# *Model Standards for Parking Lot Design*

## Kennebec Valley Council of Governments
## October, 2008

*This document provides model language for use in writing performance standards for parking on commercial sites. These standards may be used in conjunction with zoning or development review ordinances with suitable review procedures and criteria.*

*These standards are best suited for use in small urban and suburban municipalities. They are intended to demonstrate the range and depth of considerations to be included. The requirements would probably not be suitable for highly urbanized areas, with tiered commercial zones and development types. On the other hand, they contain more detail than a small, rural town is likely to feel necessary, or have the technical capacity to enforce.*

*In general, regulatory standards consist of two types. They can be "performance standards," i.e. guidelines keyed to the outcome of a site design. Or, they can be "prescriptive standards," which are more technical and quantitative rules. Standards for parking lots have traditionally been prescriptive, because of their engineered nature, and these standards reflect this history. But, each section also contains a performance standard, to put the prescriptive standards in context. (In towns that routinely grant waivers to rigidly-structured rules, a more secure procedure going forward would be to only grant the waiver upon the finding that the performance standard will be met.) Nevertheless, even the prescriptive standards shown in this model tend to be more "liberal," i.e. setting a lower bar for developers to meet, in keeping with the trend towards more performance-based regulation.*

*Model language in this document may be adapted and used freely. Illustrations and diagrams are from open –content websites or public documents, except as noted.*

***MODEL LANGUAGE*** ***COMMENTARY***

## Section 1. Purpose and Application

1.1 The purpose of these standards is to provide for the safe and efficient flow of vehicles and pedestrians while minimizing the impacts on public streets and environmental resources.

The purpose statement may be incorporated into the general purposes of a parent ordinance.

1.2 An applicant for commercial development must demonstrate that he or she has made sufficient accommodation for the volume of traffic expected to be generated by the size and type of development proposed. The following requirements are intended to be the minimum necessary to meet that standard. The Board may authorize alternative designs or construction techniques upon a showing by the applicant that they will equal or exceed the performance standard.

This is a general criterion which may be incorporated into a parent ordinance. It also directs the reviewing authority on how to accommodate alternative designs.

## Section 2. Street and Site Access

*Performance Standard:* The development must accommodate the number and size of vehicles expected to be generated without an undue impact on mobility or safety on public streets.

This section addresses the interaction of public streets and parking associated with the development.

2.1 Access to the Street:

2.1.1 All access points onto a state or state aid highway shall be designed in accordance with the Maine Department of Transportation *Highway Driveway and Entrance Rules*, Maine Administrative Rules, Title 17, Chapter 299. A Driveway, Entrance, or Traffic Movement Permit issued by Maine DOT must be provided by the applicant prior to final approval of the development by the Board.

Rather than establish a set of local access rules with a potential for conflict, this section references established DOT rules. It also requires a DOT permit prior to local approval. Since the Maine DOT under its own rules only requires the permit prior to occupancy, the developer may balk at this provision. However, towns need to know whether conditions or changes required by DOT will have an impact on their approval. OPTION: Towns with staff capacity to review access design may choose to delete the requirement for permit-in-hand.

2.1.2 All access points onto a town way or other public way shall be designed to meet the standards of Part B, section 2.1 of the *Highway Driveway and Entrance Rules*, Maine Administrative Rules, Title 17, Chapter 299.

Although the DOT does not regulate access points onto town roads, the referenced "Basic Safety Standards," addressing sight distance, driveway width, drainage, and other elements, are a sufficient standard for most public streets.

2.1.3 All access onto public streets shall meet the following standards:

2.1.3.1 In order to maintain adequate sight lines, the area adjacent to access points shall be kept free from visual obstructions, including parking stalls, landscaping,

The "sight triangle" is necessary to achieve sight lines from a vehicle when a driver is sitting three feet off the ground and at least ten feet behind the stop line of the driveway. OPTION: Since sight distance varies with

and signs above two (2) feet in height, within a triangular area defined by legs of thirty (30) feet measured along the driveway and street lines.

speed, it would be more accurate but complex to vary the street-side leg of the triangle based on the posted speed limit.

2.1.3.2 Driveways shall be paved with a surface similar to that of the street, from the edge of existing pavement to the edge of right-of-way of the street, or to the length of the *design vehicle*, whichever is greater. All driveways entering curbed streets shall be similarly curbed along the radius of the access point and extending to a minimum distance of fifty (50) feet, as measured in a straight line from the edge of the existing pavement.

The requirement for paving prevents damage to the street pavement and reduces tracking of mud or gravel onto the street.
The *design vehicle* is the type of vehicle most likely to use the development. In some cases, it will be a truck, and the paving should be correspondingly deeper.
Curbed streets tend to have closed drainage systems, and failing to curb the access points as well may result in unintended runoff problems as well as potential for damage to existing curbs.

2.1.3.3 Pavement radii connecting street and driveway shall be appropriate to the size and turning radius of the design vehicle. The minimum radius for two-way access points shall be ten (10) feet. The radius for one-way access points or access points with median islands shall be between five (5) and ten (10) feet on the inside corner and a minimum of thirty (30) feet on the outside corner.

The curvature at the mouth of the driveway controls both the speed and direction of entering and exiting vehicles. A larger radius will allow vehicles to make the transition at higher speeds, which may not be suitable. Smaller radii allow for narrower openings, desirable from a pedestrian standpoint. Larger design vehicles will require a larger pavement radius.

The above image illustrates curb radius and sight triangle (dashed line).

2.1.3.4 From the edge of the street, the driveway shall not exceed a grade of two (2) percent for at least forty (40) feet, or, where a traffic study has been done, for the full distance of the predicted queue of vehicles at the peak hour.

A relatively flat grade improves sight distance, reduces stormwater runoff problems, and allows vehicles to maintain control in times of slippery road conditions.

2.1.3.5 Inbound and outbound traffic at *high volume entrances* and for medium volume entrances at the discretion of the Board shall be separated by median islands. Islands shall be no less than four (4) feet in width and shall create a throat (entry and exit lanes) of adequate length based on the traffic study, but in no case less than 60 feet. Islands may be vegetated with plants selected not to obstruct sight lines, but shall not contain structures or signs within the sight triangle, except as necessary to direct traffic.

High volume entrances (as defined by Maine DOT) will invariably be subject to a Traffic Movement Permit, but the entrance and exit lanes may not be separated. This provision requires separation, to preserve the capacity of the throat and safety of traffic flow. A traffic study will be required for a Traffic Movement Permit, and will include a recommended queuing length (throat area). See Section 3.3.1.

| ***MODEL LANGUAGE*** | ***COMMENTARY*** |
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| 2.1.3.6 Separation of Access Points: | |
| 2.1.3.6.1 Access points shall be separated from adjacent access points, including those approved but not yet built, by a minimum of fifty (50) feet, as measured from the near edge of the driveway, excluding radius. | The Maine DOT Rule requires separation of access points only for certain classes of arterials. The standards of 2.1.3.6 would serve as a minimum for all roads, with the DOT Rule applying on state jurisdictions. The separations required by the DOT Rule are speed-based, while these are not. |
| 2.1.3.6.2 Medium volume entrances shall be separated from other medium- or high-volume entrances by a minimum of seventy-five (75) feet. | Medium and high volume entrances generate more traffic and potential for conflict, therefore must be separated by greater distances. |
| 2.1.3.6.3 High volume entrances shall be separated from other high-volume entrances by a minimum of one hundred fifty (150) feet. | |
| 2.1.3.6.4 Access points shall be aligned exactly opposite those across the street, if possible. If not possible, they shall be separated from opposing driveways by a minimum of fifty (50) feet, as measured from the near edge of the driveway, excluding radius. | The concern here is for simultaneous left-turning movements creating conflicts if only slightly separated. If opposing driveways are exactly aligned, it removes the conflict, plus allows for four-way intersection controls if needed in the future. |
| 2.1.3.7 No access point shall be located within ten (10) feet of a property line. | |
| 2.2 Improvements to Public Streets | |
| 2.2.1 Streets anticipated to carry development traffic shall have sufficient capacity or be suitably improved to accommodate the amount and types of traffic generated by the development. No development shall increase the volume to capacity ratio of a public street above 0.8 nor reduce *Level of Service* below "D". If a street affected by development traffic currently operates at a Level of Service of “E” or “F,” it shall be suitably improved to achieve a Level of Service of “D” or above. | This is the long-accepted provision which allows towns to require developers to make off-site improvements if their traffic generation triggers potential for congestion. *Level of Service* is a term in traffic engineering roughly indicative of the degree of congestion, with a range of “A” to “F.” An LOS of “D” is the standard threshold, but is a congestion level that a small town would not normally experience. OPTION: Changing the standard to “C,” (and reducing the volume to capacity ratio to 0.55) would kick in the mitigation requirements at a lesser level of traffic. |
| 2.2.2 Intersections shall be of a design and have sufficient capacity to limit the stopping or standing of vehicles attempting to enter the development from the street. Where | Developments large enough to trigger intersection improvements are usually, but not always, on DOT-controlled roads and any proposed improvements would have to meet DOT standards under a Traffic Movement |

necessary to ensure safety of drivers and pedestrians and to avoid congestion, the developer shall install turning lanes, traffic directional islands, frontage roads, signalization, or other traffic controls within public streets. All improvements to public streets shall conform to standards in the *Manual on Uniform Traffic Control Devices* (most recent edition) published by the American Traffic Safety Services Association, and be approved by the Maine DOT Regional Traffic Engineer prior to installation.

Permit. This provision is included in the event that the entrance is onto a local street, but any street improvements should still be approved by DOT or another professional engineer.

2.2.3 A Traffic Study performed by a professional engineer with experience in traffic management shall be performed for every development estimated to generate traffic in excess of 100 passenger car equivalents during the peak hour of the development. Recommendations of the traffic study for improvements to public streets shall be implemented at the developer's expense prior to the issuance of an occupancy permit for the development, unless the development is subject to impact fees for street improvements.

This mirrors the required study for a Traffic Movement Permit. But the developer is not required to submit the study to the Town unless this provision is included.

If the development area is subject to impact fees, it means that street improvements have already been planned out and the relative costs assessed, so any exactions would be unnecessary.

## Section 3. Parking Site Design

*Performance Standard:* The site shall be designed to facilitate the safe and free flow of pedestrians and vehicles while minimizing physical impacts on the land. Provision must be made for employee and customer access to the development through the design and installation of adequate parking facilities.

This section addresses the location and layout of parking facilities on the development site.

3.1 Parking Lot Location: In (*downtown or growth*) districts, parking lots shall not be located between the street and the front façade of the building, unless the Board determines that environmental conditions or existing structures preclude adequate parking elsewhere on the site.

The effect of this requirement is to force the buildings forward on the lot, to create a more walkable environment. It should only be implemented in districts where maintaining or improving walkability is an objective identified in a plan.

3.2 Parking Lot Design: All driveways, aisles, and parking areas shall be designed and constructed to support the intended use.

3.2.1 Standard-Duty Design: All areas intended for vehicle circulation and parking shall be constructed with a minimum of six (6) inches

This is the basic construction specification, with 12" of gravel, and a requirement for paving only for lots with 12 or more parking spaces. It is also common for

of gravel meeting MDOT spec. 703.06C for subbase and six (6) inches of crushed gravel meeting MDOT spec. 703.06A for a surface.

standards to increase the thickness of gravel required or to require paving for all lots.

3.2.2 Heavy-Duty Design: Parking lots or portions thereof which experience heavier use as measured by volume or vehicle weights shall be designed to sustain greater loads. Areas so designated shall be surfaced with a minimum of twelve (12) inches of gravel meeting MDOT spec. 703.06C for subbase and six (6) inches of crushed gravel meeting MDOT spec. 703.06A for a base, and paved to a minimum thickness of four (4) inches.

Heavy duty design should be required on the busiest travel lanes of large parking lots, or whenever a lot serves primarily trucks or other heavy equipment.

3.2.3 Paving: Parking lots designed for twelve (12) or more vehicles shall be paved to a minimum thickness of three (3) inches.

3.2.3.1 Porous paving materials (porous asphalt or pervious concrete) shall be used where available, to aid in the dispersal of stormwater and reduce ice/water buildup in parking areas. Porous pavement must be designed and placed by a licensed contractor certified in the installation of the materials.

Porous pavement is a promising new technology for controlling stormwater runoff. However, it is not (as of 2008) widely available in Maine. For further information on porous pavement and other Low Impact Development techniques, refer to www.mainenemo.org.

3.2.3.2 If non-porous pavement is used, it shall consist of a bituminous paving mix applied in two lifts. The finish course shall conform to MDOT Spec. 403.209, 9.5 mm nominal Hot Mix asphalt.

This is the paving standard for conventional pavement. Note that the term “plant mix” (e.g. “plant mix C”) is out of date, and no longer used by Maine DOT.

3.2.4 Segmentation of Lots: In parking lots that exceed one hundred (100) parking spaces, the landscaping plan required in section 5.3 shall illustrate the use of landscaped aisles to restrict driving movements diagonally across parking bays. Landscaped aisles shall be sufficient to divide the lot into multiple smaller cells of no more than fifty (50) spaces each.

Large parking lots should be blocked out, to limit expanses of unbroken pavement and provide opportunity for cooling and stormwater management as well as channeling traffic flows. This is generally done with vegetated islands with raised curbs. OPTIONS: The “100” and “50” numbers are a matter of preference, but based on a sampling of other ordinances.

3.2.5 Snow Storage: Parking lots must include accommodation for adequate storage of snow on a short term basis. Snow storage areas shall not occupy or limit access to required parking spaces during times of peak parking demand.

OPTION: This provision may be dropped in areas of light snow accumulation, or waived if the developer presents a suitable “overnight” snow removal plan.

3.2.6 Use of Lots for Outside Storage or Sales:

***MODEL LANGUAGE*** ***COMMENTARY***

3.2.6.1 The use of a portion of a parking lot for outside storage or sales of merchandise must be designated on the site plan.

Outside sales and storage of merchandise or bulk materials is a common alternate use of parking lots for businesses such as garden centers and lumberyards, avoiding need for additional impervious surface.

3.2.6.2 Outside storage or sales will be permitted only upon showing that parking spaces and aisles to be occupied are not necessary to meet the demand for parking during the time that such use will be occurring.

Outside sales and storage usually occurs outside of the peak times of the year, but that should be confirmed by the developer.

3.2.6.3 Parking lot sales areas will be located adjacent to the building or oriented such that customers may access the area without crossing active traffic lanes.

If customers are expected to walk to the outside sales area, forcing them to dodge traffic creates a public safety hazard.

3.2.6.4 Outside storage and sales areas will not obstruct emergency access to the development.

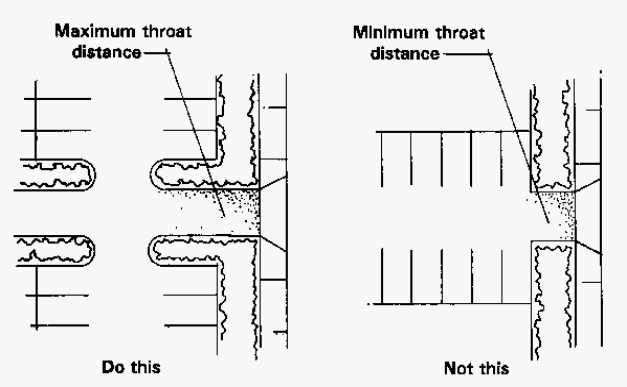
3.3 Vehicle Circulation: The site design shall show that maneuvering and parking of vehicles will take place outside of the street right-of-way and such that vehicles will not stop on or back onto a public street.

This provision states that parking lots must be separated from the public street. Subsequent provisions specify design elements to achieve the standard.

3.3.1 Entrance: Driveways shall include a *throat area* sufficient to deter vehicle conflicts and congestion at the entrances.

The throat area is a section of driveway between the street and parking stalls. If of sufficient length, it prevents incoming vehicles from stacking up into the roadway while waiting for parking traffic to clear.

3.3.1.1 The throat area shall be designed to stack the average number of vehicles waiting to exit the property during the peak hour of the development. Unless otherwise recommended by a traffic study, the throat shall be a minimum of twenty (20) feet in length, plus an additional twenty (20) feet for every fifty (50) parking spaces provided.



DRIVEWAY THROAT DISTANCE

3.3.1.2 Parking spaces shall not be accessible along the length of the throat area.

3.3.2 Aisles: Vehicle aisles will provide access to all parking on the site. All parking spaces must be accessible from an aisle without the necessity of moving other vehicles.

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3.3.2.1 Where a parking lot consists of multiple aisles and tiers of parking spaces, the tiers shall be oriented perpendicular to the face of the building containing the principal entrance, unless another orientation will enhance pedestrian safety.

Perpendicular orientation improves pedestrian safety by allowing people to walk along tiers of parked vehicles rather than crossing travel lanes.

3.3.2.2 Two-way aisles shall be a minimum of twenty-four (24) feet in width. One-way aisles shall be a minimum of eighteen (18) feet in width.

This model suggests wider aisles than prior standards, but shorter parking stalls (see section 4.1.1). This results in the same overall number of parking spaces, though with less paint.

3.3.3 Emergency access: Travel lanes shall be located so as to provide emergency access to all structures on the site and to easily access the rear of all buildings. Upon the recommendation of the fire chief, the Board may require a fire lane to be designated adjacent to any structures or buildings in the development.

Emergency access "fire lanes" should provide emergency vehicles with access to all exposures of the building. OPTION: A more rigid standard would require an actual paved lane surrounding all buildings.

3.3.4 Drive-up Windows: Any design that includes the use of vehicular service (A drive-up@ windows shall provide queuing space, designed so that it will not interfere with parking and circulation on the remainder of the site.

Drive-up windows for food service, banks, pharmacies, etc. must be designed with a circulation pattern separate from parking movements. The length of the "waiting line" will vary with the type of business.

3.3.4.1 For food service, a minimum of one hundred (100) linear feet of queuing space shall be provided on the incoming side of the ordering station or window.

3.3.4.2 For all other types of service windows, a minimum of sixty (60) linear feet shall be provided on the incoming side of each window.

The above image shows a drive-up lane circling the building, separated from parking access. (Image capture from Google Earth)

3.3.5 Freight Movements: Freight loading or delivery areas must be oriented and designed

Like drive-up windows, loading bays must not interfere with flows in the rest of the parking lot. It is often

so that trucks may access them without blocking traffic flow or parking spaces.

claimed that freight activities take place only during the hours that parking spaces are not used. If this is used as an excuse for overlapping parking, get it in writing.

3.3.6 Bus Stop: Where located in an area served by fixed-route public transportation, a development expected to generate a demand of one hundred (100) or more parking spaces shall provide accommodation for service. Accommodation shall include a covered waiting area and pavement-marked bus lane.

OPTION: This provision should only be applied to developments on a bus route which are likely to be large enough to generate bus users. Ideally the service provider will participate in design of the facilities.

3.4 Connections to Adjoining Properties: If a development adjoins a state highway, the developer will plan for or provide connections to adjoining properties.

The requirement for inter-development connections is a valuable tool for reducing street congestion, but only in limited circumstances.

3.4.1 If adjoining property is undeveloped or is developed with a non-compatible use (see section 3.4.3, below), the site design shall show an area of land reserved for future interconnection at a suitable location. The applicant shall submit a written commitment to participate in the construction of the connection at such time as it is deemed necessary by the municipality.

The chief hurdle to getting off-street connections built is the coordination of timing between adjacent properties. Sections 3.4.1 and 3.4.2 jointly provide for circumstances in which the properties are developed at different times.

3.4.2 If adjoining property is developed with a compatible use, the design shall show the construction of a connecting driveway in a location appropriate to both developments. At a minimum, the connection shall be fully constructed to the property line. The applicant shall make a reasonable effort to negotiate with the owner of adjoining property for completion of the connection.

If the adjoining property was developed without the provision for inter-connection, cooperation could be a challenge. OPTION: The municipality could put the burden on the developer to pay the entire cost of the connection.

3.4.3 Adjoining developments are considered to be compatible if both developments contain retail uses, or if one of the developments is an eating establishment, or if a traffic study shows that more than one percent of traffic generation can be distributed directly between the two developments.

The standard for interconnections only makes sense if people would actually use it. The uses described in this provision are those most likely to draw cross-traffic, but there could well be other examples.

3.4.4 Connections to adjoining properties will not be required if the development will be accessed by a service road, frontage road, or other multi-user private road, or if the development is located within an existing building in the *downtown* district.

A service road is essentially a multi-parcel connecting road, so eliminates the need for interconnections (from a public streets perspective). Within an already built-up district, there is not likely to be an opportunity for interconnections, and adjoining properties are more likely to be walkable.

3.5 Pedestrian and Bicycle Accommodation:

***MODEL LANGUAGE*** ***COMMENTARY***

Developments shall be designed and constructed to be accessible to pedestrian and bicycle traffic.

3.5.1 Pedestrian Access Required: Pedestrian access to the site shall be provided wherever a development is located within a (*growth/commercial*) district.

In most cases, it is not cost-effective to require sidewalks in all areas of town. A local plan should specify how and where the sidewalk infrastructure is to be extended.

3.5.1.1 Pedestrian access shall be provided from the street to the principal entrance of the development. This shall consist of at least one travel way dedicated to pedestrians, with a paved travel surface a minimum of five (5) feet in width.

This provision connects the street with the development.

3.5.1.2 Pedestrian ways shall be free of barriers to persons with disabilities for their entire width.

3.5.1.3 Where the pedestrian way crosses vehicle travel lanes, the surface shall consist of textured or stamped bituminous pavement, Portland cement concrete or other construction technique to clearly designate pedestrian priority. Curbing shall be ramped suitable for persons with disabilities.

This provision requires more than simple paint striping to designate crosswalks. Recommended construction techniques not only emphasize pedestrian right-of-way but reduce overall vehicle speeds in parking lots.

3.5.1.4 Sidewalks shall be constructed using a base of crushed gravel a minimum of 12 inches in thickness, meeting MDOT spec. 703.06A. Portland Cement concrete shall be a minimum thickness of four inches, and be reinforced with six-inch mesh, number 10 reinforcing wire. Bituminous surface shall be a minimum thickness of two inches and shall conform to MDOT Spec. 403.209, 9.5 mm nominal Hot Mix asphalt.

Note: Old standards using the term “plant mix” (e.g. “plant mix B”) are obsolete and should be replaced.

3.5.2 Existing Sidewalks: Wherever the property to be developed adjoins property with an existing sidewalk, the developer shall continue that sidewalk for the entire length of the property to be developed. Existing

This provision requires an extension or improvement when the property is already accessible to a sidewalk. OPTION: A sidewalk may be required for all development, but that would result in a lot of isolated sidewalks unless the municipality has a plan for infill.

sidewalks on property to be developed shall be rebuilt or improved as necessary to meet the criteria of section 3.5.1.

3.5.3 Bicycle Access Required: A development which will contain one hundred (100) or more parking spaces shall provide accommodation for bicycle access. Accommodation shall include a designated bicycle lane or trail through the site and a bicycle parking facility with at least four (4) bicycle storage areas.

As worded, this provision kicks in only for parking lots over 100 spaces. This threshold is arbitrary; it could be reduced, although the likelihood of bicycle use drops greatly with smaller lots. OPTION: Rather than by the number of parking spaces, this provision could be triggered by specific uses which might be more likely to attract bicycles.

3.5.3.1 A designated bicycle lane or trail shall be a minimum of four (4) feet in width, graded, and surfaced with stone dust, asphalt, or similar material.

This model does not distinguish between a bicycle-only path and a designated bike lane within a driveway. A separated bicycle path provides safer access but requires more impervious surface.

3.5.3.2 Each bicycle storage area shall consist of a hard-surfaced area two (2) feet in width by six (6) feet in length, equipped with a structure suitable for securing a bicycle, and clearly marked to prohibit encroachment by motor vehicles.

OPTION: There are many different styles of bike racks and lockers; While this model suggests a standard, there are alternatives that could occupy less space and offer better security.

3.5.3.3 Required vehicle parking spaces may be reduced in exchange for additional bicycle parking. For every four (4) bicycle spaces in excess of the requirement of section 3.5.3, one vehicle parking space may be eliminated from the minimum required by Table 4.2.

This provision may be used if the municipality is willing to give up some parking spaces in exchange for bike parking, in locations where parking is tight and bicycle use is common.

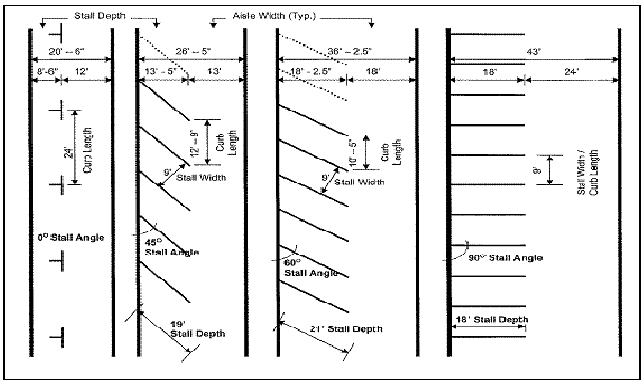
## Section 4. Parking Supply:

*Performance Standard:* The development must provide vehicle parking for employees and customers sufficient to avoid congestion of public streets or parking facilities.

An adequate number of parking spaces will avoid stress on street-side or municipal parking facilities.

4.1 Design of Parking Spaces

4.1.1 Parking stalls for head-in parking shall be a minimum of nine (9) feet in width by eighteen (18) feet in length. Stalls may be angled up to 45 degrees, provided aisles are designated one-way, and each stall contains a rectangular area of at least nine feet by eighteen feet.



***MODEL LANGUAGE*** | ***COMMENTARY***

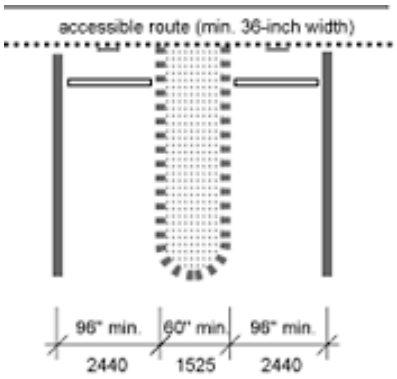
The above figure illustrates parking layout alternatives, including parallel parking

4.1.2 Head-in parking stalls designated for exclusive use of compact cars may be a minimum of eight (8) feet in width by sixteen (16) feet in length.

A shorter stall is appropriate for smaller cars; however, any use limitations, including handicapped spaces, are only effective if they are enforced. Compact spaces become a public safety problem if larger vehicles are permitted to park there.

4.1.3 Stalls for parking parallel to a travel lane shall be no less than nine (9) feet in width by twenty-two (22) feet in length.

4.1.4 Stalls designated for use by persons with disabilities may be reduced to a minimum width of eight (8) feet, but shall be separated by a minimum of five (5) feet from adjoining stalls. The separation area must be marked to discourage vehicle encroachment.




The above figure illustrates a typical design for ADA-compliant parking spaces.

4.1.5 Oversized parking spaces shall be provided for uses that ordinarily serve such vehicles as recreational vehicles, travel trailers, delivery trucks or tractor-trailer trucks.

The design of required parking spaces should be consistent with the type of vehicle most likely to use them.

4.1.6 In paved lots, parking stalls shall be delineated by pavement markings a minimum of four (4) inches in width. Where double lines are used, they should be separated a minimum of twelve (12) inches on center.

4.1.7 Curbing, bumpers, or wheel stops shall be provided to protect traffic flows, pedestrian movement on adjacent walkways, light poles, or landscape materials.

4.2 Quantity of Parking Spaces: The development shall provide adequate supply of parking. Minimum standards are listed below, subject to adjustments in section 4.3. For uses not listed, the publication *Parking Demand* (ITE, 1987 or most recent edition) shall be used as a guide.

The table below is based on the ITE manual *Parking Demand*, but for many uses is reduced. The lower threshold is intended to reduce impervious surface and discourage "overbuilding" of parking supply.

| # of Spaces | Land Use Activity |
|---|---|
| ***Places of Residence or Accommodation*** -- spaces per room or dwelling unit | |
| 1/3 | Dedicated Retirement Home, Nursing Care Facility |
| 1 | Overnight accommodations |
| 1.5 | Multifamily buildings |
| ***Places of Public Assembly*** -- spaces per seat based on maximum seating capacity | |
| 1/4 | Theater, spectator sports venue |
| 1/3 | Place of Worship, Restaurant (except fast food) |
| 1/2 | Convention Center, Meeting Hall, Fraternal Building, Bottle Club |
| ***Places of Commerce and Industry*** -- spaces per 1,000 sq.ft. of gross floor area. | |
| 1 | Warehouses, including self-storage |
| 1 1/2 | Industrial and Manufacturing Facilities, furniture and appliance stores |
| 3 | Grocery Stores over 5,000 sq.ft., Offices, except as noted. |
| 3.5 | Retail Sales (except as noted), Fitness and Recreation Centers. |
| 5 | Banks, Medical, Dental, and Veterinary Offices, Child Care |
| 6 | Fast food restaurant, snack bar |
| ***Public and Institutional Facilities*** -- spaces per 1,000 sq.ft. of gross floor area | |
| 2 | Elementary Schools, Library, Museum, Hospital |
| 4 | Secondary Schools and Colleges (classroom buildings only), Community Center, Municipal Office. |
| ***Miscellaneous*** -- criteria as specified | |
| 25 per developed acre | Mini-golf, Go-Carts, and other Outdoor Amusements |
| 3 per hole | Golf Course |
| 4 per lane | Bowling Alley |
| 3 per service bay +<br>1 per 10 vehicles displayed | Motor Vehicle Sales or Service |

4.2.1 Within each development, at least one space, plus one additional space for every twenty-five (25) or fraction thereof required, shall be designated as available for persons with disabilities.

This is the requirement for handicapped-use spaces.

4.2.2 Where the proposed development is for expansion of or addition to an existing use, the requirement for parking spaces will

Existing development is "grandfathered" for parking supply, but this provision requires that an expanded use be bought up to standard.

include sufficient spaces for the existing use, even if the existing use did not previously have sufficient spaces.

OPTION: Drop this provision in built-up areas, where space constraints may inhibit re-development. (Section 4.3 provides several alternate solutions for providing parking in densely-developed areas.)

4.2.3 Where a building or use consists of multiple segregated uses, such as a factory with retail outlet, a bowling alley with restaurant, or college with office and classroom buildings, each separate area shall be calculated independently and summed to arrive at the required parking supply.

A separate calculation for each use will result in a more accurate estimate of parking demand. The use must be distinctly different; a retail mall, for instance, cannot claim the promenade and storage areas as separate for purpose of computations.

4.2.4 The Board may permit phased installation of parking supply provided that adequate provision is made for completion of the requirement in a timely manner. The Board shall specify conditions for phasing, including but not limited to, permanent set-aside of adequate land area, a performance bond for the anticipated cost, and a schedule showing under what construction phase or development conditions the required parking will be provided.

It makes sense to defer construction of parking until it is actually needed, which could be the case if the development itself will be built out over a number of years. This provision should not be used as an excuse for letting a developer get off with a partially-completed lot, however. Administrative provisions should be in place to guarantee its eventual completion to standard.

4.2.5 Required parking shall not be occupied by vehicles associated with the ordinary conduct of the business, such as construction equipment, storage trailers, and vehicles displayed for sale.

Parking demand is calculated based on expected usage for parking, not for storage of business vehicles or equipment. The site design should show space designated for these other purposes.

4.3 Modification of Standards for Parking Spaces: In order to reduce the costs and environmental impacts of development, the site plan will minimize the amount of land devoted to impervious surface for parking, within the requirements of this ordinance. Developers may seek to reduce their parking requirements pursuant to the provisions below.

This section identifies several scenarios under which parking supply made be reduced, shared, or shifted to make more efficient use of the site. OPTION: Setting a "Maximum" could counter the trend of some (mostly franchise) developers to overbuild parking, e.g. "Paved parking areas shall not exceed ten (10) percent of the minimum requirements."

4.3.1 Within a mixed use development consisting of any residential use combined with any commercial use, the Board may eliminate space requirements for the residential use until it comprises more than two-thirds (67 percent) of the total floor space.

Demand for residential parking peaks in the overnight hours, while demand for commercial parking occurs in the daytime. This provision allows the same spaces to be counted for both purposes, up to a point, and only at the discretion of the Board. OPTION: Municipalities may choose to amend the 2/3 to ½ or ¾, depending on their experience.

4.3.2 The Board is permitted to reduce the required number of parking spaces if a parking analysis shows that similar uses

The *30th highest hour* is the engineering target for parking demand; that is, they build to the expected number of spaces required at the 30th

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| | under similar circumstances generate less demand at the *30th highest hour*. | busiest hour of the year. This tends to result in overbuilding, but if an engineering study comes in *lower* than the minimum standard, then it should definitely be accepted. |
| 4.3.3 | Within a (*downtown*) district, if the provided off-street parking will not be posted for the exclusive use of customers, employees, or tenants of the development, the Board may reduce the minimum requirement by up to ten (10) percent. | The tendency of businesses in parking-challenged neighborhoods is to reserve parking spaces for their own use. The result in an inefficient use of parking supply. This provision is a small incentive for not doing so, though it requires a commitment and subsequent monitoring. |
| 4.3.4 | In areas served by a municipal parking lot or district, the Board may allow or require the parking requirement to be met through contributions to the development and maintenance of public parking. If no impact fee system is in place, the amount of the contribution shall be based on a per-space computation of the capitalized cost of the parking (land value plus installation plus maintenance). | This requirement is in essence an impact fee system for downtown parking provision. The municipality must already have an administrative structure in place, and the fee paid must be dedicated to improving the supply of public parking. OPTION: The municipality may also choose to define the extent of "area served by municipal parking lot." |
| 4.3.5 | The Board may permit some or all of the parking requirement to be met by the provision of parking spaces not located on the same lot provided that, a) spaces are located within three hundred (300) feet of the development and accessible by an existing or proposed sidewalk, b) a written agreement is in place for long-term use of the spaces for the proposed use, and c) the spaces would not be among the minimum required for the use already existing on that lot. | Required parking need not be on-site, but the continued availability of those spaces must be guaranteed, particularly if the off-site lot is owned by a different entity. |
| 4.3.6 | Public assembly and recreational uses may have a peak period that varies from conventional parking demand. The Board may grant a reduction of up to 50 percent of their space requirement through the use of parking spaces already required for a "daytime" use. If the spaces are not on property controlled by the developer, a shared-use agreement shall be required to show that these spaces will be available for the use of the development. | Places of public assembly (see table 4.2) and recreational facilities see their peak usage on evenings and weekends. Sharing a lot with another use that primarily peaks during the weekday can result in significant savings. Since there are always exceptions, again, the granting of this option is left at the discretion of the Board. |
| 4.4 | <u>Loading Bays:</u> Loading/delivery bays shall be provided as necessary. | This model does not set specify a number for loading bays. The business is more likely to know how many bays it needs than the Town. But, if the number of bays is an operational issue, location and orientation is a public safety one. |

4.4.1 Space devoted to a loading bay shall be no less than twelve (12) feet by fifty-five (55) feet.

4.4.2 Loading bays shall not be located on the side of a building facing the public street. If loading bays are located on the side of a building facing a residential use, they shall be no closer than fifty (50) feet from the property line and fully shielded from view of that property.

This provision minimizes the nuisance impact of loading/delivery operations.

## Section 5. Landscaping and Lighting

*Performance Standard:* The development must be designed and constructed in such a way as to minimize the negative impacts of vehicle activity on neighboring property and public streets.

Some ordinances address landscaping and lighting in separate sections. This model includes these provisions to the extent that they directly impact the design and function of the parking lot.

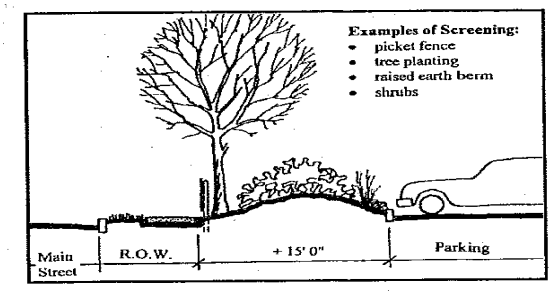
5.1 Landscaping at Street Line: Any parking lot that is located partially or entirely within the *required front setback* shall be buffered from the street with a combination of distance and screening, as follows:

The required front setback is generally a building setback, and the setback area is often used for parking. It will vary by district. OPTIONS: Rather than default to the setback, this standard could cite a specific distance from the street in which a buffer would be required. Or, the street buffer could be required regardless of where the parking lot is located.

5.1.1 A minimum buffer width of twenty (20) feet, as measured from the street line, is required if the width consists of a mixture of deciduous and evergreen vegetation a minimum of eighteen (18) inches in height at the time of planting.

The purpose of a streetside buffer is to reduce the distraction to motorists of moving vehicles in the parking lot. The denser the buffer is, the less width of it is necessary. However, the buffer should not be too tall, if the development will benefit from visibility. Trees should not be required unless the municipality is engaged in an effort to establish street trees. In that case, one overstory tree per fifty feet of road is adequate.

5.1.2 A minimum buffer width of ten (10) feet, as measured from the street line, is required if the buffer consists of entirely non-deciduous vegetation, a minimum of eighteen (18) inches in height at the time of planting.




5.1.3 No minimum buffer width is required if the parking lot will be separated from the street by a solid hedge, berm, wall, or fence a minimum of two (2) feet in height, provided

that the buffering structure does not encroach upon the street right-of-way.

5.2 Screening from Residential Properties: Any parking lot that is located within one hundred (100) feet horizontal distance of a residential district or existing residential use shall be screened from that district or use. A natural or landscaped vegetative strip shall be established or retained to provide an *effective visual barrier*. At the time of application, the Board may require the developer to produce a visual representation (such as a Photoshop image) to illustrate the effectiveness of the barrier.

Although developments quite often landscape their side boundaries regardless of whom the neighbor is, this model only requires it where the neighbor is a residential use.
An *effective visual barrier* is one in which the activity of the parking lot, including movement, noise, duct, and lighting, is reduced to what would be normal for a residential neighborhood.

5.2.1 A minimum screen width of fifty (50) feet shall be required if the area will consist of undisturbed native woodland or change in elevation of at least ten (10) feet.

5.2.2 A minimum screen width of twenty-five (25) feet shall be required if the area will consist entirely of native coniferous vegetation forming an effective visual barrier, or if a planted vegetative screen is installed and maintained. If a planted vegetative screen is used, it shall consist of a combination of mature trees, understory trees, and shrubs forming an effective visual barrier within five (5) years of planting.

OPTION: Many ordinances have detailed specifications for the planting of buffer strips, including species, spacing, and heights, as well as maintenance requirements. The municipality may want to consider a separate section for these requirements, or a process for having landscape plans reviewed by a landscape architect.

5.2.3 Where the establishment of vegetation is impracticable, or in unique circumstances, the Board may permit screening to consist of fences, walls, berms, or combinations thereof. In no case shall a parking lot be located closer than five (5) feet to adjoining residential property.

This model suggests that the "non-vegetative option." should be the last resort. Some walls and fences are less attractive than the parking lots they shield.

5.3 Landscaping within the Parking Lot

5.3.1 A parking lot exceeding ten thousand (10,000) square feet shall be supplemented by interior landscaping. Landscaping shall be oriented and designed to serve multiple purposes, such as stormwater retention, traffic flow management, pavement cooling, and pedestrian refuges.

Interior landscaping (islands, endcaps, etc.) breaks up large expanses of pavement, providing visual relief as well as public safety and stormwater management benefits. This model suggests an area threshold at which it would be required rather than a number of parking spaces. 10,000 square feet is approximately 30 spaces. OPTION: A higher or lower threshold may be selected depending on the perceived need for additional landscaping.

5.3.1.1 A minimum of five (5) percent of the

Some models require a certain square footage per

overall area of the parking lot shall be devoted to interior landscaping.

parking space. Five percent works out to roughly 100 square feet of landscaping for every seven parking spaces.

5.3.1.2 Landscaped aisles shall be used to break large expanses of parking stalls into bays of no more than fifty (50) stalls each. Landscaped aisles shall have a minimum width of fifteen (15) feet, if containing a pedestrian walkway, or ten (10) feet if consisting entirely of pervious surface.

Vegetated aisles (or "islands") used to break up tiers of parking prevent diagonal driving and can serve as pedestrian refuges and stormwater collectors. OPTION: The "50 stall" figure is arbitrary, but it should not be much below that.

5.3.1.3 Landscaped areas shall consist of a mixture of deciduous and evergreen vegetation selected for adaptability to the site. A two-inch (2") caliper canopy tree shall be placed within each landscaped area and along every fifty (50) feet of landscaped aisle, to aid in cooling and reduce visual and aural impacts of the parking lot.

In contrast to streetside buffering, shade trees are an important element of parking lot landscaping. The trees must, however, have suitable growing conditions (adequate space and drainage).

5.3.1.4 Landscaped areas shall be located, designed, planted, and maintained as bio-retention areas for the purpose of managing stormwater from the parking lot wherever feasible.

Low Impact Development techniques such as bio-retention areas ("rain gardens") are becoming standard practice for stormwater management. Further information on design and function of bio-retention areas can be found in the *LID Guidance Manual for Maine Communities*, published by Maine State Planning Office (2007).

5.3.1.5 Landscaped areas shall be protected from vehicle encroachment by curbs, wheel stops, or other devices permanently installed.

5.4 Landscape Plan: The applicant shall provide a landscaping plan in sufficient detail to ascertain the landscape elements, including lighting structures, hardscape features, and type and placement of vegetation planted or retained on the site.

A landscaping plan may already be required as part of another standard, but is included here because the parking lot is generally the primary landscape feature. The requirement for a landscape plan should also be inserted into the list of submission requirements.

5.4.1 All trees and shrubs to be planted must be rated for climate Zone 4 or lower, and must be demonstrated to be adaptable to urban, roadside conditions. Non-native plants shall not be of an invasive or nuisance species.

Vegetation to be placed on site must have a high likelihood of survival. Native species are preferred, but some exotics may fill a niche better, if their viability can be demonstrated. Vegetation is usually described in a Planting Schedule, showing plant variety, size, and other details.

5.4.2 The landscaping plan shall include provisions for regular maintenance and replacement of required plantings.

Because all vegetation is ephemeral, the proposed development should contain a commitment to maintain and replace it.

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| 5.4.3 The landscaping plan shall include provisions for maintenance of walls, fences, drains, and other landscape features and stormwater structures, including but not limited to, regular painting and repair. | Elements of "hardscape" can also deteriorate. Any structures required as part of a visual buffer or stormwater control should be maintained on a regular basis. |
| 5.5 Lighting: A development may employ parking lot lighting which serves security, safety, and operational needs but does not impair the vision of vehicle operators on adjacent streets or infringe on neighboring properties. | Overlit parking lots tend to be the principal complaint of development abutters and the public. Reducing the spread of lighting while maintaining business-appropriate illumination is a relatively simple technological challenge. |
| 5.5.1 Lighting fixtures shall be shielded or hooded, and placed so that the lighting elements are not exposed to normal view from a public street or adjacent dwellings. Under no circumstances will fixtures be located or directed so as to create a nuisance to abutting residential properties. | The technology of parking lot lighting is changing rapidly, so specific requirements for fixture types (e.g. "low-pressure sodium, full-cutoff fixtures") should be avoided. |
| 5.5.2 Free-standing light fixtures that are located within one hundred (100) feet of a residential district or existing residential property shall not extend more than fifteen (15) feet above ground level. | These numerical requirements are reasonable though may be varied by the municipality based on local experience. |
| 5.5.3 Lighting intensity shall not exceed one-half (0.5) foot-candle at the property line. The Board may require a lighting plan which will estimate the intensity of the proposed lighting throughout the site. | A lighting plan overlaid on the site plan shows the intensity of illumination (in footcandles) within the development and beyond its boundaries. It is relatively simple to produce with currently-available software. One caution: most lighting plans do not account for grade changes, so more light than predicted will spill over if the abutting property is at a lower elevation than the parking lot. |