Parking Reduction in Minnetonka

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Introduction

This report was undertaken in response to an inquiry by the city of Minnetonka, Minnesota, as to how the city might update its parking regulations to meet a number of goals. Minnetonka is an older, upscale, second-ring suburb located approximately twenty minutes west of downtown Minneapolis, Minnesota. The city boundaries encompass township land, and there is no one pre-existing village center or downtown. Besides a large regional mall, most of the commercial districts in the city are of a strip-mall character.

Parking ordinances in Minnetonka are currently tied to land use, establishing minimums that are very similar to those used by the International Transportation Engineers standards and many other municipalities around the country. Those minimums are in many cases set to fulfill peak demand, resulting in a surplus of parking capacity relative to demand. This surplus in parking is manifest in a preponderance of impermeable paved surface throughout this wooded suburb, diminishing the capacity of the city’s watershed system to filter and naturally convey storm water effectively.

The city of Minnetonka has recognized the environmental consequences of excess parking, and also recognizes that its high minimum parking regulations create inefficiencies in land use. Land devoted to parking could be converted to more economically and socially productive uses; high parking requirements are also a barrier to mixed-use and transit-oriented development. As the city seeks to densify in coming decades in response to market demand and increased transit connectivity, amending parking guidelines will be an imperative.

This report responds to that imperative by providing recommendations for how the city can update its parking regulations to more effectively meet its environmental and developmental goals. The report begins with a review of the literature around parking reduction, citing examples and data from around the country. A set of case studies follows, including some in the region and others nationally, demonstrating the effects of parking reduction and conservation techniques, and illustrating lessons learned. A set of recommendations is put forth to reduce and simplify the city’s parking ordinance, introduce shared parking arrangements, employ conservation techniques and sustainable design in parking, and to establish an open and meaningful community process. Finally, the report concludes with a summary and a set of draft documents to be used as a starting point for implementation of the recommendations discussed herein.
Literature Review

Automobile dependence has created many challenges in today’s metropolitan environment. With the rise in auto use, parking lots have become a necessity provided for through high parking minimum policies. These policies have subsidized auto use, decreased density, and presented many environmental issues. The literature has pointed to many alternatives to negate the effects of parking like shared parking, landscaping design, and travel demand management policies.

High parking minimums have evolved for many reasons. Richard Wilson’s “A Tacit Policy for Automobile Use and Sprawl” identified two. The first is local governments’ interest in a development project succeeding, and their perception that without adequate parking it may not. A high parking minimum policy is one mechanism local governments employ to ensure parking supply meets or exceeds demand. The second reason Wilson identifies is that local governments are also concerned that without adequate off-street parking in a development, there may be overfill to on-street spaces, leading to increased congestion. Wilson found that at peak times, only 72% of parking spaces were in use, or about 2.6 spaces per 1,000 square feet. Davis et al., in “The Environmental and Economic Costs of Sprawling Parking Lots in the United States,” also identified two reasons for this oversupply. Most businesses determine parking needs based on peak demand, like Black Friday for retail, leaving the parking lots relatively empty on the remaining days of the year. The second reason Davis et al. gives is that the general consensus in local governments is that parking is a problem only when there’s not enough.

Free parking acts as a subsidy that hides the true cost of driving. Subsidies can be found in the tax code, which permits employers to give employees up to $155 per month for parking as a tax-free benefit (Wilson, 2007). In “An Opportunity to Reduce Minimum Parking Requirements,” Donald Shoup estimates that about one-third of all auto trips and two-thirds of all morning peak trips are subsidized by these tax-free parking benefits. Oregon implemented a policy that eliminated free commuter parking and on-street parking while at the same time implemented a parking benefit district and maximum parking limits. This lead to the transit mode split to grow from 21% to 41% in just eight years (Davis et al., 2010). Oregon’s program demonstrated that many individuals are price sensitive to driving, so by removing hidden subsidies, the benefits of driving are decreased.

Maximum parking requirements do not only promote auto use, but they discourage smart growth principles like compact development, walkability, and responsible energy consumption. Compact development can be achieved through infill and redevelopment, but redevelopment projects often lack the large amount of land required to meet on-site parking requirements (EPA, 2009). By requiring large amounts of on-site parking, developers are forced to devote a percentage of the lot to very expensive parking lot with little return on that financial investment. To make a project more profitable, developers may seek parcels where land costs are lower and thus
Parking lots are problematic not only for pedestrians, but also for the environment. Parking lots are usually paved with impervious surfaces, which permit pollutants to pool and run off the surfaces quickly. The velocity of this runoff decreases soil infiltration, leading to erosion, reduced groundwater recharge, and the prevention of natural processing in the soil (Arnold and Gibbons, 1996). Arnold and Gibbons, in their 1996 article “Impervious Surface Coverage: The Emergence of a Key Environmental Indicator,” identified urban runoff as the “second most common source of water pollution for lakes and estuaries nationwide and the third most common source for rivers.” Automobile fluids are not the only pollutants found in parking lots; sealants used in maintenance are pollutants too that contribute to water pollution (Davis et al., 2010). Beyond water pollution, parking lots contribute to the urban heat island effect. Onishi, et al., believe that the urban heat island effect can raise urban air temperatures two to five degrees Celsius.

Understanding the effects of over supplying parking should convince urban planners of the need to re-evaluate current parking policies. Reducing parking requirements through shared parking initiatives may be one way to mitigate the harm caused by parking lots. Where reducing parking is not appropriate, mitigating parking effects can be done through landscaping and design policies. To make these policies successful, they should be combined with a travel demand management program to reduce parking demand.

Shared parking is a policy that permits off-site parking spaces to be shared by more than one user. Shared parking will encourage the development of a few large parking structures rather than a small parking lot for every business (Forinash, et al., 2003).

There are three different types of shared parking programs: zoned, parking between sites, and public provision through fees (Victoria Transport Policy Institute, 2013). Victoria Transport Policy Institute (VTPI) describes the zoned method as parking shared among a group of employees. This permits reductions because rarely will all employees drive at the same time. This strategy is the most difficult because it requires some vehicle trip reduction methods to prevent overflow if there is not a one to one ratio of parking and drivers. Shared parking between sites works well with businesses that have different peak hours. Instead of all facilities providing their own parking lots, an office building with weekday peaks may share with restaurants and bars that have an evening peak. Other businesses that have weekday peaks are schools, factories, and medical
facilities. Businesses with evening peaks are stadiums, auditoriums, bars, restaurants, and theaters. Weekend peak businesses are religious facilities, parks, and retail. VTPI estimates that this method of shared parking can reduce total parking by forty to sixty percent. The last method of shared parking identified is publicly provided parking with in-lieu fees. This method permits developers to pay fees in-lieu of providing their own off-street parking. With these fees, the local government can provide public parking.

Implementation of shared parking varies by municipality. Montgomery County, Maryland uses a formula to determine the requirements for shared facilities. The variables include the amount of parking required for each use across all times of the day and proximity to transit. The total shared parking spaces is set based on the total spaces required throughout the day (Forinash, et al., 2003). VTPI discusses how local governments should support shared parking through the ordinances and broker agreements between developers and businesses.

Shared parking can be implemented through contractual agreements, or through parking management districts (Capital Region Council of Governments of Connecticut, 2002). Contractual agreements should include the uses and facilities in the agreement, establish their differences in peak parking demand, and create the formal agreement. Parking management districts are similar to an in-lieu fee, where each property is assessed a fee based on the value of the property which supports shared off-street parking. Here the government is responsible for all aspects including oversight (Capital Region Council of Governments, 2002). Capital Region Council of Governments (CRCOG) has identified many “keys to success” for shared parking implementation. These keys include:

- Targeting the appropriate locations for shared parking, like mixed use developments
- Providing zoning incentives for auto-oriented business centers like increased floor area ratios
- Making shared lots walkable
- Demonstrating how shared parking can work.

Shared parking isn’t the only mechanism to reduce parking supply.

Forinash et al’s “Smart Growth Alternatives to Minimum Parking Requirements” identify several useful alternatives to existing parking minimum policies. They recommend allowing reduced minimums with new zoning overlays, reductions for affordable and senior housing developments, and tailoring parking requirements for each project based on type, density, transportation choices and shared parking opportunities. New zoning overlays may take the form of transit overlays, where areas with high transit service have no parking minimums because they are well connected, or mixed use zones that don’t require private off-street parking because they are walkable. Reductions for affordable and senior housing developments are appropriate because these populations generally have lower auto ownership, and thus lower demand for parking. Tailoring parking requirements can be time consuming, but
drafting ordinances based on the development type, surrounding land uses, and surround peak parking demand may produce parking requirements that more closely reflect demand.

Along with reducing parking to reduce impervious surface, redesigning parking lots to be more sustainable can address environmental concerns. One way to reduce parking and simultaneously provide more green space for filtration is landscaped parking reserves. Such policies require a small percentage of land left unpaved, but set aside for future parking needs. Reserve requirements permit future flexibility in parking while encouraging urban greening in the present (Mid America Regional Council, 2010). Efficient design is another sustainability measure. By shortening parking stalls, San Mateo County recommends fifteen feet, cities can either achieve less impervious surface through a reduction in actual space needed or by landscaping the remaining space (San Mateo County, 2009). Adding a tree canopy in parking lots can help filter rainwater and naturally cool pavement to reduce the urban heat island effect (San Mateo County, 2009). Changing the pavement type can assist in storm water management. Pervious pavement comes in many forms: pervious concrete and asphalt made with large pores to permit water to pass through and pervious pavers where water can pass between the pavers. Each pervious pavement type has its own advantages and disadvantages, so careful selection is key here.

After reducing the impervious surface through effective design, additional small area landscaping measures are the final steps in sustainable parking lot design. San Mateo County defines vegetated swales as “shallow landscaped areas designed to capture, convey and potentially infiltrate storm water runoff as it moves downstream. Parking lots are particularly well suited for swales because they provide a long expanse of available land, increasing the amount of time water can pass through the natural filtration system. Rain gardens are another low cost landscaping feature for parking lots. Rain gardens provide a similar function to swales but differ slightly because they are often larger, and act as collection site rather than a guide way for rainwater (San Mateo County, 2009).

Parking cannot successfully be reduced without a complementary travel demand management (TDM) program. These programs allow a city to incentivize alternative modes and spread demand beyond peak times, enabling a reduction in parking supply. TDM programs may include increased transit service and access, improvements to bicycle and pedestrian options, and facilitating carpooling and car sharing. Transit service is an alternative mode that requires no parking spaces. However, there are barriers to transit service including lack of information about stops, routes, and times, as well as alternatives if a rider misses the bus. Municipalities can address these issues by establishing transit liaisons to disseminate information, by providing additional peak hours and stops, and by offering a guaranteed ride home service (Forinash et al., 2003). Forinash et al. found that Montgomery County Maryland offers a fifteen percent reduction in parking requirements if a business offers transit passes to its employees.
Improvements to bicycle and pedestrian infrastructure may also reduce parking demand. Independence, Missouri requires bicycle-parking facilities as a percentage of off-street parking requirements in all zones except residential. Institutional uses, like schools and swimming pools, require the number of bike parking spots to be equal to ten percent of the off-street automobile parking spots; other office and commercial spots are required to provide five percent (Mid American Regional Council, 2010). Schaumburg, Illinois, requires all retail centers have ten bike parking spaces, separate from the auto parking lot, at each entrance (Forinash et al., 2003). Car sharing services, like HourCar and Zipcar in Minneapolis, permit users to get to their destinations without needing their own dedicated parking spaces at home. They also make using transit easier, allowing for quick midday trips from the workplace without requiring that a person drive from home and take a dedicated space at the office. Employers and municipal governments can facilitate and incentivize car and van pooling by providing preferential parking spots or providing fleet vehicles (Forinash et al., 2003).

Oversupplying parking has many consequences in an urban and suburban environment. As a subsidy, oversupply encourages auto dependence while simultaneously discouraging walkability and infill. Low value parking lots lower the value of developments and decreases tax revenue for municipalities. It negatively impacts the environment. These reasons should encourage local governments to examine their existing parking policies. Remediation of oversupplied parking can take the form of parking reduction policies, shared parking, and landscaping requirements. These efforts, when focused in the appropriate locations and in tandem with travel demand management programs, can successfully result in a more sustainable metropolitan landscape.

**Case studies in parking reduction**

Parking is a highly localized affair, and approaches to address oversupply are as varied as the places that have undertaken to do so. The nature of Minnetonka is unique in that it lacks a defined center and is built at a lower density than many older suburbs in larger metropolitan areas. As such, few similar places exist where parking reforms have been in existence long enough to demonstrate widespread results. That said, three cases are presented here where changes in the paradigm and programming of parking have been undertaken to address challenges and goals of each municipality.

**Marlborough, MA: Changes to regulatory requirements**
The City of Marlborough is an outer ring suburb of Boston, near the intersection of the Massachusetts Turnpike and Interstate 495. With 38,499 residents in 2010, Interstate 290, U.S. Highway 20, and State route 85 also serve the city. Limited regional bus service is available to residents. The urban form shows evidence of auto-oriented development, often found in late-20th century suburban cities. There are wide, curved streets with cul-de-sacs, interstates through several areas of the city, and an oversupply
of surface parking lots. The city has taken steps to reduce the oversupply of parking through various ordinances.

The first such ordinance is a shared parking regulation created to allow visitors of mixed-use areas to park once and visit multiple destinations. In the past, Marlborough developers had been required to meet minimum parking requirements in a limited amount of space. With the new regulation, parking required for two or more buildings or uses may be provided in combined parking facilities. The number of spaces may be reduced by up to one-half the sum of the spaces for each use individually. In order to be eligible for a reduction in the minimum requirement by the city, parties must demonstrate that the peak parking demand for each land use occurs at different times or days, justifying a reduction. The City Planner and Engineer have the authority to accept or decline the reduction request, according to the City of Marlborough zoning bylaw §200-25, Off-Street Parking. If the reduction is granted, 150 square feet of open space (per parking spot reduced) must be provided in addition to that required by lot coverage provisions within the zoning by-law. The determination of how the combined facility should be split is made by the Planning Department.

The second measure taken by the city to reduce the oversupply of parking is a compact car regulation. It allows up to 33% of a site’s require parking to be reduced by one foot in width and two feet in length, which can reduce the overall lot footprint required while still accommodating the same number of cars. Because developers are inclined to maximize the amount of buildable land, this regulation was widely utilized.

The temporary reserve parking regulation has been useful in areas of Marlborough where the demand for parking has fallen significantly short of supply. Developers are allowed to pave a reduced amount of parking spaces than required. That land is left to be landscaped or undeveloped, in the case that future demand increases. It helped reduce the City’s total impervious surface coverage while addressing the uncertainty of future parking demand.

The three regulations created by the City of Marlborough - shared parking, compact car spaces, and temporary reserve parking - are methods to reduce to the oversupply of parking spaces commonly found in suburban cities.

_Wilton Manors, FL: Parking changes catalyze development._

Wilton Manor is an incorporated village in suburban Miami-Fort Lauderdale, Florida. The village is characterized by low-density single-family residential housing stock, wide curvilinear streets, and strip retail. The Shoppes at Wilton Manors was one such strip retail center. While the Shoppes had once enjoyed full occupancy, it had in recent years deteriorated along with the residential and commercial district around it. This area of South Florida was poised for strong growth in coming decades, but city leaders in Wilton Manors felt that the city might miss out on the benefits of that growth due to the general deterioration of the built environment and the relatively stronger pull of
nearby districts, including tony Bal Harbour, for big-box retailers. The city sought to find a solution to the deterioration of the commercial strip at the Shoppes in an environmentally-friendly way, as the fragility of the South Florida ecosystem meant that watershed systems and water quality were primary concerns. Not only did new development have to be environmentally friendly, but the city also wanted it to fit in the context of its aspiration to embrace walkability and mixed-use development.

The Shoppes at Wilton Manor was purchased by a company that approached the city with a redevelopment proposal. The developer and the city partnered together early in the process. Rather than pursue the challenge of additional retail development despite the draw of outlying shopping centers, the developer instead wanted to leverage the untapped market niche around entertainment, cultural attractions, and eating establishments.

The city changed its zoning in this area in several ways to enable this development. It established an overlay which included the Shoppes but also extended into the surrounding area. This overlay promoted redevelopment by allowing the new (previously disallowed) entertainment and cultural uses. But this raised a concern for the developer: the huge parking requirements for those uses would have required 390 new spaces (in addition to the existing retail spaces) and would have imperiled the financial viability of the project. To address that concern, the city exempted parking requirements for the new uses and instead established a shared parking arrangement between businesses and allowed the requirement to be fulfilled through nearby but off-site facilities. Because this solution would require patrons to walk, the city also allowed outdoor seating at eating establishments to create a more pedestrian-friendly environment.

The results of this partnership and the city's tailored approach to parking regulations benefitted the developer, the surrounding area, and the city itself. The developer's project became viable because the onerous parking requirements were lifted. Rents quadrupled on a per-square-foot basis, and occupancy skyrocketed in the development to 100%. The surrounding area saw a similar effect in rents and occupancy; this important economic impact benefited the city through a 10% increase in tax value in the overlay district. Perhaps most importantly, these changes catalyzed redevelopment in Wilton Manors by decreasing crime in the area and increasing vitality and walkability. The solution, which required a committed partnership between the city and the developer, accomplished the city's goals for walkable, mixed-use, and environmentally friendly development (EPA, January 2006).

_Kansas City, MO: 10,000 Rain Gardens_
Kansas City, Missouri faces significant issues related to runoff and flash flooding, most notably a 1977 overflow incident that swept through the city's iconic Country Club Plaza, causing loss of life and significant property damage. The city and metropolitan area have responded by undertaking significant efforts to reduce the amount of
impervious surface and increase the number of landscaped amenities around parking lots and throughout the urbanized area. While Kansas City and the cities around it have adopted ordinances and established programs to incentivize or regulate their way to a more sustainable future, one such program in particular is worthy of a closer look for how its success is a result of ongoing community outreach.

The 10,000 Rain Gardens Program began as a minor initiative created by an environmental services manager at the Kansas City municipal offices. As part of a much broader strategy to find systematic solutions to the city’s and region’s wastewater and storm water problems, the manager saw an opportunity to reach out directly to the public and encourage people to plant rain gardens. Rather than use colorless technical terminology like “bioswales” or “retention features,” the program referred to “Gardens,” a nod to the gardening that business and property owners were already doing all over the city. The idea was to spark interest in these environmentally friendly solutions by connecting them to an activity that was familiar and had positive connotations. The initiative quickly gained the support of the mayor of Kansas City, who ensured that it received the funding necessary to reach early success.

What made the 10,000 Rain Gardens program a bit different from other environmental initiatives was that it was not focused on installation, tax credits, or other efforts that would provide a direct incentive to building such a feature. Rather, because rain gardens are essentially gardens with specific features to enable smarter storm water management, the effort took the form of a marketing campaign. Promoters of the initiative partnered with local media to spread the word about rain gardens - what they are, what they do, and how the business or property owner can install one. And then the city provided a huge but accessible set of resources, many of them technical in nature, that helped property owners incorporate rain gardens for maximum effectiveness. Not only did the city provide those resources through an actively maintained website, but it took the concept on the road, holding trainings and offering free roadshows for companies who wanted the idea to be introduced at the workplace.

Ten thousand was never a goal; the number was used merely for its ability to get attention in a marketplace crowded with sustainability solutions. And yet the program has been prolifically popular due to the effectiveness of ongoing outreach. Program representatives met with community groups, established a donation program to benefit schools other under-resourced groups, and then reached out to developers when the idea proved popular in the community. To confirm its commitment to rain gardens, the city built demonstration projects at municipal properties round town. The 10,000 Rain Gardens Initiative is a strong example of a low cost, incremental approach to implementation of a sustainability program that built community support over time rather than working through ordinances and code reform (Water Environment Research Foundation, 2009).
Policy Recommendations for Minnetonka

With knowledge of parking supply and regulations from literature as well as from examples around the country, a set of recommendations for Minnetonka follows. The following recommendations were created to simplify the parking ordinance, illustrate shared parking options, and promote sustainable design in parking lots. Minnetonka’s current parking ordinance is incredibly fine grained, requiring parking spaces by each specific use (for example, 1.5 parking spaces per golf hole is required for a miniature golf course). Requirements by each specific use does not allow for flexibility in providing off-street parking. The additional parking ordinances do not support flexibility or reduction in required spaces.

1: Reduce parking minimums.
Currently, Minnetonka’s ordinances permit limited flexibility for reductions, and in most cases round up on required spaces. Shared parking is permitted if it is recorded and approved by the city. Parking spaces for compact cars, which effectively reduce the size of a parking lot, are only permitted if parking lots have at least twenty spaces and are not “high turnover” lots.

Minnetonka calculates the number of spaces for each use. If the calculation results in a fraction, each fraction greater or equal to one-half results in an additional space. For public gathering places where patrons sit on benches or pews, every twenty-four inches is one seat. If structures have more than one use, the off-street parking requirements will be the sum of the required parking spaces for each use. The ordinance breaks down parking uses even further by every type of use. Some examples are provided below:

- Senior citizen housing requires one parking space unless conversion to general housing is possible, then it is two spaces per unit.
- Religious institutions require one space for each 2.5 seats.
- An elementary school requires two parking spaces for each classroom while a senior high school requires one parking space for each classroom plus one space per ten students.
- Golf driving rang requires one parking space for each driving tee.
- Retail store requires one space per 250 square feet with a minimum of five parking spaces

These requirements are significantly higher than many parking studies have found are necessary, and the level of precision used implies a scientific rigor to parking requirements where no such rigor exists. Requirements are based on national standards calculated by engineers under highly generalized conditions, rather than on-the-ground conditions in Minnetonka. For these reasons, Minnetonka must reduce its requirements. We suggest implementing parking maximums in mixed-use and high-density residential zones and for all other zones simplify the formula and offer additional reductions.
First, Minnetonka should create parking reduction overlay zones. These zones have inherently lower parking demand because of the alternative modes like walking and biking or exceptional transit access. The lower parking demand permits lower parking supplied. Therefore, in these zones parking maximums should be applied. Areas suitable for these overlays would be the Glen Lake Station, Highway 7 and County Road 101, Minnetonka Boulevard and County Road 101, Cedar Lake Road/ Hopkins Crossroads, South Shady Oak and Bren Road. These areas have been labeled Community and Neighborhood Village Centers in Minnetonka’s 2030 Comprehensive Plan. These areas are intended to develop over the next twenty years into walkable mixed-use centers that would benefit from parking maximums.

Parking reductions should come in the form of a new requirements formula. This formula should be based on actual, observable parking demand rather than on how many holes are on a golf course. The policy should require that parking needs are not calculated on peak demand, but rather an average demand across all time periods. Additionally, these policies should not include a “whichever is greater” clause, arbitrarily increasing the parking supply. Simplifying and reducing the parking minimums will allow greater flexibility for developers, leading to a more efficient allocation of land and lower project and housing costs.

After deciding on a new formula, further reductions should be optional. One example of appropriate reduction incentives is for businesses that implement TDM programs. Additional appropriate examples are reductions for senior and low-income housing. With these programs, parking demand for patrons would be lower; therefore, diminishing parking supply is suitable. Minnetonka should work with the developers to identify good candidates and individualized strategies for additional reductions.

2: Implement shared parking.
Shared parking is not a new tool for reducing the number of underutilized parking spaces, but its use is likely to increase in the future. Suburban America has great capacity for increased spatial efficiency, and changes must be made to meet emerging goals around housing, environment, and transportation programming. Minnetonka has a long history of pride in the outdoors, and more efficient use of impervious space will provide more open space as well as developable land with potential to increase tax revenue. This section describes the ways to execute shared parking in Minnetonka as well as some challenges the city can expect to face.

**Option 1: Parking Demand**

Shared parking facilities serve multiple destinations, allowing the driver to park once and walk to each destination. Factors that should be evaluated in establishing shared parking agreements include operating hours, seasonal/daily peaks in parking demand, and the site’s location. In order to shared facilities to keep the adequate number of spaces available, parking demand for each destination must be analyzed and compared with all users of the facility.
There are many ways to compute parking demand, but generally, destinations have the highest demand on weekdays, evenings, or weekends. During weekday hours (7:00am to 5:00pm), the following land uses see the peak parking demand: banks and public services, offices, employment centers, park and ride facilities, schools, daycare centers, colleges, factories, distribution centers, clinics, and professional services. In the evening (after 5:00pm), peak parking demand is seen at auditoriums, bars, restaurants, theaters, hotels, and meeting halls. On the weekend (Friday through Sunday), religious institutions, parks, shops, and malls experience peak parking demand. The total number of spaces necessary for the facility is the summation of the minimum number of spaces necessary for each destination.

It is recommended that well-recognized sources such as the Urban Land Institute (ULI) Shared Parking Report or Shared Parking Guidelines by the Institute of Transportation Engineers (ITE) be used for calculating demand. Field surveys are also recommended for City of Minnetonka in order to measure hourly variation patterns among land uses. The analysis should be completed for weekday, evening, and weekend hours, as well as for seasonal peak periods like Black Friday (shopping) or Independence Day (special events).

Option 2: Districts
There are two common approaches to shared parking by city governments. They include districts and contractual agreements. Within a shared parking district, all land uses would be granted access to the allotted parking spaces at any given time. Districts can easily collect fees within property taxes for maintenance of lots, security, parking enforcement, utility fees, signage, landscaping requirements, and more. As government may struggle to provide proper staffing of such responsibilities, an oversight committee is recommended with the implementation of a shared parking district.

For the district model, it is best to target compact, mixed-use, pedestrian-oriented commercial nodes where parking is in short supply. In Minnetonka, shared parking districts would work best in the village areas defined in the 2030 Vision Plan. According the vision plan, village areas are expected to maintain historic function, support businesses and services, have strong connections to adjacent neighborhoods, have high walkability, and reflect sustainable and cohesive urban design. Districts are also recommended in regional business corridors as well.

Special attention must be paid to on-street parking in the district areas. If supply and demand is not well balanced, it could cause negative impacts to citizens. If demand is too high in shared parking facilities as well as on-street, drivers may park in adjacent residential areas or choose to go elsewhere for business.
Option 3: Contracts

Contractual agreements are the other common approach to shared parking. The contract explains the agreement in detail by two or more adjacent uses. A contractual agreement is recommended between property owners in order to ensure that the shared parking facility is arranged and operated fairly as well as efficiently. It is recommended that the Minnetonka parking ordinance require a written contractual agreement for all shared facilities and that city government provide a model agreement to refer to.

Like district areas, contractual agreements for shared parking would work best in mixed-use areas of Minnetonka, such as villages and regional business corridors. Contracts are recommended for facilities used by two or three uses. If there are more than three uses, a defined district area is often the most appropriate option.

Contracts must show proof that that the uses within contract have differing peak hours of parking demand, therefore requiring less parking spaces than those without a contract. It is recommended that the development review process at the City of Minnetonka include provisions stating that shared parking is preferred between adjacent land uses with different peak hours of demand. Zoning incentives are a good option for the implementation of contractual shared parking. If a business, individual, or organization enters into a contractual agreement during the development process, incentives could include an increase in floor area ratio, flexibility in building height, or other incentives created by the City of Minnetonka.

Historically, shared parking has been greatly underutilized by city governments as a tool for reducing impervious surface and increasing the amount of developable land. Most importantly, the City must establish an official set of procedures for calculating parking demand for shared parking districts or contractual agreements. The City is also challenged with changing demand over time. It is important to implement a set of procedures indicating how to properly adjust parking ratios as demand of shared facilities changes. Also, on-street parking availability near shared parking facilities must be monitored in order to prevent any negative affects on adjacent neighbors. The City may wish to host educational workshops and create promotional written material on the subject to inform citizens and property owners of the possibilities. With effort by the City and the citizens, these challenges can be overcome. Shared Parking is a real possibility for Minnetonka in the future.

3: Embrace sustainable parking lot design.
A reduction in parking minimums, and the adoption of a shared parking policy, can have a notable impact in reducing impervious surface in Minnetonka. A complement to these regulatory actions is to encourage a more sustainable parking lot design in the city. The most common conception of a parking lot is a blacktop surface with driving
lanes and parking spots, delineated by paint. But the notion of parking lot can be rethought and enhanced, with results that are attractive and move the city toward its sustainability goals.

Parking lot design is an important environmental issue. Dark, non-landscaped paved surfaces pose a significant problem for storm water; runoff is warmed by the retained heat, tainted by surface pollution (such as oil and paving chemicals), and is rushed off the paved surface and into the watershed without a chance to be filtered slowly and naturally by the cleansing power of the plant ecosystem. The result is more frequent storm water overflows and significantly increased watershed pollution. It also should be noted that blacktop surface parking lots are almost universally unattractive, providing a dull and hot walk from the car to the door and contributing nothing to surrounding property values.

Landscaped parking lots, however, address environmental concerns and provide an attractive alternative. Green features, such as bioswales and tree canopies, introduce opportunities for water filtration and soil permeation. Thinking about space more efficiently can provide space for these important features. And thoughtful use of paving material can make a difference for how attractive a parking lot looks and how effectively it reduces surface runoff. Below are a series of tools that the city of Minnetonka can use to implement a more thoughtful approach to parking lot design.

Landscaped reserves

Under traditional parking ordinances, the entire parking requirement must be fulfilled on site if a project is considered to be in compliance. Landscaped reserves introduce flexibility into the parking program by setting aside a certain percentage of land from the parking requirement for landscaping or a green land bank. If demand grows over time, this leftover land can be converted to parking. The advantage of this approach is in the flexibility it provides to the developer (for whom parking requirements present a considerable construction cost) and the city (who may wish to lower parking requirements but needs the ability to correct for undersupply). A reserve can be left as natural open land, or can be landscaped with a bioretention feature. Such a feature can be included in the interior or exterior of a parking lot, and collects and stores runoff for a time so that it can be treated naturally near its source before filtering into the general watershed or storm water system.
Shade trees
Parking lots are hot, inhospitable places that warm up the surrounding environment and increase emissions by increasing temperatures in gasoline tanks. Shade trees reduce parking lot temperatures and filter rainwater before it reaches paved surfaces. Shade trees can be incorporated into parking requirements in a few different ways:

- Require that a certain percentage of parking spaces be covered by a shade tree canopy at the year of tree maturity. Many places in California require fifty percent coverage; maturity is typically in ten to fifteen years.
- Require a shade tree per certain number of spaces. An ordinance in Kansas City, MO requires one shade tree per ten parking spaces.
- Require that each space in the parking lot be no more than a certain number of feet from shade trees.

Each of these approaches has the advantage of giving the property owner or developer some flexibility in how the trees are incorporated on site. Whichever approach the city of Minnetonka chooses, it should be paired with appropriate minimum dimensions for landscaped islands, to ensure that trees are able to grow to maturity; this was a problem in early cases in Kansas City.
Above: Shade trees in parking lot cool vehicles and pavement and filter rainwater.

Reduced dimensions
Cars are getting smaller and more efficient; parking spaces can reflect that change by also becoming smaller and more efficient. Where most municipalities require spaces between 8.5‘x18’ and 9‘x20’, in many cases most spaces in a lot can be reduced while not sacrificing access. Kansas City allows 7.5‘x15’ spaces, which reduces costs for developers and makes more space available for reserve or landscaped features. One means of incentivizing several changes at once is by allowing spaces adjacent to landscaped features to be shorter.

Cool pavements
Blacktop is hot, speeds runoff, blocks filtration, and is visually unappealing. White concrete has proven a viable (if somewhat more expensive) alternative, though rarely does it enable filtration any better than does blacktop. Instead, the city of Minnetonka should establish incentives or a program to encourage developers to use permeable pavements, such as paving blocks. These blocks are placed with space between (where grass or soil is usually exposed), allowing water to flow between the blocks and cooling the surrounding environment through evaporation. If an incentive program for such pavements proves infeasible, parking ordinances should be updated to reference directly that the use of cool pavements is allowed and encouraged.
4: Work with the community.
The City of Minnetonka has a tremendous opportunity to implement these changes by leveraging the green culture that is already so evident in the community. Much of the land in Minnetonka is wooded, and the protection of woodland and other green assets is a key priority for city leaders and the public. Just as Kansas City implemented its 10,000 Rain Gardens program by reaching the public through its love of gardening, the city of Minnetonka can build a brand for sustainability initiatives around the protection of the city’s woodsly identity.

The city should take a two-pronged approach to outreach, working with developers and with the community at large in strategic ways. Although the changes recommended in this report often reward the developer’s extra effort with significant cost savings that may make projects more feasible, any change in ordinances can be met with some resistance. Speak with developers about pending and planned projects to determine how reductions in parking minimums will impact project financials. Bring businesses or projects together that may be viable candidates for shared parking arrangements, and test the arrangements to see how they work. Gather feedback from developers and businesses; both are sensitive to the impact that access, including parking, has on their day-to-day operations. An incremental approach to implementation, combined with thorough testing and adjustment and re-testing, may help to overcome some early cynicism. And close partnership with businesses and developers most affected by
ordinance changes will demonstrate the city’s commitment to smart development that meets sustainability goals while not sacrificing project feasibility.

The public, too, plays an essential role in any proposed ordinance change. Make use of the public’s enthusiasm for the visual identity of the city by demonstrating how code changes are about more than potential inconveniences at peak shopping times. Use drawings and demonstration sites to show how a reduction in parking can result in a far more attractive environment in the city of Minnetonka. Listen closely to the public’s feedback, and ensure that parking lots continue to provide needed supply while also becoming more attractive and environmentally sound. Open houses provide an excellent opportunity to gather feedback from the public about how parking changes are being received; at the same time, members of the community can learn how to reduce runoff and incorporate sustainable features on their own property.

Outreach should always be an iterative process, where feedback is gathered continually and ordinances are continually refined to reflect how parking lots are actually used in the community. Today’s tech-savvy public are resourceful and eager for information, so establish a website early on and update it frequently with resources for developers and businesses and plenty of information for the public about the environmental benefits of parking ordinance reform.

**Implementation**

This report has examined the existing literature on parking reduction techniques and illustrated cases where such techniques have been implemented successfully across the country. The recommendations, based on those studies and research, suggest that Minnetonka simplify its parking ordinance while also implementing shared parking and conservation programs aimed at facilitating a more sustainable approach to parking in the city. The following appended documents include a travel demand management plan, a draft revised parking ordinance, and an example shared parking contract for use by various parties. These documents provide ideas about how to execute these recommendations in Minnetonka. The draft revised parking ordinance removes minimum parking requirements, calls for a new formula to compute average parking demand, increases the maximum percentage of compact car parking stalls permitted in lots, encourages pervious pavement as well as concrete in lots, and decreases the minimum standard parking space size from 8.5ft x 18ft to 7.5ft x 17ft. The example contract was drafted as a reference for those entering into a shared parking contract agreement. It includes sections on details of use, maintenance and cleaning, utilities, taxes, insurance, signage, cooperation, enforcement, and termination.

It should be noted that the documents provided are drafts, and should be considered a starting point; actual ordinances and contracts should be the result of a thoughtful participatory process and take into account the unique conditions of Minnetonka and the valuable input of businesses, residents, and other stakeholders. We hope that the literature review, case studies, recommendations, and appended documents will
provide the city of Minnetonka with solutions that effectively meet its environmental and developmental goals.
Appendices

1. Overall growth strategy map
2. Draft revised parking ordinance
3. Draft shared parking contracts
4. Transportation demand management plan
5. Works consulted and image credits
PARKING REQUIREMENTS

a. Parking and loading shall be provided and maintained in accordance with the following.

1) No change of use, tenancy or occupancy of a parcel of land or building, including construction of a new building or an addition to a building, which requires additional parking or loading spaces shall be allowed until such additional parking or loading is approved and furnished. Review may be required under the site and building plan review procedures of section 300.27 of this ordinance.

2) Required parking and loading areas and the driveways providing access to them shall not be used for storage, display, sales, rental or repair or motor vehicles or other goods or for the storage of inoperable vehicles or snow.

3) Required parking and loading spaces shall be located on the same development site as the use served. The city may approve off-site parking if the city council finds the following:

   a. reasonable access shall be provided from the off-site parking facilities to the use being served;

   b. the parking shall be within 400 feet of a building entrance of the use being served;

   c. the parking area shall be under the same ownership as the site served, under public ownership, or the use of the parking facilities shall be protected by a recorded instrument that is acceptable to the city, such as a shared parking facility agreement among parties or agreement within the a shared parking district.

   d. the off-site parking shall be maintained until such time as on-site parking is provided or an alternate off-site parking facility is approved by the city as meeting the requirements of this ordinance.
4) Notwithstanding any other provision of this subdivision to the contrary, a land use may provide the required off-street parking area for additional land uses on the same development site if the following conditions are met:

   a. because of the hours of operation of the respective uses, their sizes and their modes of operation there will be available to each use during its primary hours of operation an amount of parking sufficient to meet the needs of such use; and

   b. the joint use of the parking facilities shall be protected by a recorded instrument, acceptable to the city.

5) Bicycle parking facilities shall be provided in an amount and design adequate to the demand generated by each use. Institutional uses are required to provide bike parking spots equal to 10% of the off-street automobile parking spots required. Office and Commercial uses must provide bike parking spots equal to 5% of the off-street automobile parking spots required.

7) Parking areas and structures shall be designed and maintained to avoid vehicles queued within the public right-of-way. Gates or other access limiting devices may be installed only after a finding by the city that no adverse impacts on public right-of-way will result.

b. Parking areas shall be designed in conformance with the following:

1) Parking stalls shall have a minimum paved dimension of 7.5 feet by 15 feet. Stall and aisle dimensions shall be as noted below for the given angle:

<table>
<thead>
<tr>
<th>Angle</th>
<th>Curb Length</th>
<th>Stall Length</th>
<th>Aisle</th>
<th>Low-Turnover Parking Structure Aisle Width***</th>
</tr>
</thead>
<tbody>
<tr>
<td>45°</td>
<td>12.0'</td>
<td>15.0'</td>
<td>13.5'*</td>
<td>12'</td>
</tr>
<tr>
<td>60°</td>
<td>10.0'</td>
<td>15.0'</td>
<td>18.5'*</td>
<td>16'</td>
</tr>
<tr>
<td>75°</td>
<td>9.0'</td>
<td>15.0'</td>
<td>23'</td>
<td>18'</td>
</tr>
<tr>
<td>90°</td>
<td>8.5'</td>
<td>15.0'</td>
<td>26'**</td>
<td>24'</td>
</tr>
<tr>
<td>Parallel</td>
<td>20.0'</td>
<td>8.0'</td>
<td>22'</td>
<td>22'</td>
</tr>
</tbody>
</table>

* one way aisles only.

** aisles serving one row of 90° angle parking spaces may be 22 feet wide.
aisle widths within parking structures for low-turnover uses, such as offices, industrial facilities, residential complexes and hospitals. Retail uses and other uses with similar traffic characteristics are considered high-turnover uses.

2) Up to 50 percent of the total number of required spaces may be for compact cars and have minimum paved dimensions as follows:

<table>
<thead>
<tr>
<th>Angle</th>
<th>Curb Length</th>
<th>Stall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>45°</td>
<td>10.0'</td>
<td>16.0'</td>
</tr>
<tr>
<td>60°</td>
<td>8.5'</td>
<td>17.5'</td>
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<tr>
<td>75°</td>
<td>8.0'</td>
<td>16.5'</td>
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<tr>
<td>90°</td>
<td>7.5'</td>
<td>15.0'</td>
</tr>
<tr>
<td>parallel</td>
<td>16.0'</td>
<td>8.0'</td>
</tr>
</tbody>
</table>

Compact car parking may be provided if the following conditions are met:

a. compact car stalls shall be identified by appropriate directional signs consistent with sections 300.30 et seq. of the code of city ordinances;

b. compact car stalls shall be distributed throughout the parking area so as to have reasonable proximity to the structure served but shall not have generally preferential locations such that their use by non-compact cars will be encouraged;

c. the design of compact car areas shall to the maximum feasible extent be such as to discourage their use by non-compact cars; and

d. An additional 25% of spaces may be compact cars if those spaces are adjacent to landscaped features.

3) All parking areas except those serving one and two family dwellings on local streets shall be designed so that cars shall not be required to back into the street. If deemed necessary for traffic safety, turn-around areas may be required.

4) Buffers and setbacks shall be provided as follows.

a. Access drives, driveways and aisles shall not be allowed to intrude into a required parking setback except at the access point or where a joint drive serving more than one property will provide better or safer traffic circulation; and

b. Parking lots, driving aisles, loading spaces and maneuvering areas shall have setbacks as indicated in the following table:
### Required Parking Setbacks

<table>
<thead>
<tr>
<th>Land use designation of adjacent property</th>
<th>Zoning classification of subject property</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1/R-2 with CUP for public buildings</td>
<td>R-1/R-2</td>
</tr>
<tr>
<td>R-1</td>
<td>R-1</td>
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<td>R-2</td>
<td>R-2</td>
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<td>R-3</td>
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<td>R-4</td>
<td>R-4</td>
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<tr>
<td>B-1</td>
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<td>B-3</td>
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<td>I-1</td>
<td>I-1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>R-1/R-2</th>
<th>R-2</th>
<th>R-3</th>
<th>R-4</th>
<th>B-1</th>
<th>B-2</th>
<th>B-3</th>
<th>I-1</th>
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</thead>
<tbody>
<tr>
<td>Low density</td>
<td>20'</td>
<td>20'</td>
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<td>20'</td>
<td>20'</td>
<td>20'</td>
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<tr>
<td>Mid density</td>
<td>20'</td>
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<td>20'</td>
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<tr>
<td>High density</td>
<td>20'</td>
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<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>30'</td>
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<tr>
<td>Commercial</td>
<td>20'</td>
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<td>10'</td>
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<tr>
<td>Industrial</td>
<td>20'</td>
<td>10'</td>
<td>10'</td>
<td>10'</td>
<td>10'</td>
<td>10'</td>
<td>10'</td>
<td>10'</td>
</tr>
<tr>
<td>Office</td>
<td>20'</td>
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<td>10'</td>
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<td>20'</td>
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<tr>
<td>Institutional</td>
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<td>20'</td>
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<tr>
<td>Public open space</td>
<td>20'</td>
<td>20'</td>
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<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
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<tr>
<td>Right-of-way</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
<td>20'</td>
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</tbody>
</table>

Land use of adjacent property is as designated in the comprehensive plan. Where a mix of land uses is indicated on the comprehensive plan for adjacent property, the most restrictive applicable buffering requirement shall be observed. The requirements of this table may be waived at points where shared access is utilized.

5) All parking and loading areas, aisles and driveways shall be bordered with raised concrete curbs or equivalent approved by the city. Single family and two family dwelling developments shall be exempted from this requirement.

6) Parking, loading and driveway areas shall be surfaced with asphalt, concrete or pervious pavement approved by the city. The use of pervious pavement may make property eligible for Storm Water Assessment Rebate.

   a. Use of concrete is encouraged when pervious surface infeasible.

7) Except in the R-1 and R-2 districts, all parking stalls shall be marked with painted lines not less than four inches wide in accordance with the approved site and building plan.

8) All parking lots shall provide islands for traffic control as needed.
c. The number of required parking spaces shall comply with the following:

1) Calculating the number of spaces shall be in accordance with the following:

   d. for mixed-use buildings, parking requirements shall be determined by the city based on the full occupancy of the building if part of the building is vacant. In cases where full occupancy uses of a building will generate additional parking demand, the city may require a proof of parking plan for the difference between minimum parking requirements and the anticipated total demand; and

   e. if warranted by unique characteristics, or documented parking demand for similar developments, or both, the city may allow reductions in the number of parking spaces actually constructed as long as the applicant provides a proof of future parking plan. The plan must show the location for all minimum required parking spaces in conformance with applicable setback requirements. The city may require installation of the additional parking spaces whenever the need arises. The preserved land shall be landscaped in a manner suitable for runoff mitigation from impervious surfaces.

3) One handicapped parking stall shall be provided for each 50 stalls. Handicapped parking spaces shall be in compliance with the uniform building code and state law.

4) The parking requirement for all uses listed in this subdivision may be established by the city based on a formula that incorporates characteristics of the use and available information on average parking demand for such use.

d. Loading and unloading requirements shall be in compliance with the following.

1) Any use which the city believes requires the provision of designated spaces for the loading, unloading or parking of trucks or semi-trailers shall provide such spaces and maneuvering area in the number and configuration which shall be deemed necessary in order to prevent interference with the use of the public right-of-way and with vehicles entering onto or exiting from the public right-of-way.

2) Semi-trailer spaces shall be at least 55 feet in length, 10 feet in width and 14 feet in height plus necessary additional maneuvering space.

3) Spaces and the associated maneuvering area shall be at least 50 feet from the property line of any property which is zoned for or designated in the comprehensive plan as residential.

4) No trucks shall be parked in areas other than those designed for such purpose on an approved site plan.
5) Delivery and service areas shall be sized in accordance with Minnesota department of transportation WB-60 standards.

e) Business establishments containing drive-up facilities, including restaurants and financial institutions, shall provide a stacking area for vehicles on the site. A minimum of 6 vehicle spaces per lane shall be provided.

All such spaces shall be entirely on the site and shall be in addition to parking spaces required for the principal use. The vehicle stacking area shall not extend beyond the street right-of-way line and shall be delineated in such a manner that vehicles waiting in line will not interfere with nor obstruct the primary driving, parking and pedestrian facilities on the site.

f) All required parking spaces shall be accessed by adequate maneuvering space. All dead-end parking rows shall contain a turnaround area at least 13 feet deep.
This Shared Agreement for Parking Facilities between __________ and __________, shall be declared by the City of Minnetonka, Minnesota, on the _______ day of ____________, ____________. The facilities shall be shared commencing with the ___ day of ____________, ________, for [insert negotiated compensation figures, as appropriate]. [Monthly payment arrangements inserted here if applicable].

The Parties Agree to abide by the following guidelines within this shared parking facility:

1. Use of Facilities
   This section should describe the details of the shared use. For example, it should define times and days of usage as well as any sections that of the facility that should have specific exclusivity rules.

2. Maintenance and Cleaning
   Describe here the responsibility each party has for maintenance of the parking facility, as well as painting, cleaning, and general up-keep. Be specific about maintenance expectations and sharing of costs.

3. Utilities
   This section should describe the responsibility that each party holds for the payment of utility bills including electrical, water, and sewage.

4. Taxes
   Responsibility for property tax and any other taxes should be specified in this section.

5. Insurance
   This section should describe the insurance requirements for the facility and the payment responsibility of each party.
6. Signage
   Expectations for signage and upkeep of signage should be described in this section. Be sure to feature the City of Minnetonka ordinance on signage allowances and restrictions.

7. Enforcement
   Parking enforcement methods for the facility should be defined here. For example, surveillance cameras, towing companies, and private security providers may be necessary.

8. Cooperation
   The section should state that parties agree to cooperate to the best of their abilities to use the facility without disrupting the other party. For example, the parties may agree to meet on a regular basis to discuss any changes that need to be made at the facility.

9. Termination
   It is important to describe how to terminate the agreement if necessary for one or both parties. In this section, describe the responsibilities of each party in the case of early termination of the contract.

In Witness Hereof, the parties have executed this Agreement as of the Effective date set forth.
[Signature and notarization as appropriate to this legal document]
Transportation demand management plan
As part of a complete parking reduction program, Minnetonka should carefully select travel demand management strategies that complement and build upon existing infrastructure. Using short- and long-term strategies can help capture the widest group of users and be most effective.

Short-term opportunities are affordable and easily implemented with little commitment from the community. Secure bicycle parking located close to the entrance provides incentives for bikers. Improving knowledge of the local transit system can be done with informational seminars where local transit providers visit businesses to demonstrate how to pay fares, board, signal a stop, and how to read the service maps. The city should also encourage employer implemented TDM. Employers have the opportunity to develop strategies that fit their culture. Programs that may be successful here include reduced cost transit passes, supporting a carpool registry, and flexible work schedules. Employers located in areas with excellent transit service may benefit from subsidizing transit passes. Subsidizing transportation costs is a business expense that is tax deductible in most cases. Supporting a carpool registry can be as simple as providing premium parking spaces for carpools and a place for organizing carpools either on the company intranet or break room. Flexible work schedules may not be feasible for all businesses, but where it is appropriate, altering shift start times away from morning and evening peaks, allowing for a compressed workweek or telecommuting may decrease daily parking demand. Minnetonka should evaluate further financial incentives for participating in TDM.

Long-term goals to reduce demand should revolve around an inclusive multi-modal transportation policy. In the villages identified earlier, complete streets should be provided where appropriate. Complete streets provide a safe and accessible location for all modes of transportation - driving, transit, biking, and walking for all. These streets are well marked with bike lanes and signaling. They also feature wider sidewalks with landscaped features to provide an element of comfort and safety for pedestrians. Minnetonka should determine appropriate corridors that connect residential areas with commercial ones. These corridors should provide additional bike and pedestrian infrastructure to increase multi-modal connectivity. As the final element in Minnetonka's TDM, additional transit lines should be researched to encourage a modal shift away from single occupancy vehicles into efficient and cost-effective transit. Bus rapid transit or express buses may be appropriate here.

The suggested policies and programs will help reduce the parking demand to mitigate spillover effects from decreased parking supply. It is important to note that not all of these methods are appropriate for all areas of Minnetonka and should be carefully reviewed for potential impacts on parking demand.
Works consulted


http://www.werf.org/liveablecommunities/studies_kc_mo.htm

Image credits


Page 21: Interlocking Concrete Pavement Magazine. http://npaper-wehaa.com/icpi/2012/05/s1/?g=print#?article=1577709