technologies to enhance supply/operations (e.g. real-time availability), payment and monitoring/enforcement is not widespread across the Region, although there is an upward trend towards the implementation of new technologies such as pay-by-phone, credit card or quick-read codes, automated license plate reading technology, and others.

A number of strategies to be considered as part of the parking management component of the Regional Transportation Strategy are discussed.

**Guidance**

TransLink is well positioned to provide guidance and to local Municipalities on how to set parking standards for private development and the appropriate ratios for different geographies and land use categories, particularly for urban designations outlined in the Regional Growth Strategy. For example, it
is challenging and perhaps risky for one municipality to deviate significantly from current practices in isolation from other Municipalities.

Guidance with regards to effective parking management strategies such as flexible parking standards, bicycle parking, parking maximums and others should also be considered to support sustainable transportation choices across the region.

**Parking and Transit**

The RTS will need to address the complex issue of how to balance parking supply and demand near transit stations given multiple objectives including reducing auto demand (lower parking density), maximizing park-and-ride use and opportunities, serving residents and non-residential retailers, and encouraging high-density developments. This also includes approaches to parking supply management and operational strategies near existing and future high-demand areas with TransLink service, as well as guidance on appropriate levels of parking standards for developments in these areas.

**Parking Performance Criteria**

Parking management considerations will increasingly inform discussions between TransLink and Municipalities when planning for major transit investments. Specifically, major considerations would address how parking management strategies could proceed and complement transit investments.

**Parking Design Guidelines**

The Regional Transportation Strategy could include parking design guidelines to encourage high-quality facilities and move away from large surface parking to more compact facilities that reduce impacts on environments, integrate urban-form characteristics and maximize safety.

**Parking Incentives and Regional Programs**

An effective parking management strategy should promote the use and expansion of regional programs that reduce parking demand such as carsharing, ridesharing and other carpool parking incentives. Regional guidelines, regional staff designated to work with Municipalities on these issues, and other incentives at the regional level may attract Municipalities towards creating and adopting strategies that encourage these services.
1. INTRODUCTION

1.1. REGIONAL TRANSPORTATION STRATEGY

In order to support the development of more evidence-based plans, policies, and strategies – including an update to the Regional Transportation Strategy in 2013 – TransLink has commissioned a series of working papers. The papers are designed to help illuminate and explore key issues from a global context (A-series papers) and from the local context of Metro Vancouver (B-series papers). This paper sets the local context for parking management.

1.2. PURPOSE & SCOPE OF THIS REPORT

While land use planning and development regulation in Metro Vancouver are the responsibility of the municipal governments that make up the region, TransLink works with the Municipalities and Metro Vancouver to coordinate regional land use and transportation strategies and plans to support regional objectives. As part of these regional planning coordination efforts TransLink has an opportunity to help shape parking regulations and guidance at the municipal level in support of mutual municipal and regional objectives.

Parking regulations are a key component of land use planning as parking directly impacts the physical form of the built environment. In addition, managing parking demand is key to creating transit-oriented and supportive communities as it is one of the most effective strategies for shifting travel demand away from single-occupancy vehicle use toward walking, cycling and transit. More specifically, the price and availability of parking are two very important factors in any individual’s choice of travel mode.

The purpose of this report is to provide TransLink with a local perspective of the practices, policies, and metrics for parking management undertaken by Metro Vancouver Municipalities to inform the development of the RTS and ultimately the development of a guiding policy and planning framework for parking management in the region.

1.3. METHODOLOGY

The scope of this study includes a summary of current parking operations of Metro Vancouver Municipalities based primarily on:

- Publicly available parking information through municipal zoning and/or parking bylaws and municipal websites; and,

- In-depth discussions with municipal staff. The study reached out to Metro Vancouver Municipalities for participation to gain insights on parking management issues and opportunities that these Municipalities and their residents, business owners, developers, etc. face in regard to parking. Telephone conversations were held with 14 Municipalities and one of the major universities in the Region.

Where appropriate, information is also provided on major regional universities due to their significant parking management operations.
Analyses of parking supply and trends are primarily based on data associated with the Metro Vancouver Apartment Parking Study and the TransLink Parking Stall Tax. The parking stall tax data was collected in 2005 and includes all off-street non-residential parking that was taxable under the associated bylaw. This data does not include on-street parking, residential parking or estimates of utilization.

1.4. Organization of Report

Following this introduction, the research and analysis portion of this report is divided into two main sections. The first section, consisting of Chapter 2, provides an overview of local practices under six main areas:

- Parking Management Organizational Structures
- Parking Regulations/Standards and Incentives
- Demand Management
- Supply Enhancement
- Monitoring and Enforcement
- Payment Technology

These categories are drawn from the Global Practices Paper which included a comprehensive inventory of parking management practices.

One of the key findings of the Global Practices Paper was that of all of the categories of measures reviewed, zoning and incentives and demand management have the greatest potential to shape land use and effectively manage parking demand. Accordingly, Chapters 3 and 4 of this report start to explore the relationship between parking supply, demand and urban form at a very high level. Chapter 3 provides a high level summary of the Metro Vancouver Apartment Parking Study. Chapter 4 utilises the parking stall tax data and other sources to explore relationships between parking supply, demand, pricing and land use for non-residential uses. It should be noted that the lack of comprehensive data on parking supply and utilization across the Region prevents a detailed analysis of cause and effect.

Finally, Chapter 5 provides some high level conclusions on issues and opportunities for parking management and recommendations for the Regional Transportation Strategy.
2. OVERVIEW OF LOCAL PRACTICES

This chapter summarizes current parking operations, local practices and policies being implemented by Metro Vancouver Municipalities. Information is based primarily on reviews of municipal zoning and parking-related bylaws, and on telephone conversations with staff from Metro Vancouver Municipalities conducted in February 2012. Discussions with municipal staff focused on parking operations, management and related issues and/or opportunities in their jurisdiction. A summary of these interviews is provided in Appendix C.

Local practices and parking-related issues are grouped into six major categories:

- Parking Management Organizational Structures
- Parking Regulations/Standards and Incentives
- Demand Management
- Supply Enhancement
- Monitoring and Enforcement
- Payment Technology

With the exception of management organizational structures, the categories are in line with those presented in the Parking Management Series A Global Context foundation paper. A glossary of terms and brief description of parking terminology are included in Appendix A.

For each category, a summary of jurisdictional practices, comparisons, common approaches and unique issues for Metro Vancouver Municipalities are provided. General themes of effectiveness and outcomes are also discussed.

2.1. PARKING MANAGEMENT ORGANIZATIONAL STRUCTURES

2.1.1. Jurisdictional Comparisons

Municipalities

In Metro Vancouver, each municipality has jurisdiction over the management of public parking operations within its jurisdictional boundary. This includes on-street parking restrictions, on-street paid parking and publicly-owned off-street parking facilities, to the extent that each of these exist.

As shown in Table 1, parking management and operations responsibilities are generally under the responsibility of engineering departments for most Metro Vancouver Municipalities. Other Municipalities have included these responsibilities under the mandate of Planning and Development Services, or under the Public Works or Roads and Transportation department. Parking enforcement is generally carried out by the bylaw enforcement department or division. Exceptions include the City of Vancouver and the City of New Westminster where a parking services group is responsible for enforcement of parking regulations. Enforcement and monitoring is further discussed in Section 2.5.
### Table 1: Summary of Public Parking Management Organization Structure by Municipality

<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Planning and Operations</th>
<th>Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village of Anmore</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Village of Belcarra</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Bowen Island Municipality</td>
<td>n/a</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>City of Burnaby</td>
<td>Engineering: Traffic Division</td>
<td>Branch of Bylaw Enforcement dedicated to parking enforcement</td>
</tr>
<tr>
<td>City of Coquitlam</td>
<td>Engineering &amp; Public Works: Roads &amp; Transportation Services (Transportation Planning, Traffic Operations)</td>
<td>Bylaw Enforcement Third-party operator for paid-parking</td>
</tr>
<tr>
<td>Corporation of Delta</td>
<td>Engineering Dept.: Transportation Division</td>
<td>Bylaws, together with Delta police</td>
</tr>
<tr>
<td>City of Langley</td>
<td>Engineering, Parks &amp; Environment Dept.</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>Township of Langley</td>
<td>Engineering</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>Village of Lions Bay</td>
<td>Public Works</td>
<td>n/a</td>
</tr>
<tr>
<td>District of Maple Ridge</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>City of New Westminster</td>
<td>Engineering Dept.: Parking Services</td>
<td>Engineering Dept.: Parking Services</td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>Engineering: Transportation</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>District of North Vancouver</td>
<td>Engineering: Transportation Planning and Traffic Engineering</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>City of Pitt Meadows</td>
<td>Engineering Development Services: Transportation</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>City of Port Coquitlam</td>
<td>Development Services Engineering &amp; Operations</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>City of Port Moody</td>
<td>Roads &amp; Transportation</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>City of Richmond</td>
<td>Planning &amp; Development Dept.: Transportation Division</td>
<td>Community Bylaws</td>
</tr>
<tr>
<td>City of Surrey</td>
<td>Engineering Dept.: Transportation</td>
<td>Bylaw Services</td>
</tr>
<tr>
<td>Tsawwassen</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>Engineering Services: Neighbourhood Parking and Transportation Branch</td>
<td>Engineering Services: Parking Operations and Enforcement Branch</td>
</tr>
<tr>
<td>District of West Vancouver</td>
<td>Engineering &amp; Transportation Dept.</td>
<td>Bylaw &amp; Licensing Services Department</td>
</tr>
<tr>
<td>City of White Rock</td>
<td>Planning &amp; Development Services: Parking Services</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: "n/a" is noted where information was not readily available through the municipality’s website or discussed with municipal staff.

**Universities**

There are two major post-secondary institutions in Metro Vancouver that own and operate a significant amount of parking: University of British Columbia (UBC); and Simon Fraser University (SFU). The main campus for UBC is on the peninsula to the west of the City of Vancouver and for SFU at Burnaby Mountain, though both institutions have additional campuses across the region, including Downtown Vancouver. Parking management discussed in this report refers to parking services at the two primary campuses in Metro Vancouver.

Both universities have designated parking services responsible for all parking operations in their main campuses: the Parking & Access Control Services at UBC and Parking Services at SFU. These services are ancillary departments of the university, and as such, are stand-alone departments and must be self-
supporting (financially). Parking departments are generally responsible for parking management and operations on campus, including permits (faculty, staff, student), visitor parking, and special-event parking arrangements, as well as enforcement, ticketing and towing illegally parked cars on campus.

2.1.2. Effectiveness and Outcomes

Overall, the majority of Municipalities do not have staff dedicated solely to public parking management and related issues. Where this is the case the transportation planning and/or traffic operations division oversee the operations and management of parking.

One of the largest exceptions is the City of Vancouver, which has two branches of the Engineering department that oversee parking-related operations within its jurisdiction. The Neighbourhood Parking and Transportation Branch is focused on the residential parking concerns such as residential parking permit programs. The Parking Operations and Enforcement Branch, the largest branch in the Transportation Division\(^1\), is responsible for compliance and enforcement of several City bylaws associated with parking meters, street and traffic and other parking regulations.

The current organization models for each municipality correspond well with the type and extent of parking operations in each jurisdiction (see Section 2.3). However, where there is a lack of staff dedicated primarily to parking, it is difficult to conduct major long-range planning for parking operations and management, such as pricing strategies, development and implementation of new initiatives, etc.

As Municipalities continue to experience residential and employment growth and parking operations in each jurisdiction may expand in the future, there is an opportunity to develop best practices and lessons learned across the Region of parking management approaches and governance models.

2.2. Parking Regulations/Standards and Incentives

2.2.1. Jurisdictional Comparisons

Bylaw Requirements

As noted earlier, Municipalities manage off-street parking supply through parking standards in zoning and parking-related bylaws. A summary of parking requirements (spaces per dwelling unit or gross floor area) for residential, retail and office land uses by municipality is included in Appendix B.

Residential Land Uses

For typical residential uses, parking requirements range between 1 and 2 spaces per dwelling unit, plus additional spaces for developments with secondary suites, and additional spaces for visitors. Most Municipalities have single-family unit requirements of 2 spaces per unit, except for the City of Vancouver and neighbouring Municipalities to the east (Burnaby, New Westminster, Port Moody) and the north (West Vancouver, District of North Vancouver, and City of North Vancouver). Multi-unit residential development parking requirements (shown in Figure 1) average around 1.25 spaces per dwelling unit, excluding visitor parking, with most Municipalities having a range of requirements based on:

\(^1\) City of Vancouver Engineering Parking Services webpage. http://vancouver.ca/engsvcs/parking/enf/history.htm
• Size of unit (number of bedrooms). For example, the City of Coquitlam parking requirements for apartment land uses are 1 space per bachelor and one-bedroom units, and 1.5 spaces per dwelling unit with two or more bedrooms.

• Location, land use district or land use zones (e.g. lower requirements in downtown or city centre zones). For example, in Burnaby, requirements are 1.35 for apartments (excludes 0.25 for visitor units, and 1.0 per dwelling unit for apartments in the Urban Village Non-residential District (Hastings)).

Figure 1: Parking Requirements for Multi-Unit Residential Land Uses

Notes: Vancouver parking requirements vary based on size of dwelling unit.
ITE Parking Generation 4th Edition. Range for weekday urban low/mid-rise and high-rise apartment (combined)
Office and Retail Land Uses

Parking requirements for office and retail land uses are broader across Municipalities (see Figure 2 and Figure 3) partly because non-residential land uses are more diverse in nature compared to residential uses. Office parking requirements average between 2 and 3 spaces per 100 m² of gross floor area (GFA), with some Municipalities reducing requirements for land uses in city centres or designated zones. Some Municipalities have reductions for areas above the ground or second floor.

For general retail land uses, parking requirements vary significantly between Municipalities. Delta, Township of Langley and Lions Bay have parking requirements greater than 5 spaces per 100 m² GFA, a reflection of their outer-urban location in the region, where modes other than the auto are not available to the same degree as inner-urban Municipalities.

Additional discussion of non-residential parking requirements, employment densities and mode shares are included in Section 4 of this report.

Figure 2: Parking Requirements for Office Land Uses

In addition to parking standards, various strategies and incentives can be prescribed to encourage reduced parking supply and more efficient use of parking resources. Strategies are discussed in the Parking Management Series A Global Context foundation paper. A glossary and brief description of each strategy is included in Appendix A.

Table 2 summarizes the review of zoning related parking strategies found in Metro Vancouver Municipalities. The most common strategy is the allowance for off-site parking, although this is generally restricted to within 90-300 metres of the development site. Off-site parking allowance is typically not allowed for residential land uses, and in some cases is restricted to certain land uses or specific areas of the municipality.

Cash-in-lieu of parking fee provisions are also common for the more populated Municipalities, with fees ranging from $8,000 to $35,000 per parking space. Provisions for cash-in-lieu are restricted to
designated areas such as city centres, special heritage or historical areas, or specific neighbourhoods, and are generally mixed-use, higher density areas. For example, Burnaby allows for cash-in-lieu for non-residential uses on Hastings Street between Boundary Road and Delta Avenue and the City of Richmond’s cash-in-lieu provisions are limited to the Steveston area. The City of New Westminster provides for cash-in-lieu for developments within 1,500 feet of a city parking facility.

Flexible parking standards are also common among Metro Vancouver Municipalities and are specified in their bylaws. Flexible standards are set as lower parking requirements for specific areas, such as in the case of Vancouver, White Rock, City of Langley and the Township of Langley (where requirements are reduced by 50% for the Fort Langley area), or as potential reductions in parking requirements through the application of transportation demand management (TDM) measures or parking studies to justify the reduced requirement, as is the case for New Westminster, Pitt Meadows and Richmond.

The City of New Westminster and the City of Vancouver are the only two that have provisions for a maximum number of parking spaces for certain land uses.

The District of Maple Ridge manages its parking operations in the downtown area similar to a parking benefit district. The municipality owns a number of public parking lots which are managed by the Downtown Parking Association. The income generated from the downtown parking lots is used for specific expenditures within the district.

### Table 2: Zoning and/or Parking Bylaw Strategies by Municipality

<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Parking Maximums</th>
<th>Flexible Parking Standards</th>
<th>Shared Parking/Park Once</th>
<th>Allowing Off-Site Parking</th>
<th>Parking Benefit Districts</th>
<th>In-Lieu Fees</th>
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<td>City of Coquitlam</td>
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<td>Corporation of Delta</td>
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<td>City of Langley</td>
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<td>Township of Langley</td>
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<td>Village of Lions Bay</td>
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</tbody>
</table>

*Key: ✓ = strategy/policy is legislatively in force in the Municipality; - = strategy/policy is not in place.*
Incentives

It is difficult to assess the extent to which incentive strategies are being used across the region, as these are generally implemented on a case-by-case basis by developers. However, some Municipalities discussed working with developers to minimize the amount of parking spaces provided, and to integrate design features (e.g. bicycle parking) or provide transit tickets/passes to promote more sustainable forms of transportation.

2.2.2. Effectiveness and Outcomes

In addition to zoning and parking incentives, some Municipalities in the Region have recently updated or are planning to review their zoning bylaws to reflect reductions in minimum parking requirements by land use. This is in line with sustainability goals to encourage higher density and more compact developments that are more in line with dense urban form and are conducive to public transit, active transportation and other sustainable forms of travel. On the other hand, a few Municipalities noted recent studies and reviews of their bylaws concluded changes in their minimum parking requirements are not warranted at this time.

Additional parking issues referred to by Municipalities included:

- Visitor parking can be perceived as not convenient, which creates spill-over problems for on-street parking.
- Although parking standards for single-family, semi-detached and/or townhouses are generally 2 spaces, it is common for garages to be used for storage and residents parking a second vehicle on the street.
- There is a prevalent mindset of entitlement to on-street parking in front of residential units (i.e. ownership or priority of space in front of home), which contributes to residents perceiving there is a neighbourhood parking problem.

While land use planning and parking regulations remain the responsibility of municipal governments, TransLink plays a major role in this area as increases in transit service (including the introduction of frequent transit) can be a catalyst – by providing a sustainable transportation choice that reduces car ownership – towards reducing parking standards.

In addition, as a regional and multimodal transportation authority, several Municipalities identified TransLink as the most logical administrative body to develop guidance on parking requirements and demand for land uses that reflect the range of opportunities and challenges for Metro Vancouver Municipalities, particularly for high density areas around transit stations and major transit interchanges.2 One challenge that Municipalities face is the need to remain consistent with other jurisdictions so as to remain competitive. For example, if a municipality were to singularly adopt strict parking maximums for office uses, these uses could consider locating elsewhere.

2 This is already underway in the form of TransLink’s Transit Oriented Communities guidelines and work associated with Frequent Transit Development Areas.
2.3. PARKING OPERATIONS

2.3.1. Jurisdictional Comparisons

Parking operations vary widely across Municipalities in Metro Vancouver. As shown in Table 3, nine Municipalities operate municipal pay-parking facilities, including on-street parking and off-street parking garages, lots and parkades. Some Municipalities, such as Pitt Meadows, have municipal parking at civic and community facilities but are provided for free to users.

Among issues and challenges discussed with Municipalities with regards to pay parking, is the suburban nature of many Municipalities and availability of free parking by retailers, particularly big-box and large-format non-residential stores. This has resulted in auto-oriented communities where expectations of free parking are high, which can create barriers for implementation of pay-parking by the municipality.

Pay-parking facilities are generally located in downtown areas, town centres or non-residential districts, and parking rates range between $0.50 and $3.00 per hour. The City of Vancouver has the most extensive amount of on-street parking as shown on Figure 4, with parking charges up to $6.

Monthly and annual pay-parking permit/passes are available in a few Municipalities. For example, the City of Richmond offers a monthly on-street parking permit for $50 and a monthly parking permit for three of its city off-street pay parking lots at a cost of $40 per month. Residents of the City of Coquitlam can purchase an $18 one-year parking pass that allows the vehicle to park (without paying the hourly fees) at 3 of the City’s 4 revenue-generating off-street parking lots. The City of White Rock offers an annual decal ($15 per year) for use at the Centennial Arena’s pay parking areas, excluding short-term meters. Parking rates do not appear to change or be adjusted periodically to reflect occupancy data (see Demand-Responsive Pricing strategy in glossary).

A unique parking operation is noted in the City of Port Coquitlam. Its location on a floodplain restricts the construction of underground parking structures and parking at ground level, which constrains the number of on-site parking spaces developers can accommodate. Because of these limitations, the City owns seven parking facilities and leases out the parking spaces to non-residential properties in the downtown to satisfy non-residential parking requirements. Non-residential developments sign a long-term agreement (typically 5 years) with the City for parking stalls in these lots to be used by customers, although these are not exclusive or reserved. Rates are around $7.50 per stall per month, but vary based on the terms of the lease and when the lease was signed. The City leases parking stalls on a first-come, first-served basis, and only leases up to capacity and does not “overbook”.
Table 3: Summary of Parking Operations by Municipality

<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Pay parking</th>
<th>Parking Management Restrictions</th>
<th>Other</th>
<th>Other: Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village of Anmore</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Village of Belcarra</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Bowen Island Municipality</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>City of Burnaby</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Residential annual pass ($18/yr) - allows parking at 3/4 of City-owned pay lots</td>
</tr>
<tr>
<td>City of Coquitlam</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Corporation owns parking lots, but are free of charge</td>
</tr>
<tr>
<td>Corporation of Delta</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>City of Langley</td>
<td></td>
<td></td>
<td>✓</td>
<td>One off-street lot marked “Pay Lot” in downtown</td>
</tr>
<tr>
<td>Township of Langley</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Village of Lions Bay</td>
<td></td>
<td></td>
<td>✓</td>
<td>Village owns but not operates paid lots. Also leases lot from CN with marina -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>marina operates pay parking, share revenue.</td>
</tr>
<tr>
<td>District of Maple Ridge</td>
<td></td>
<td>n/a</td>
<td>✓</td>
<td>Pay-parking: Reserved monthly parking stalls in the District’s six off-street lots,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>as well as the shared public parking stalls in the underground Civic &amp; Cultural Centre</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>lot (although the first hour is free).</td>
</tr>
<tr>
<td>City of New Westminster</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>District of North Vancouver</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>City of Pitt Meadows</td>
<td></td>
<td></td>
<td>✓</td>
<td>City parking at civic and community facilities (free)</td>
</tr>
<tr>
<td>City of Port Coquitlam</td>
<td></td>
<td></td>
<td>✓</td>
<td>Parking leased by City to non-residential properties in downtown.</td>
</tr>
<tr>
<td>City of Port Moody</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>City of Richmond</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Pay-parking off-street at civic and community facilities ($40/month). Monthly on-street permit parking ($50/month). Have time-limit (free) off-street parking lots.</td>
</tr>
<tr>
<td>City of Surrey</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>Third-party pay-parking operators</td>
</tr>
<tr>
<td>District of West Vancouver</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>City of White Rock</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Resident decal ($15/yr) - allows 4 hrs in pay parking at arena</td>
</tr>
</tbody>
</table>

Note: “n/a” is noted where information was not readily available through the municipality’s website or discussed with municipal staff.
Figure 4: Extent of On-Street Paid Parking in the City of Vancouver

Source: City of Vancouver (February 2012)
TransLink administers the Parking Sales tax that applies to all non-residential parking lots within Metro Vancouver. The Parking Tax legislation was introduced in 2005 and came into effect in January 2006, with TransLink taking responsibility from the Provincial government for collection in 2010. Taxable parking is described as “a parking site, space or area, in which a motor vehicle may, for a price or other consideration, be parked for any period of time” ³. The current Parking Tax rate is 21% and has been in effect since January 1, 2010. In addition, parking sales are subject to the 12% Harmonized Sales Tax (HST) as of July 1, 2010.

Almost all Municipalities have time limits or restrictions on on-street parking to encourage turnover of parking spaces and discourage long-term users. However, the extent of these restrictions varies considerably. Time limits are typically 2 to 4 hours, and are the most common strategy employed by Municipalities in Metro Vancouver to manage on-street parking demand. Municipalities noted these are generally implemented along streets in non-residential areas, near major employers or near major transit stops such as terminals, rapid transit stations, or bus interchanges.

A number of Municipalities implement resident-only and/or resident permit parking. For resident parking only (RPO) zones, parking is strictly limited to residents in the area, who may have to display a permit in the vehicle. Resident permit parking (RPP) typically allow vehicles with a valid parking permit to park free of charge or beyond the posted time limits. These residential parking restrictions are generally implemented to deter on-street parking by long-stay users or those trying to avoid pay-parking nearby, and are typically found on neighbourhood streets near major attractors such as schools, arenas and hospitals.

**Campus Parking**

Both UBC and SFU operate all on-street and off-street parking facilities on campus, including: metered on-street parking; garages; parkades; and, surface lots. Parking operations include long-term parking passes available for faculty, staff and students, and hourly and flat-day parking rates for visitors. Both universities have established a multi-level tier parking rate structure, generally based on factors that drive demand: location, weather protection (parkade vs. surface lot), and reserved/unreserved parking stall. For example, parking rates at SFU vary based on a combination of these three factors, such that a permit for a reserved space in covered parking facility located in the centre of campus is more expensive than a permit for an unreserved stall in a surface lot on the outer boundaries of campus. Parking at UBC offers users a variety of parking packages based on access (number of parkades that can be accessed) and frequency (no limit or limited number of entries).

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2.3.2. Effectiveness and Outcomes

As previously discussed, the suburban nature and availability of free parking in many of the Municipalities tends to limit the implementation and extent of public and private pay parking operations. A few Municipalities noted on-street pay parking has been considered by the transportation department, but it is generally not supported by council and the public. Other Municipalities expressed that as communities move towards more urban, higher-density and compact development patterns to accommodate growth, there will be an increase in opportunities to manage parking, particularly in implementing pay parking operations and changing the mindset and perception of “free parking” and “available parking” (e.g. people accustomed to finding a parking space directly in front of home or destination) associated with more suburban forms of development.

Time limit and residential parking (RPO and RPP) strategies are the most common tools currently used by Municipalities to manage on-street parking and provide a balance between residents, local employers and commuters. Parking restrictions are particularly important in near major attractors such as schools, arenas and hospitals, and in neighbourhood and non-residential areas near public transit stops. However, a number of issues and challenges with time limit and residential parking were noted:

- The lack of park-and-ride and kiss-and-ride facilities at some rapid transit stations and major transit interchanges create parking management problems on nearby streets, and are the primary reason behind the implementation of parking restrictions in these areas.
- Although some Municipalities have RPO and/or RPP restrictions, they try to limit application based on the mindset that it is public roadway and on-street parking should, as a default position, remain available to all users.

2.4. Supply Enhancement

2.4.1. Jurisdictional Comparisons

Supply enhancement strategies aim to improve efficiency and capacity of existing facilities to meet demand. A variety of these strategies have been implemented by Metro Vancouver Municipalities.

Intelligent Parking Systems (Guidance)

Real-time space availability displays and other intelligent parking systems (IPS) are not common in parking facilities across Metro Vancouver. In downtown Vancouver, a few parking garages have recently implemented real-time space availability displays at entrance ramps informing drivers of demand and directing them to available capacity. These are primarily found in underground garages that have over 1,000 parking spaces. One garage with IPS, Pacific Centre operated by Easy Park, has over 1,500 stalls underground and spans 3 city blocks. This type of real-time technology is currently not being explored by other Municipalities.  

Park Royal, a shopping centre in West Vancouver, developed “Park Smart at Park Royal” as a parking strategy during the 2011 holiday season. Park Smart established a FM radio broadcast to provide updates on parking availability and direct customers across its 11 major parking areas. Broadcasters

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4 Statement refers only to real-time technologies, and not other parking technologies in terms of payment or enforcement. Based on discussions with municipal staff.
relied on closed-circuit camera feeds and real-time information from staff on the ground. In addition, the Park Smart program included a parking valet service at two of its major parking facilities. Results of this traffic management strategy are not available, though it has been reported the radio station and other components of the strategy may be retained during planned reconstruction in the area.

Parking Design
Parking design strategies such as diagonal parking, reverse angle parking and tandem parking allow for the more efficient use of existing surface area, generally by reducing the area devoted to circulation and manoeuvring, and improvements in safety.

The City of Langley has implemented angle-parking in the downtown area to increase parking capacity for business owners and customers along First Street.\(^5\) Recently, the City is considering back-in angle parking along Douglas Crescent to increase the number of parking spaces and improve safety.\(^6\)

A number of Metro Vancouver Municipalities have provisions in their zoning and parking-related bylaws for the allowance of “small parking spaces”. As shown in Table 4, the bylaws allow for a maximum rate of “small parking spaces” to be provided. The maximum number of stalls that can be designed and designated as “small space” ranges from 10% to 50%, with some Municipalities only allowing these smaller parking stalls where total requirements is greater than 30 spaces. Generally, the small spaces must be clearly marked. The extent of use of this allowance in the region is not known.

<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Maximum Number of “Small Spaces”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowen Island Municipality</td>
<td>35%</td>
</tr>
<tr>
<td>Corporation of Delta</td>
<td>25%, where total number of required parking spaces exceeds 30</td>
</tr>
<tr>
<td>City of Langley</td>
<td>40%</td>
</tr>
<tr>
<td>Township of Langley</td>
<td>20% (must be at 90°)</td>
</tr>
<tr>
<td>District of Maple Ridge</td>
<td>10%</td>
</tr>
<tr>
<td>City of New Westminster</td>
<td>30%</td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>35%</td>
</tr>
<tr>
<td>District of North Vancouver</td>
<td>35%</td>
</tr>
<tr>
<td>City of Pitt Meadows</td>
<td>25%, where total number of required parking spaces exceeds 30</td>
</tr>
<tr>
<td>City of Port Moody</td>
<td>35%</td>
</tr>
<tr>
<td>City of Richmond</td>
<td>50%, where total number of required parking spaces exceeds 30</td>
</tr>
<tr>
<td>City of Surrey</td>
<td>25%</td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>The number of small car parking spaces on a site may not exceed 25% of the total parking spaces required for the site for all uses combined, except that: (a) if the parking spaces on a site are primarily reserved and clearly designated for employee parking in association with office, industrial, or similar uses, the number of such small car parking spaces may increase to no more than 40% of the total parking spaces; and (b) if a particular use requires only two or three parking spaces, one of them may be a small car space.</td>
</tr>
</tbody>
</table>

2.4.2. Effectiveness and Outcomes

Real-time displays and dissemination of parking space availability do not increase parking supply but improve parking operations and customer service. This strategy is most effective and beneficial for large parking facilities where there are multiple parking areas (e.g. floors), multiple access points and aisles/corridors, and other constraints that make it difficult for drivers to gauge availability and operators to control demand. This supply enhancement strategy is thus not as relevant for the majority of parking operations outside the downtown core.

Parking design guidelines in zoning and parking-related bylaws are effective to standardize parking across the municipality. In addition, allowances for small car parking spaces are practical and effective where development areas are constrained. However, potential issues with parking design strategies may arise that offset these benefits. For example, provisions for tandem parking for townhouses have created spill-over problems on residential on-street parking as tenants utilize one parking space (garages) for storage, use the tandem space for one vehicle and park a second vehicle on the street.

2.5. Monitoring & Enforcement

2.5.1. Jurisdictional Comparisons

As noted in Section 2.1, parking monitoring and enforcement are generally carried out by the bylaws enforcement department of division of a municipality, as part of their mandate to ensure compliance of all city bylaws. In some cases, the department or division has a parking section or staff solely dedicated to the enforcement of parking- and traffic-related bylaws.

The application of new technologies in parking enforcement and monitoring is not common among Municipalities, as pay-parking operations are generally limited and on-street parking regulations are typically confined to known areas (i.e. near major attractors). Some Municipalities noted enforcement is primarily done on the basis of complaints.

Of note as a case study, the City of North Vancouver and the districts of North Vancouver and West Vancouver have implemented a new system for bylaw notice disputes, the first Municipalities in British Columbia to have this type of program. The system streamlines all disputes of bylaw notices like parking tickets to a provincially appointed adjudicator, instead of having to appear before a BC Provincial Court, enhancing services for residents and making the process more efficient for all three Municipalities.

2.5.2. Effectiveness and Outcomes

The use of hand held devices or other enforcement practices were not discussed in detail with municipal staff. It is expected that Municipalities with enhanced pay-parking technology such as pay-by-phone and pay-by-plate have more advanced systems that improve the efficiency of monitoring and enforcement. For example, in the City of Vancouver and Richmond, parking officers use a handheld device to verify the license plate number and parking time for any vehicles that have paid by cell phone.

A few Municipalities identified the application of newer technologies in pay parking operations (see Section 2.1) and in monitoring and enforcement as an opportunity to streamline parking management. Particularly, automated license plate reading technology would reduce the labour intensive efforts behind time-limit parking enforcement. And, as most Municipalities in Metro Vancouver implement
time-limit restrictions on on-street parking, these types of enforcement strategies would be applicable across the region.
2.6. Payment Technology

2.6.1. Jurisdictional Comparisons

Table 5 summarizes the types of payment technology implemented at Municipalities with public pay-parking. Most Municipalities have single or double head on-street parking meters, although some Municipalities are considering other newer technologies such as multi-space pay stations, payment by phone, card readers and quick-response code readers. Notable case studies include:

- The City of Coquitlam used to have over 100 on-street parking meters, but due to theft, vandalism and maintenance issues, the City decided to remove them. There are currently only less than 15 on-street parking meters in the area. However, the City noted it is working on reviewing and potentially upgrading its parking payment technology, including pay-by-plate and other types of payment such as debit and smart card.

- The City of Vancouver is the first city in Canada to offer single-space meters that accept credit card.

- The City of Surrey has recently replaced all of its on-street parking meters with new pay-by-plate parking stations.

2.6.2. Effectiveness and Outcomes

Municipalities with pay-parking operations are transitioning to newer, digital payment technologies to improve customer service and convenience, but also to enhance parking monitoring, enforcement and revenue management.

Table 5: Payment Technology by Municipality

<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Meters</th>
<th>Pay-and-display</th>
<th>Pay-by-space</th>
<th>Pay-by-phone</th>
<th>Pay-by-plate</th>
<th>Other: Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Burnaby</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Slowly moving to newer technology.</td>
</tr>
<tr>
<td>City of Coquitlam</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td>Recent RFP for new parking operations and technology. Considering “pay-by-plate” and other types of payment (debit card, smart card)</td>
</tr>
<tr>
<td>District of Maple Ridge</td>
<td>-</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>City of New Westminster</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Pay-by-plate in Sapperton area</td>
</tr>
<tr>
<td>City of Richmond</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td>☑</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>City of Surrey</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>☑</td>
<td>-</td>
<td>☑</td>
<td>☑</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>City of White Rock</td>
<td>☑</td>
<td>-</td>
<td>☑</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
3. RESIDENTIAL PARKING ANALYSIS

Metro Vancouver completed an Apartment Parking Study in 2012 that looked at parking supply and peak residential parking demand of select apartment parking facilities across the region. The study included two surveys: a Parking Facility Survey of peak parking demand, and a Household Survey of residents in the same buildings to capture additional residential data such as household auto ownership, carshare participation, and visitor parking experience.

The study looked at apartment parking facilities across the region, with various proximities to TransLink’s frequent transit network (FTN), with different building ages, and of different building tenure (strata, market rental, non-market rental). A total of 80 sites were included in the Parking Facility Survey, and 90 sites for the Household Survey. Over 1,500 household survey responses were received. Analysis of the Parking Facility Survey and the Household Survey data are summarized below.

Figure 5: Metro Vancouver Household Parking Survey Sites

Source: Metro Vancouver Apartment Parking Study
3.1. **Parking Supply and Demand**

The Apartment Parking Study presents various trends to parking supply, parking demand and household auto ownership, with regards to residential characteristics. Strata residential buildings tend to have higher supply and demand of parking, in line with higher household auto ownership levels, compared to non-market and market rental units. The greatest parking oversupply was observed among market rental units – an expected trend as renters tend to own fewer vehicles.

Looking at strata residential units only, Table 6 shows there is an 18-36% range in parking oversupply across the region based on observations of parking stalls per dwelling unit (DU) and observations of parked vehicles per DU from both the Household Survey (HHS) and Parking Facility Survey (PFS). The Metro Vancouver study notes households in the City of Vancouver and UBC have the lowest vehicles per household. However, a trend not discussed is that vehicles per household is observed to be on par with apartment parking supply in most sub-regions.

| Table 6: Residential Parking Supply and Demand in Strata Sites by Sub-region |
|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Subregion         | Stalls per Dwelling Unit | Stalls per Dwelling Unit | Vehicles per Dwelling Unit | Parked | Parked | Parking |

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Figure 6: Metro Vancouver Parking Facility Survey Site

Source: Metro Vancouver Apartment Parking Study
Table 7 shows multi-unit residential sites near both a rapid transit station and a bus stop have on average the lowest vehicles per household and parking demand compared to sites at other locations. This is expected as these areas offer more attractive alternative transportation choices to owning and using a vehicle and are generally mixed-use developments (reducing the need for automobile for many trips). The study notes that while parking demand around FTN bus service and those near a rapid transit station are not statistically different, the difference in parking supply is statistically significant. The Apartment Parking Study makes the observation that frequent bus service is generally not considered by Municipalities in regards to parking standards, and as a result, these sites have a high oversupply of parking.

<table>
<thead>
<tr>
<th>Geography</th>
<th>Stalls per DU (HHS)</th>
<th>Stalls per DU (PFS)</th>
<th>Vehicles per Household (HHS)</th>
<th>Parked Vehicles per DU (HHS)</th>
<th>Parked Vehicles per DU (PFS)</th>
<th>Parking Oversupply Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beyond FTN</td>
<td>1.39</td>
<td>1.40</td>
<td>1.43</td>
<td>1.25</td>
<td>1.07</td>
<td>11-31%</td>
</tr>
<tr>
<td>FTN Bus Only</td>
<td>1.41</td>
<td>1.43</td>
<td>1.27</td>
<td>1.14</td>
<td>1.04</td>
<td>24-38%</td>
</tr>
<tr>
<td>FTN Station Only</td>
<td>1.28</td>
<td>1.26</td>
<td>1.28</td>
<td>1.16</td>
<td>0.95</td>
<td>10-33%</td>
</tr>
<tr>
<td>FTN Bus and Station</td>
<td>1.30</td>
<td>1.23</td>
<td>1.15</td>
<td>1.06</td>
<td>0.87</td>
<td>23-41%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.35</strong></td>
<td><strong>1.32</strong></td>
<td><strong>1.27</strong></td>
<td><strong>1.14</strong></td>
<td><strong>0.97</strong></td>
<td><strong>18-36%</strong></td>
</tr>
</tbody>
</table>

Source: Metro Vancouver Apartment Parking Study

The Apartment Parking Study also notes there is no evidence to support minimum parking requirements above 1.5 spaces per DU, and provides guidance for lower parking requirements as well as parking maximums. Comparing with the parking requirements discussed in Section 2, Figure 1 shows only a few Municipalities have multi-unit residential parking requirements above 1.5 spaces per DU.

### 3.3. Visitor Parking

Households were asked about visitor parking and their visitor’s level of difficulty in finding a parking space in the residential building. Figure 7 shows visitors of residential sites in Vancouver and UBC have the most difficulty finding an on-site parking space, consistent with generally lower visitor parking requirements and extent of on-street parking regulations in these areas. On-site design considerations
and on-street parking restrictions were also identified as factors that increase visitor parking challenges (as opposed to supply) in North Vancouver and New Westminster, based on individual comments received. These factors are consistent with comments received from municipal staff as part of this study – that on-site visitor parking is generally considered less convenient than on-street parking. However, in these cases, Municipalities noted free and convenient on-street parking contributes to under-utilized on-site visitor parking and spill-over problems.

Figure 7: Visitor Parking Challenges by Subregion

Source: Metro Vancouver Apartment Parking Study

3.4. STUDY FINDINGS

Among the various findings and recommendations from the Metro Vancouver Apartment Parking Study, the following are of note.

The study provides recommended minimum and maximum parking requirements as guidance for Municipalities and developers to: provide more appropriate levels of parking; allow developers to assess and reflect market demand; reduce case-by-case requests for variances; and reduce housing costs through more efficient and innovative forms of housing (e.g. unbundled parking). The recommended minimum and maximum parking requirements reflect various criteria:

- Strata versus market rentals – study survey observed renters have fewer vehicles than home owners;
• Proximity to TransLink’s FTN bus stop and station (see discussion on parking near transit); and,
• Size of units (number of bedrooms).

The lowest parking requirements are recommended for market rental bachelor dwelling units near FTN (minimum 0.25, maximum 1.0), while the base rate for two-bedroom dwelling units is 0.75-2.0 spaces.

The average visitor parking rate of 0.20 visitor spaces per dwelling units is recommended to be reduced to 0.10. In addition, greater flexibility in visitor parking design and access should be implemented to make these parking spaces more convenient and increase their efficiency.

While many Municipalities already include these strategies as provisions in their bylaws, payments in-lieu and shared parking are recommended to improve efficiency of parking facilities and better reflect parking demands.

Also recommended is “a comprehensive approach toward parking” in higher density centres and areas served by transit, and considering on-site and street parking as a system, as well as other factors such as parking facilities in the area and other non-vehicle transportation elements.

The Metro Vancouver study also included a questionnaire for Municipalities in the region that asked about parking standards and related regulations. Among the general comments received by the 11 Municipalities that participated were:

• Requests for variances in parking requirements are common among most Municipalities and are assessed on a case-by-case basis upon the development of a traffic impact study or adoption of TDM measures. This is consistent with the strategy for flexible parking standards discussed in Section 2.2 of this report.

• There is a trend among Municipalities to recognize lower parking requirements near rapid transit and urban centres, although parking requirements are not reviewed or updated on a regular basis. This trend was also observed in this study’s discussions with municipal staff, with some Municipalities having lower requirements for particular areas such as city centres or higher-density areas, and some Municipalities having recently updated or in the process of reviewing their bylaws.

• On-street parking availability is generally not considered in the determination of or reduction of on-site parking. However, based on IBI Group experience, consideration of reduced parking provision based on on-street parking would require detailed parking studies and review of requests on a case-by-case basis.
4. OFF-STREET NON-RESIDENTIAL PARKING SUPPLY ANALYSIS

The following sections review how off-street non-residential parking is currently being supplied throughout Metro Vancouver, and investigate patterns and connections based on a review of available parking data.

4.1. PARKING DATA METHODOLOGY

The database for the Translink Parking Stall Tax was used to provide guidance on where and how much off-street non-residential parking is provided across Metro Vancouver. While the database is comprehensive in terms of coverage, there are some limitations to the data, including:

- The data was collected in 2005/06 and therefore does not include off-street parking areas which have been created or removed in the period since the original survey;
- The data only covers the type of parking which was taxed as part of the policy, i.e. off-street parking that is non-residential. This therefore does not provide a full picture of parking supply in the region but just the characteristics of off-street non-residential parking; and,
- The data does not contain parking supply levels for land uses that were not included in the parking tax bylaw. In addition to residential land uses, this includes: utilities; property owned by TransLink or its subsidiaries; areas used for storage of inventory; areas used for servicing/fueling motor vehicles; ferry loading areas; and property that is wholly exempt from property tax (institutions, hospitals etc.).

The survey data is expressed in square metres and not number of parking stalls. For the purposes of this study, the area was converted to an estimated number of parking spaces by assuming 30 m² of parking area per space. This value was checked using aerial photography and field visits (conducted in December 2011) on a sample of parking areas.

In addition to the Parking Stall Tax data, population and employment data from the 2006 census was used to investigate patterns of parking and land use. Transportation mode shares for 2008 at the traffic zone level from the Metro Vancouver regional transportation model were used for travel pattern analyses.

4.2. PARKING SUPPLY

Figure 8 below shows the estimated number of parking spaces for the land uses contained in the parking tax database. It shows that in 2005/06 the Municipalities of Surrey, Richmond, Burnaby and Vancouver all have over 100,000 off-street non-residential parking spaces. Together, these four Municipalities account for over 60% of all off-street non-residential parking in Metro Vancouver.

However, caution is noted in these numbers given the assumptions discussed in Section 4.1. Particularly, there is potential for overestimating the number of off-street non-residential parking spaces in Municipalities with major industrial areas where parking spaces may be larger than the assumed 30 m² (i.e. for trucks or large non-residential vehicles).

Figure 9 presents the percentage of the total urbanized land that is given over for off-street non-residential parking. There are significant variations between the Municipalities, with the City of Langley having 8.6% of urbanized land as off-street non-residential parking but the District of West Vancouver and City of White Rock having only 0.7%. Again, caution is noted because some parking, especially in
Municipalities with high levels of office floorspace, may be structured and the percentage of land required for this parking would be reduced.

**Figure 8 - Off-street Non-residential Parking Spaces by Municipality**

Source: TransLink Parking Stall Tax Database

**Figure 9 – Percentage of the Total Municipal Urbanized Area that is Off-street Non-residential Parking**


Note: The urbanized area if calculated from the Urban Containment Boundary as adopted in the Regional Growth Strategy.
4.2.1. Regional Context

As an initial step, an investigation was carried out on how off-street non-residential parking is provided across the region. Figure 10 shows the distribution of off-street non-residential parking across Metro Vancouver with municipal boundaries and rapid transit lines shown for context (Appendix D includes zoomed-in maps with this data by regional quadrant). The data indicates several major clusters of off-street parking spaces that generally correspond to non-residential/mixed-use areas, as well as main industrial areas.

While the pure number of parking spaces shown in Figure 10 is of interest, the density of parking spaces is a better measure of how parking is provided. Figure 11 shows the non-residential off-street parking density by traffic zone across Metro Vancouver. Areas with stronger colours indicate higher parking density (measured in spaces per hectare). The map shows that the parking is not evenly distributed across the region, or across urban areas. Instead, parking tends to be clustered around regional centres, or close to major transportation corridors such as highways, railroads and waterways.

Parking density tends to be high in the same areas as places of employment. This is to be expected as this data exercise only maps non-residential parking, which by nature will be located in areas with associated office, retail and industrial land uses.
Figure 10: Parking Provision across Metro Vancouver

Source: TransLink Parking Stall Tax Database
Figure 11: Off-street Non-Residential Parking Density by Traffic Zone

Source: TransLink Parking Stall Tax Database
Figure 12 is a scatter plot of parking density versus job density, and illustrates a degree of correlation between the two variables (coefficient of 0.58). The link between job density and parking density is to be expected as this data exercise only maps non-residential parking, which by nature will be located in areas with associated office, retail and industrial land uses, i.e. places of dense employment. However, there are areas with high job density and low parking levels, which may be in part due to transit accessibility and other sustainable modes of transportation.

Figure 12: Parking Density vs. Job Density per Traffic Zone

Source: TransLink Parking Stall Tax Database, 2006 Census

It is useful to look at the number of parking spaces per job by municipality, to determine the relative level of parking and employment. The parking per job ratio, plotted in Figure 13, was estimated using the total parking spaces in each municipality from the parking tax database and the total employment in that municipality from the 2006 census. Municipalities are illustrated in descending order of parking/jobs ratio. This is a high level exercise because the nature and exact location of the job will determine the site specific parking requirements.

Figure 13 shows there is significant variation between the Municipalities. Municipalities with higher ratios are generally located furthest away from downtown Vancouver, with the exception of White Rock and Port Moody. Low parking per job ratios are observed in Vancouver and the North Shore and are likely due to high levels of employment (Vancouver) and geographical constraints that limit major parking facilities.
4.2.2. Parking Characteristics by Land Use

The previous sections looked at the amount of parking across Metro Vancouver. The intent of this section is to provide a more local picture of the different parking conditions throughout Metro Vancouver, and analyze how parking is supplied for different land uses.

The Park Stall Tax data includes information on associated land use. This information was grouped into four broad categories for the purposes of this analysis: retail/services; office; industrial; and, other. The latter includes various non-residential uses, such as recreational, institutional, education, and health care.

Figure 14 through Figure 16 show the location of non-residential off-street parking for retail/services, office employment and industrial land uses, respectively. The following trends are evident:

- Parking associated with retail/services land uses tends to be found along major roads, or in downtown Vancouver.
- Parking associated with office/employment land uses tends to be clustered in downtown Vancouver, with some in other non-residential/regional centres.
- Parking associated with industrial land uses is mostly found adjacent to major waterways or the TransCanada Highway.

Source: TransLink Parking Stall Tax Database, 2006 Census
Figure 14: Retail/Services Land Use Off-street Parking

Source: TransLink Parking Stall Tax Database
Figure 15: Office Employment Land Use Off-street Parking

Source: TransLink Parking Stall Tax Database
Figure 16: Industrial Land Use Off-street Parking

Source: TransLink Parking Stall Tax Database
Having looked at the spatial distribution of parking by land use, it is useful to examine the characteristics of typical parking areas by geographical typology. This will help identify any issues with current parking characteristics, along with opportunities for improvement. Parking can be characterized in a number of ways:

- Location (surface lots, underground, above-ground parkades, solely on-street);
- Physical access (open to the general public or restricted to private users);
- Cost (paid or free);
- Exclusivity (stand-alone, building-specific, or shared between multiple users);
- Surrounding land uses; and
- Accessibility to transit, in particular the Frequent Transit Network (FTN).

Parking characteristics by settlement character are shown in Table 8, along with the issues and opportunities for each. Various key points are noted. Firstly, areas with high development density generally have frequent transit service, meaning that there are transportation alternatives to the auto available. However, higher densities attract high levels of employment and customers, leading to potentially high parking densities that encourage auto use and result in traffic congestion and related impacts. In these cases, effective parking management in terms of appropriate pricing are needed to reduce auto demand and make efficient use of land.

Secondly, the large parking lots on suburban non-residential and retail areas limit potential economic activity, because space is taken up by parking instead of more productive uses. A reduction in the parking supply could potentially allow land owners to provide an appropriate amount of parking and more efficiently use land areas. This is only viable when considered alongside the provision of transportation alternatives.

Further, suburban non-residential and retail areas tend to place large parking lots between the sidewalk and building entrances, which acts as barrier for pedestrian access (including from transit stops) and discourage mode shift away from auto use. Future development or redevelopment can address this by placing parking at the rear of the lot, allowing buildings to be placed adjacent to the sidewalk. Existing developments can mitigate this by providing effective pedestrian walkways (separate from vehicular traffic) between the sidewalk and building entrance.
### Table 8: Parking Characteristics, Issues and Opportunities by Settlement Character

<table>
<thead>
<tr>
<th>Settlement Character</th>
<th>Example(s)</th>
<th>Parking Characteristics</th>
<th>Issues and Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Core</td>
<td>Downtown Vancouver</td>
<td>- Underground and structured</td>
<td>- With high real estate values in Downtown Vancouver parking land use is not the most efficient use.</td>
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<tr>
<td></td>
<td></td>
<td>- Mix of paid public and private parking facilities</td>
<td>- High parking density encourages auto use and congestion on downtown streets and streets into the core area.</td>
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<tr>
<td></td>
<td></td>
<td>- Mix of both shared or building-specific</td>
<td>- High accessibility to transit (SkyTrain, CanadaLine, West Coast Express, ferries, water taxis and bus service) provides attractive alternative options to driving, and therefore have lower requirements for parking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Significant paid on-street parking</td>
<td>- Grid street pattern allows efficient transit service and encourages greater pedestrian activity.</td>
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<tr>
<td>Metro Centre City</td>
<td>Surrey Metro Centre</td>
<td>- Mix of both structure or underground parking, and surface lots</td>
<td>- Opportunities to shift travel demand, land use and parking supply/demand: Surrey Rapid Transit connections to Newton City Centre, Langley Centre, White Rock Town Centre.</td>
</tr>
<tr>
<td>Centre</td>
<td>New Westminster</td>
<td>- Mix of both public and private parking facilities</td>
<td>- Focus on transit-oriented developments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pay parking in core or key streets; free in periphery</td>
<td>- Enhance and expand pay parking to discourage auto use (Surrey recently upgraded on-street parking to pay-by-space).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pay on-street parking in core or key streets</td>
<td>- Future development should focus on lower parking standards, redevelopment opportunities (higher densities), urban design and place parking areas behind buildings (entrances adjacent to sidewalk).</td>
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<tr>
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<tr>
<td>Mixed Use Transit</td>
<td>Central Broadway Corridor</td>
<td>- Mix of both structure or underground parking, and surface lots</td>
<td>- Opportunities to shape transit and parking characteristics: UBC Line Rapid Transit</td>
</tr>
<tr>
<td>Corridor (Vancouver)</td>
<td></td>
<td>- Mix of public and private facilities</td>
<td>- Potential for redevelopment into transit-oriented developments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- On-street pay parking</td>
<td>- Pay parking needed to discourage high auto use.</td>
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<tr>
<td></td>
<td></td>
<td>- Building-specific parking facilities</td>
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<tr>
<td></td>
<td></td>
<td>- Restricted on-street</td>
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<tr>
<td>Urban retail / non-</td>
<td>Austin Ave. (Coquitlam)</td>
<td>- High level of surface parking</td>
<td>- Parking in front discourages pedestrian access and activity.</td>
</tr>
<tr>
<td>residential strip</td>
<td></td>
<td>- Free on-site parking</td>
<td>- Surface parking lots limit area available for economic activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- No publicly-managed parking facilities</td>
<td>- Lower parking supply would allow more development on existing and future lots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Restrictions for on-street parking (no parking along arterial/collector; time limited)</td>
<td>- Improvements to pedestrian facilities and connections may encourage walking.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>- High potential for shared-parking opportunities.</td>
</tr>
<tr>
<td>Settlement Character</td>
<td>Example(s)</td>
<td>Parking Characteristics</td>
<td>Issues and Opportunities</td>
</tr>
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<td>----------------------</td>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Industrial</td>
<td>River Rd. (Richmond) Annacis Island (Delta)</td>
<td>- High level of surface parking&lt;br&gt;- Free on-site parking&lt;br&gt;- No publicly-managed parking facilities&lt;br&gt;- Restricted on-street parking (no parking along arterial/collector)</td>
<td>- Low employment density results in low transit service.&lt;br&gt;- Large vehicular traffic discourages walking and cycling.&lt;br&gt;- Limited opportunities for sustainable parking given balance to serve efficient goods movement and support economic activities.</td>
</tr>
<tr>
<td>Mixed Employment</td>
<td>Bridgeport Rd., Cambie Rd. (Richmond)</td>
<td>- High level of surface parking&lt;br&gt;- No publicly-managed parking facilities&lt;br&gt;- Free on-site parking&lt;br&gt;- Limited on-street parking</td>
<td>- Potential for higher employment density through intensive forms of non-residential development.&lt;br&gt;- Frequent transit service needed to encourage reductions in auto use and parking supply.&lt;br&gt;- High potential for shared-parking opportunities.</td>
</tr>
<tr>
<td>High density residential</td>
<td>Steveston (Richmond) Quayside Dr. (New Westminster)</td>
<td>- On-site underground and structured&lt;br&gt;- Limited on-street parking restrictions (some time limit)</td>
<td>- Parking often included in housing value or rent, reducing its perceived cost.&lt;br&gt;- High-density mixed-use development with ground floor non-residential frontage encourages walking and limited parking (e.g. Moncton St.)&lt;br&gt;- Potential for developers to provide appropriate parking supply based on market and demand (see Section 3 of this report)</td>
</tr>
<tr>
<td>Low density residential</td>
<td>British Properties (West Vancouver)</td>
<td>- Private driveways and garages (single family, townhomes, etc.)&lt;br&gt;- Free, unrestricted on-street available</td>
<td>- High parking supply encourages higher household vehicle ownership and as a result higher auto use.&lt;br&gt;- Ease of parking encourages high auto mode share.&lt;br&gt;- Opportunities through changes in land use and zoning bylaw parking standards.</td>
</tr>
</tbody>
</table>
5. CONCLUSIONS

5.1. OPPORTUNITIES AND CHALLENGES FOR PARKING MANAGEMENT

Based on the review of local municipal bylaws and parking operations, telephone conversation with municipal staff, and parking data analyses in Section 3, the following are emerging issues, challenges and opportunities for parking management for the Region.

5.1.1. Management

As noted in Section 2.1, management and planning of parking-related operations is generally under the mandate of engineering, transportation or planning departments. The organizational structure is not consistent across local Municipalities, but is in line with the extent of parking operations within their jurisdiction. That is, those with a significant amount of publicly-owned and operated pay parking have a dedicated city department responsible for parking management and operations (e.g. City of Vancouver), while Municipalities with little to no publicly-owned and operated parking do not have staff dedicated solely to parking within their engineering, transportation or planning departments.7

However, as policies promoting sustainable transportation and compact communities become more established in the region there will be a greater need for policies and programs to help manage demand and improve efficiency of parking supply. This may include the expansion of pay parking operations, and the need for more focused parking management by municipal staff will emerge.

5.1.2. Operations

Pay parking operations varies widely among Municipalities, with some Municipalities (Vancouver, New Westminster) having significant amounts of both public and private pay parking, others with limited pay-parking facilities (Richmond, Coquitlam, White Rock), and others that do not have public or private pay parking in their jurisdiction (Port Coquitlam, District of North Vancouver). There is also the case where Municipalities own public parking lots but do not charge users a fee (Delta, Pitt Meadows).

Overall, outside of the Vancouver downtown core and municipal city centres, most parking is free and generally unrestricted. A number of Municipalities agreed the implementation and extent of pay parking is limited by the suburban land uses that contribute to more auto-oriented travel behaviour. In addition, the availability of free parking from many retailers, particularly large retailers, and the mindset of residents that parking should be easily available and for free, further add to the challenge for Municipalities to move towards effective tools and strategies to manage parking demand. As many Municipalities transition from suburban to more compact forms of development, there will be a challenge and opportunity in changing drivers’ mindset and tolerance for available and/or free parking.

The provision of rapid transit represents a major opportunity for changes in parking management. The Evergreen Line, currently under construction, is a prime example. The City of Coquitlam noted that with the Evergreen Line stations in their jurisdiction, the City has an opportunity to prepare for new, more compact development near station areas, and therefore are looking towards parking supply operations and programs, such as cash-in-lieu. However, the City also notes they will need to balance parking issues that encourage transit use while also protecting local residents and merchants from higher

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7 Staff have various transportation-related responsibilities, including parking.
parking demands (e.g. potential commuters). On the other hand, the City of Port Coquitlam noted that without the rapid transit line extension to its community, there is the propensity for development to continue to be more auto-oriented and for limited implementation of parking strategies. This clearly demonstrates that frequent and reliable transit service also serves to provide residents with sustainable transportation choices, therefore reducing parking demand and the need for higher parking supply requirements.

As shown in Section 3.5, rapid transit and frequent bus service (headway less than 10 minutes) tend to reduce parking supply in neighbourhoods over time, as parking demand decreases with more competitive transportation choices. Currently, few parking standards take into account the amount of transit service or mode share. This can result in an over-supply of parking in areas where transit service is frequent and reliable. However, because comprehensive parking demand data was not available for this study, further examination of parking demand in areas with high transit share would be needed to establish the extent of this effect.

5.2. Parking Data Analysis

The report includes an analysis of two sets of parking data – supply of and demand for off-street apartment parking; and, supply of off-street non-residential parking.
Appendix A
Glossary of Terms
The following are brief descriptions of parking management strategies and other parking-related terminology used throughout the report.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Allowance for off-site parking</td>
<td>Provision within parking requirements and regulations (bylaw) that allow for the full or partial number of parking spaces required for a land use to be provided on another parcel outside of the development site.</td>
</tr>
<tr>
<td>Automated License Plate Reading Technology</td>
<td>Monitoring technology that allows a moving vehicle to scan the license plates of both parallel and diagonally parked cars and check for vehicles that overstay the maximum time or are not allowed to park in a specific location. Also sometimes referred to as “digital chalk”.</td>
</tr>
<tr>
<td>Curbside Sensors</td>
<td>Sensors embedded in the pavement and linked with advanced parking meters (single-head or multi-space) enabling the parking system to monitor when a car is actively occupying the space.</td>
</tr>
<tr>
<td>Demand-Responsive Pricing</td>
<td>Alteration of the cost of parking according to level of demand using market principles. For example, higher parking rates with higher demand.</td>
</tr>
<tr>
<td>Diagonal Parking/Reverse Angle Parking</td>
<td>Reverse angle parking, or “back-in, head-out” angle parking. The driver backs into the stall, and when leaving, the driver can simply pull out of the stall.</td>
</tr>
<tr>
<td>Flexible Parking Standards</td>
<td>Provisions in zoning and/or parking-related bylaws that allow for different minimum and/or maximum parking requirements by land use type. Different parking standards may apply to developments based on various criteria such as:</td>
</tr>
<tr>
<td></td>
<td>• Location (e.g. city centre, downtown);</td>
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<td></td>
<td>• Availability of transit (e.g. within 400 metres of transit station);</td>
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<tr>
<td></td>
<td>• Integration of transportation demand management measures or programs (e.g. carshare vehicles, inclusion of transit passes); and,</td>
</tr>
<tr>
<td></td>
<td>• Parking studies to support case for reduced parking supply.</td>
</tr>
<tr>
<td>Handheld Units</td>
<td>Small, computerized devices that aid parking enforcement officers in accessing parking data and in issuing accurate and legible citations.</td>
</tr>
<tr>
<td>In-Lieu Fees</td>
<td>Provision that allows developers to pay a per-space fee for each required parking space not provided. Fees are generally designated to pay for parking improvements elsewhere in the area.</td>
</tr>
<tr>
<td>Intelligent Parking Systems (Guidance)</td>
<td>Technology that provide drivers with parking-related information (e.g. number of available stalls) or direct drivers to available capacity at nearby parking facilities. Information is provided in real-time through the use of sensors or counters.</td>
</tr>
<tr>
<td>Parking Benefit Districts</td>
<td>Designation of area where revenues from paid parking in the district are solely designated to fund public improvements that benefit the district itself.</td>
</tr>
<tr>
<td>Parking Maximums</td>
<td>Upper limit of parking spaces to be provided for a specific land use, in conjunction with minimum parking requirements and/or standards by land use type generally found in zoning bylaws or other parking regulations.</td>
</tr>
<tr>
<td>Parking Tax</td>
<td>Tax paid on the sale of a parking right. For TransLink, the Parking Tax is calculated on the purchase price of parking rights within TransLink’s transportation service region. This includes parking rights that are sold by the hour, month, year or any other basis.</td>
</tr>
<tr>
<td>Parking Tax/Levy</td>
<td>Application of a tax or levy applied to parking stalls or other parking operations.</td>
</tr>
<tr>
<td>Payment - In-Car Meters</td>
<td>Small devices which are loaded with pre-paid parking time. The user displays the meter in their car, often on the dashboard or hanging from the rearview mirror, and activates the device when parked at a metered space.</td>
</tr>
<tr>
<td>Payment - Pay and Display Parking</td>
<td>Pay parking operations where drivers purchase a “certificate” for paid parking time at a pay station, and then needs to display it on their dashboard to prove compliance.</td>
</tr>
<tr>
<td>Payment - Pay by Phone Parking</td>
<td>Allows customers to pay via telephone. Users generally need to sign-up for service and provide a credit card under their account. Drivers park their vehicle and provide location and desired time via phone (e.g. parking stall number). System is usually in conjunction with other payment technologies (meters, pay-and-display, etc.) for users without a phone-service account.</td>
</tr>
<tr>
<td>Payment - Pay by Plate Parking</td>
<td>Pay parking operations where drivers park their vehicle and purchase paid parking time at a pay station by entering their license plate number. Assuming enforcement is carried out with real time checks of a database to confirm payment, drivers do not need to return to vehicle or display receipt of compliance.</td>
</tr>
<tr>
<td>Payment - Pay by Space Parking</td>
<td>Pay parking operations where drivers park at a designated space that is numbered and purchase paid parking time at a pay station by entering the specified parking space number. Drivers do not need to return to vehicle or display receipt of compliance.</td>
</tr>
<tr>
<td>Payment - Smart Card</td>
<td>Stored-value cards that can be used to pay for parking.</td>
</tr>
<tr>
<td>Remote Parking</td>
<td>Additional parking off-site commonly connected to the primary destination by shuttle buses and/or valet services.</td>
</tr>
<tr>
<td>Residential Parking Benefit Districts</td>
<td>Area that allows residents to park for free while offering non-residents paid parking, either through a fee or by offering a finite number of permits. A portion of the revenue from the visitor permits or on-street fees within the district are often reinvested in public improvements chosen by the residential parking benefit district.</td>
</tr>
<tr>
<td>Shared Parking/Park Once</td>
<td>Share parking spaces between various uses and developments, thereby reducing the total number of spaces required compared to the same uses in stand-alone developments. Shared parking facilities for multiple land uses allow visitors to park their car and access multiple locations without having to re-park.</td>
</tr>
<tr>
<td>Stackers</td>
<td>Addition of vertical parking capacity through a hydraulic lifting apparatus that raises the first car up, allowing a second car to be parked underneath.</td>
</tr>
<tr>
<td>Tandem Parking</td>
<td>Parking spaces designed for two motor vehicles to park nose-to-end (one behind the other).</td>
</tr>
<tr>
<td>Time Limits</td>
<td>Maximum time allowable for parking on a stall or parking area.</td>
</tr>
<tr>
<td>Unbundled Parking</td>
<td>Approach by developers to separate the cost of the facility and parking, thereby allowing prospective residents who do not wish to own a vehicle to not pay a premium for a parking space that they may not need.</td>
</tr>
<tr>
<td>Valet</td>
<td>Allows drivers to go directly to their destination and have an attendant park the car.</td>
</tr>
</tbody>
</table>
Appendix B
Parking Standards

Residential, Retail and Office
<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Residential</th>
<th>Residential</th>
<th>Office</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single family</td>
<td>Townhouse</td>
<td>Apartment, Multi-unit</td>
<td>(per 100 m²)</td>
</tr>
<tr>
<td>Village of Anmore</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2.63</td>
</tr>
<tr>
<td>Village of Belcarra</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bowen Island Municipality</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>(2 spaces in rural zones)</td>
<td></td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td>City of Burnaby</td>
<td>1</td>
<td>1-1.75</td>
<td>1-1.6</td>
<td>2.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(reduced in certain districts)</td>
<td>(reduced in certain districts)</td>
<td>3.57 (retail floor); 2.18 (GFA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visitor: 0.25 / unit of requirement</td>
<td>Visitor: 0.25 / unit of requirement</td>
<td>-</td>
</tr>
<tr>
<td>City of Coquitlam (^1)</td>
<td>2</td>
<td></td>
<td>1</td>
<td>&quot;Non-residential zone&quot;: 2.5</td>
</tr>
<tr>
<td></td>
<td>(1: &quot;Street-oriented Village home&quot;)</td>
<td></td>
<td>2-or-more-bedroom unit: 1.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Visitor: 0.2 per dwelling unit</td>
</tr>
<tr>
<td>Corporation of Delta</td>
<td>2; Visitor: 0.2</td>
<td>2; Visitor: 0.2</td>
<td>1.5; Visitor: 0.2</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.13 (retail area); Neighbourhood Non-residential Use: 3 for customer plus 1 for employee</td>
</tr>
<tr>
<td>City of Langley</td>
<td>2</td>
<td></td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-bedroom, studio: 1.2-1.5</td>
<td>1.2-2.0; 3-or-more-bedroom: 2.0</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-bedroom:</td>
<td></td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-or-more-bedroom: 2.0</td>
<td>(varies by zone); Visitor: 0.2</td>
<td>-</td>
</tr>
<tr>
<td>Township of Langley</td>
<td>2; Visitor: 0.2</td>
<td>2; Visitor: 0.2</td>
<td>Studio: 1; 1-or-more-bedroom: 1.5; Visitor: 10% of required spaces</td>
<td>3.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Village of Lions Bay (^2)</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.37</td>
</tr>
<tr>
<td>District of Maple Ridge</td>
<td>General Requirements</td>
<td>1.5-2; (various residential zones)</td>
<td>1.0-1.3 (various residential zones)</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visitor: 0.2</td>
<td>Visitor: 0.2</td>
<td>3.3-4 (in special zones)</td>
</tr>
<tr>
<td>City/Town/Village/District</td>
<td>Residential</td>
<td>Office (per 100 m²)</td>
<td>Retail (per 100 m²)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single family</td>
<td>Townhouse</td>
<td>Apartment, Multi-unit</td>
<td></td>
</tr>
<tr>
<td>Town Centre</td>
<td>2 (General Requirement)</td>
<td>Studio: 0.8-0.9; 1-bedroom: 0.9-1; Additional bedrooms: 0.1/unit; (reduced for CBD, mixed-use) Visitor: 0.05-0.10/unit where on-street available; 0.1-0.20/unit where no on-street parking supply</td>
<td>2</td>
<td>2 (up to 10,000 GFA), plus 2.5 (additional over 10,000 GFA); Maximum: 3</td>
</tr>
<tr>
<td>City of New Westminster</td>
<td>1</td>
<td>Studio: 1; 1-bedroom: 1.2; 2-bedroom: 1.4; 3-or-more-bedroom: 1.5 Visitor: 0.2</td>
<td>2 Maximum: 3.2</td>
<td></td>
</tr>
<tr>
<td>District of North Vancouver</td>
<td>2 (Base Rate)</td>
<td>2 (Base Rate)</td>
<td>1 per unit plus 1 per 100 m² of GFA (maximum of 2 per unit inclusive of 0.25 for visitors)</td>
<td>Non-residential Base Rate: 2.2 plus 1 per 100m² of outdoor display Non-residential: Village Non-residential blended rate - 3.3</td>
</tr>
<tr>
<td>City of North Vancouver</td>
<td>1 per One-Unit, Two-Unit use</td>
<td>Studio, 1-bedroom: 1.2-1.3 (Reduced requirement in Town Centre, Main Street non-residential zones) 2-or-more-bedroom: 1.5; Visitor: 0.2</td>
<td>1.2</td>
<td>1.44-2.15 (varies by zone)</td>
</tr>
<tr>
<td>City of Pitt Meadows</td>
<td>2</td>
<td>1.75 0.2 visitors</td>
<td>Studio: 1.0; 1-bedroom: 1.3; 2-bedroom: 1.5; 3-or-more-bedroom: 2.0 Visitor: 0.2 (building &lt; 4 stories), 0.1 (building &gt; 4 stories)</td>
<td>2.2</td>
</tr>
<tr>
<td>City of Port Coquitlam</td>
<td>2</td>
<td>1-to-2-bedroom: 1.5; 3-bedroom: 2; Visitor: 0.2</td>
<td>Studio: 0.8-0.9; 1-bedroom: 0.9-1; Additional bedrooms: 0.1/unit; (reduced for CBD, mixed-use) Visitor: 0.05-0.10/unit where on-street available; 0.1-0.20/unit where no on-street parking supply</td>
<td>2.2</td>
</tr>
<tr>
<td>City of Port Moody ^</td>
<td>1</td>
<td>Visitor: 0.2</td>
<td>Visitor: 0.2</td>
<td>2.7</td>
</tr>
<tr>
<td>City/Town/Village/District</td>
<td>Residential</td>
<td>Office</td>
<td>Retail</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single family</td>
<td>Townhouse</td>
<td>Apartment, Multi-unit</td>
<td>(per 100 m$^2$)</td>
</tr>
<tr>
<td>City of Richmond General Requirements</td>
<td>2</td>
<td>2 Visitor: 0.20</td>
<td>1.5 Visitor: 0.20</td>
<td>3</td>
</tr>
<tr>
<td>City Centre</td>
<td>2</td>
<td>1-1.4 (varies by zone) Visitor: 0.2</td>
<td>1-1.4 (varies by zone) Visitor: 0.2</td>
<td>3.75-4.4 (first 1-2 floors) plus 0-15% reduction from the minimum general requirement above 1st or 2nd floor (varies by zone)</td>
</tr>
<tr>
<td>City of Surrey General Requirements</td>
<td>2</td>
<td>2 Visitor: 0.20</td>
<td>Studio, 1-bedroom: 1.3; 2-or-more bedroom: 1.5; Visitor: 0.2</td>
<td>3 (ground floor) plus 2 (areas above 1st floor)</td>
</tr>
<tr>
<td>City Centre</td>
<td>2 Reduced by 20%</td>
<td>Reduced by 20%</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>District of West Vancouver</td>
<td>1</td>
<td>Greater of: 1 per dwelling unit or 1 per 84 m$^2$ GFA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of White Rock</td>
<td>1 Reduced: 1 per dwelling unit in RS-3 zone</td>
<td>1.5</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>City of Vancouver</td>
<td>1 Maximum varies by size</td>
<td>0.5-2 (varies by zone, size, GFA)</td>
<td></td>
<td>1 (up to 300 m$^2$) plus 2 per additional 100 m$^2$ 1.47 in special district (maximum 2.15)</td>
</tr>
<tr>
<td>Downtown</td>
<td>Lesser of: 1 per dwelling unit or 1 per 140 m$^2$</td>
<td></td>
<td></td>
<td>0.69 (maximum 0.87)</td>
</tr>
</tbody>
</table>

Notes:

1 City of Coquitlam recently updated its zoning bylaw parking requirements, although this is not available on City website. Parking standards reflect older zoning bylaw.
2 Draft zoning bylaws
3 Parking space regulations for City of Vancouver are complex and regulations vary by zones/districts/areas, size of developments, and other factors. Values shown are summaries. In addition, City has provisions for exceptions and reduced requirements for developments near rapid transit stations and criteria for transit routes.
Appendix C
Summary of Telephone Interviews with Municipalities
<table>
<thead>
<tr>
<th>City/Town/ Village/District</th>
<th>Data / Studies</th>
<th>Type of Parking</th>
<th>Parking Operations</th>
<th>Issues / Challenges</th>
<th>Opportunities</th>
<th>Other Notes</th>
</tr>
</thead>
</table>
| City of Vancouver          | Intelligent meters and parking systems provide high level of data; area specific studies common | All forms of on-street and off-street/paid and unpaid | $1-$6/hr | • Right sizing parking supply for development  
 • Adjusting parking supply in response to new rapid transit lines | • Reducing parking minimums may be desirable, but need to maintain ability to request incentives  
 • Continue to apply adjustment factors for TDM  
 • Tie parking standards to transit | • EasyPark operates off-street lots very effectively  
 • Cash in lieu can be used for other than parking (e.g. pedestrian improvements, subject to terms)  
 • Large sites must meet Green Mobility and Green Vehicle Plan |
| City of Burnaby            | Area studies; maybe have database of meters | Pay off-street (small lots)  
 Limited RPO on-street | $1.00 / hr base rate | • Lack of parking near SkyTrain;  
 • Kiss-and-ride – not provided by TransLink, creates problems on nearby streets. | | Parking technology |
| City of Coquitlam          | Area studies; recent Strategic Transportation Plan w/ parking component | Pay on-street  
 Pay off-street (4 lots: 3 near civic, community centres; 1 near non-residential area)  
 Time-limited, RPO on-street | $0.50 / hr base rate  
 $18 / mo. permit at 3 civic/comm. Lots | • Balance bw commuters and residents, local non-residential parking;  
 • City transitioning from suburban to urban – free parking mentality;  
 • Parking taxes – City took financial hit;  
 • Visitor parking in higher-density residential;  
 • OCP statement on reductions to requirements;  
 • Evergreen Line – identified deficiency in parking. | • Evergreen Line;  
 • Strategies being looked at: new parking technologies, cash in-lieu.  
 • New bicycle requirements in zoning bylaw. | Work with TransLink on TDM – do outreach (why develop another program when TransLink has one) |
| Township of Langley        | No city paid parking (only paid parking near Hospital)  
 Time-limited on-street | No City pay-parking | n/a | • Eastern/southern-most municipality - agricultural, auto-oriented, 5 urban areas are spread out;  
 • Spillover on-street parking in residential areas (tandem parking, suites in single-family, inconvenient visitor) - greater problem in high-density areas;  
 • Street parking mentality - own space in front of house;  
 • Size of parking getting smaller; | • Work with Ministry on future development, TOD, park-and-ride; | Until they proceed further with development, there is not much appetite for changing parking operations or parking restrictions. |
<table>
<thead>
<tr>
<th>City/Town/ Village/District</th>
<th>Data / Studies</th>
<th>Type of Parking</th>
<th>Parking Operations</th>
<th>Issues / Challenges</th>
<th>Opportunities</th>
<th>Other Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>District of North Vancouver</strong></td>
<td>None, only residential MV parking study</td>
<td>No City pay - parking (very few cases of pay - parking in District: parks, Waterfront) Time-limited on-street</td>
<td>n/a</td>
<td>• Have oversupply of parking - suburban nature, roads designed w/ parking on both sides (results in speeding); • Street parking mentality - own space in front of house; • Introducing paid-parking would be difficult to pass w/ Council and residents; • Problem w/ parking and drop-off near schools.</td>
<td>• The Official Plan identified 4 centres, with potential to implement a few things (on-street metres, short-term parking, etc.).</td>
<td></td>
</tr>
<tr>
<td><strong>City of Port Coquitlam</strong></td>
<td>None, only residential MV parking study</td>
<td>No City pay - parking City has 7 lots - leases spaces to non-residential developments that cannot meet requirements. Time-limited on-street</td>
<td>Free parking Non-residential lease: $7.50 / month / space</td>
<td>• Residential requirement +1/unit - looked to change requirements, but study was inconclusive; • Auto-oriented community - large format retailers; • Parking restricted by flood plain requirements (no underground, need to be above ground); • Will not see connection to Evergreen Line;</td>
<td>• Need to look at standardizing parking dimensions; • Working w/in Regional model • Cash in-lieu program - recent changes to legislation.</td>
<td>• WCE provides tremendous opportunities to planning; • Parking arrangements btw community centre and WCE PnR.</td>
</tr>
<tr>
<td><strong>City of Richmond</strong></td>
<td>Area study; May have database of on-street parking meters and restrictions.</td>
<td>Pay on-street Pay off-street lots dedicated to community: parks Time-limited and permit parking lots (Steveston) Time-limited on-street</td>
<td>• $2.50 / hr • On-street permit: $50/mo • Off-street permit: $40/mo</td>
<td>• Truck, large vehicle parking;</td>
<td>• Guidelines for parking requirements across Metro Vancouver (TransLink is logical agency to lead); • Regional studies - offer municipal experience and provide consistency among Municipalities.</td>
<td></td>
</tr>
<tr>
<td><strong>City of North Vancouver</strong></td>
<td>Study, with inventory, done a long time ago</td>
<td>Pay off-street lots Time-limited, RPO on-street</td>
<td>Parking cost info not available</td>
<td>• Time-restricted parking: problems with long-term users; balance between residents, non-residential employees. • On-street pay-parking currently not supported by council</td>
<td>• Further study to evaluate options for residential on-street parking</td>
<td>• Had major parking operations responsibilities during Olympics (transfer stops up to Cypress and Whistler)</td>
</tr>
<tr>
<td>City/Town/ Village/District</td>
<td>Data / Studies</td>
<td>Type of Parking</td>
<td>Parking Operations</td>
<td>Issues / Challenges</td>
<td>Opportunities</td>
<td>Other Notes</td>
</tr>
<tr>
<td>----------------------------</td>
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<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Village of Lions Bay</td>
<td>None</td>
<td>One pay-parking lot, share with marina; Time-limited, RPO on-street</td>
<td>Parking cost info not available</td>
<td>Safety issues with people, especially in spring and summer, that park in area and walk down CN rail line to cliff/beach.</td>
<td>Considering pay-parking to offset operations and enforcement costs.</td>
<td>Loosely patrol time-limited parking restrictions</td>
</tr>
<tr>
<td>Corporation of Delta</td>
<td>Recent study (did not provide)</td>
<td>Free on-street and off-street parking (owned by City); Owns land for park-and-ride Time-limited, RPO on-street</td>
<td>n/a</td>
<td>High usage of motor vehicle, not moving to transit fast enough. Have low parking requirements for multi-unit residential, creates on-street spill over problem. Balance between non-residential and mixed-use development (Scott Rd.), including people using on-street parking and then taking transit. Truck parking is a challenge, especially near industrial areas, leaves roadway too narrow.</td>
<td>Council would like to reduce parking requirements (difficult with auto mentality) North Delta plan (potential new park-and-ride) Encourage transit use (better sidewalk network, park-and-ride)</td>
<td>Try to discourage resident-only parking (promote non-exclusive use of on-street parking) Haven't increased parking supply</td>
</tr>
<tr>
<td>New Westminster</td>
<td>Parking Study for Downtown Community Improvement Project (Halcrow)</td>
<td>Pay on-street Pay off-street lots Time-limited, RPO on-street</td>
<td>Hourly rates: $1.10 / hr Free parking after 6pm</td>
<td>Parking infiltration into residential neighbourhoods, especially adjacent downtown and hospital Redevelopment of heritage buildings - hurdles with need for parking variance against bylaw requirements Provision of free parking, especially in Queensborough area, big box stores, casino No park-and-ride, kiss-and-ride facilities at SkyTrain stations</td>
<td>Recommendations for TransLink: what is the best around transit stations, what is the right balance of parking</td>
<td>Residential parking only permit cheap ($10, $5 renewal) Cash in lieu of parking area was restricted to specific area in downtown, but has recently been expanded to cover entire City City interested in using cash in lieu funding to improve sustainable transportation options, especially outside of central area (taking advantage of recent provincial legislation allowing more flexible use of CIL funds)</td>
</tr>
<tr>
<td>City/Town/ Village/District</td>
<td>Data / Studies</td>
<td>Type of Parking</td>
<td>Parking Operations</td>
<td>Issues / Challenges</td>
<td>Opportunities</td>
<td>Other Notes</td>
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<td>-----------------------------</td>
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<td>-------------</td>
</tr>
</tbody>
</table>
| Pitt Meadows                | No city paid parking | Free off-street lots at community and civic centres | • Free  
• Only paid parking in City at WCE park-and-ride | • Parking adjacent to WCE stations: hide-and-ride parking in adjacent neighbourhoods  
• Parking at residential developments: trend to avoid parking in underground parking and park on adjacent streets instead (convenience), and since on-street parking on residential streets is not restricted. Consequently, on-site parking at multi-unit residential with underground parking does not appear to be well used. | • New zoning bylaw 2505 contains TDM considerations – reduction in minimum required parking with TDM measures in place. | • Have time-limited parking in mixed-use/ non-residential areas (2 hour limit for most new on-street parking areas in mixed-use areas).  
• No specific parking department or staff, engineering department looks after creation of on-street parking. |
| Maple Ridge                | Recent study for town centre by Bunt & Associates (includes parking inventory: 1350 on street spaces, 660 public off-street spaces, 6,000 private off-street spaces, including customer/visitor parking. | Pay off-street lots  
• 6 parking lots (owned by District, managed by Downtown Parking Association) use parking permits  
Free off-street lots at community and civic centres  
Time-limited on-street | • 1st hour free at civic centre paid lot.  
• $22/mo employee pay parking permit for district-owned lots | • Most significant issue: parking overspill in residential areas adjacent to non-residential land uses.  
• Also spill-over issue adjacent to the Port Haney West Coast Express Station, where some drivers park all day on street and conflict with residents and visitors. Time restrictions and enforcement not workable in all areas. Looking to implement residential permit parking. | • Parking study recommended discontinuing practice of issuing designated reserved spaces in municipal lots. Maple Ridge working to address recommendation.  
• In general, on-street turnover is good, some dissatisfaction with time limits.  
• Maple Ridge working through Economic development department to unlock potential of privately owned parking as a shared community resource.  
• Cash-in-lieu provision exists, but seldom used. If unable to provide parking, usual approach is variance but without providing cash-in-lieu. | • 7 lots owned downtown, with 6 managed by the Downtown Parking Association (membership made up of BIA plus municipality, council).  
• Maple Ridge has recently brought in designated on-street accessible parking spaces, for which locations are determined by the accessibility committee.  
• Zoning bylaw changed in 2008 following town centre parking study, includes reduced minimums. |
<table>
<thead>
<tr>
<th>City/Town/Village/District</th>
<th>Data / Studies</th>
<th>Type of Parking</th>
<th>Parking Operations</th>
<th>Issues / Challenges</th>
<th>Opportunities</th>
<th>Other Notes</th>
</tr>
</thead>
</table>
| Simon Fraser University  | Parking Management Plan (2007) 2009 Update to the PMP to the Board of Governors | Pay on-street Pay off-street lots No free parking on campus: hourly, permits | • $3.25 / hr (max $13 weekday daily; $6.50 max weekend)  
• $3.50 early bird rate, outskirts of campus  
• Monthly permits: tier based on location, type - $52-$131 / mo (with tax)  
• Monthly permits sold per semester (4 mos) or annual | • Parking Tax – TransLink parking tax and HST = 36%. It does not make sense in a suburban area such as the Burnaby campus of SFU. Consumers wonder why they pay 36% taxes on parking at SFU (or at a hospital, other Universities, etc.) when they can go to the nearby shopping mall, movie theatre, etc. and park for free.  
• Park and Ride policy – Translink offers free parking at many of their park and ride locations (and will offer free parking at new park and ride locations). This actually represents a net cost to Translink as they then pay a third party to administer/enforce the park and rides. Consumers at SFU compare this free parking offered by Translink to the paid parking offered at SFU and wonder why the discrepancy exists. | • Opportunities: changing environmental impact of the automobile (i.e. electric cars). There is a distinction to be made between the gasoline powered automobile and an electric automobile – in BC the latter being a sustainable form of transportation. | • Difficult to determine best practices in the University environment as each University operates slightly different from each other, however; SFU continues to investigate and pursue sustainable transportation options and development that are in the best interests of our stakeholders. |
Appendix D
Additional Parking Maps
Figure D.1: Parking Provisions across Metro Vancouver (Northwest)

Legend
- SkyTrain line
- WCEx line
- Major Road

Parking Polygons
- 1 - 200 spaces
- 200 - 500 spaces
- 500 - 1000 spaces
- 1000 - 2000 spaces
- 2000 - 5000 spaces
Figure D.2: Parking Provisions across Metro Vancouver (Northeast)
Figure D.3: Parking Provisions across Metro Vancouver (Southwest)

Legend
- SkyTrain line
- VCEX line
- Major Road
- Parking Polygons
  - 1 - 200 spaces
  - 200 - 500 spaces
  - 500 - 1000 spaces
  - 1000 - 2000 spaces
  - 2000 - 5000 spaces
Figure D.4: Parking Provisions across Metro Vancouver (Southeast)

Legend
- SkyTrain line
- WCEX line
- Major Road

Parking Polygons
- Centroids
  - 1 - 200 spaces
  - 200 - 500 spaces
  - 500 - 1000 spaces
  - 1000 - 2000 spaces
  - 2000 - 5000 spaces