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COMMUNITY DEVELOPMENT

MEMORANDUM

**Planning,
Zoning,
Building Safety,
Construction Inspection Services,
Public Health,
Housing Inspections,
Code Enforcement**

To: Planning and Zoning Commission
From: Andrew Fangman, City Planner
Date: May 13, 2014
Re: The Initial Draft of the Portion of the New Zoning Ordinance that Deals with Off-Street Parking

The process to rewrite Muscatine's 40 year old zoning ordinance and implement the vision contained within the recently adopted Comprehensive Plan is underway. The first part of the new zoning is that dealing with off-street parking. A presentation on and discussion of the proposed draft off street parking regulations will occur at the May 13th meeting of the Commission.

Attached is an annotated version of the proposed off-street parking regulations. Commentary and explanation of the proposed regulations are contained within grey boxes.

In the currently adopted zoning ordinance regulations regarding off-street parking are primarily contained within Chapter 21, however additional regulations regarding off street parking can be found in 17 other chapter of the zoning ordinance. One of the most important goals for the zoning ordinance is contained with Policy LU.2.G of the Comprehensive Plan which states: *“make the zoning ordinance more user-friendly.”* The scattering of off-street parking regulations across 18 chapters does not make for a user friendly zoning ordinance. For this reason in the current draft of a new zoning ordinance all regulations regarding off-street parking have been consolidated in a single chapter. This will give users of the zoning ordinance a single and easy to find location for all off-street parking regulations.

The draft chapter on off-street parking regulations unlike the current zoning ordinance chapter on off-street parking regulations makes use of tables and illustrates in order to more clearly explain regulations. This fulfills Policy LU.2.K of the Comprehensive Plan which states: *“Make use of tables and illustrations in the revised zoning ordinance to make clear the different permitted uses, parking, signage, and any form standards between various districts.”* The use of tables and illustrations also fulfils the Comprehensive Plan goal of making the Zoning Ordinance more user-friendly.

Title 10 – Zoning

Chapter XXX – Off-Street Parking & Loading Regulations

Section 1, which deal with the manner that number of required off-street parking spaces are calculated, is a direct carry over from the current zoning ordinance. There seems to be a consensus that portion of the current zoning ordinance is working well as no suggestions for change or complaints regarding it have been received. As such there is not rational justification for changing something that has been functioning satisfactorily for more than four decades.

10-XXX-1 Rules for Computing Required Off Street Parking

In computing the number of required off-street parking spaces or loading spaces, the following rules shall apply:

- A. Floor area shall mean the gross floor area of the specific use, excluding any floor or portion thereof used for parking, as herein defined.
- B. Where fractional spaces result, the parking spaces required shall be the nearest whole number.
- C. In the case of mixed uses, the parking spaces required shall equal the sum of the requirements of the various uses computed separately.
- D. Whenever an existing building or use is changed or enlarged in floor area, number of employees, number of dwelling units, seating capacity or otherwise, and parking spaces shall be provided on the basis of the enlargement of change.

Regulations regarding the minimum number of off-street parking spaces are contained in Section 2 and Section 3. Section 2 details the minimum number of off-street parking spaces required by specific land use type. Section 3 sets out a process by which an applicant can request that the number of required off-street parking spaces can be reduced based on special characteristics of the customer, client, user, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to off-street parking space requirements contained in Section 2.

Regulations establishing the minimum number of off-street parking spaces are contained in Section 2 and Section 3. Section 2 sets the minimum number of off-street parking spaces required by specific land use type. Section 3 contains out a process by which an applicant can request that the number of required off-street parking spaces can be reduced based on special characteristics of the customer, client, user, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to off-street parking space requirements contained in Section 2

Regulations that cause more parking spots to be constructed than actual demand warrants are harmful both to the property owner and to the community as a whole. Unnecessary parking spaces are a wasteful use of land that cause sprawl by taking up land that is already served with infrastructure, and which could be put to a more beneficial use. Parking lots which are larger than necessary are detrimental to the attractiveness of the streetscape. Typically the most disused portion of a parking lot is the portion furthest from the building; typically this is the area nearest the street. Where there are many overbuilt parking lots, the streetscape can come to be defined by the unused portion of parking lots that line the street. Additionally the construction of unnecessary parking also increases the amount of impervious surfaces. This makes it more difficult to manage the quantity and quality of stormwater.

The guiding principle of behind the number of required off-street parking spaces is to require no more off-street parking spaces than are necessary to prevent any negative impact on surrounding properties, and to do this in flexible manner which can account for any unique characteristics of a site and/or use. This guiding principle is based on directives contained within the Comprehensive Plan and on the large volume of recent research on the impact of minimum parking space requirements.

Section 2 regulates the minimum number of required off-street parking based on the type of land use. This is the same manner in which required off-street parking is currently regulated. However there are three significant changes being proposed, the centralization of these requirements in a single section, a reduction in the amount of parking required for most land uses, and the establishment of more land use categories.

The minimum off street parking requirements contained within Section 2 were created by conducting a review of recently published research on this topic and of other communities that have recently revised their off-street parking requirements. The minimum off street parking requirements for each type of land use are based on the rough consensus that emerged from this review.

The current regulations regarding off-street parking contain 16 broadly defined land use categories. The proposed regulations contained in Section 2, are based 34 more narrowly defined land use categories. By allowing for land uses with unique parking needs to be accounted for the creation of more categories should help ensure that the ordinance does not require more parking than will actually be used.

10-XXX-2 Minimum Number of Required Off-Street Parking Spaces

The minimum number of off-street parking spaces required is determined by the use of a parcel and are as follows:

A. Single Family Residential: 2 per dwelling unit

B. Duplex: 2 per dwelling unit

C. Multi-Family Residential

1. Efficiencies & One Bedroom: 1 per unit

2. Two Bedroom Unit: 1½ per unit

3. Three Bedroom or More Units: 2 per unit

4. All Multi-Family Residential Dwelling Units not Located in Areas Not Zoned for Multi-Family Dwelling Units or in the C-2 Downtown Commercial Zoning District: 2 per unit.

- D. Boarding House:** 1 per 2 tenants
- E. Place of worship:** 1 per 4 fixed seat, 1 per 8 feet of bench length, or 1 per every 28 square feet in areas where no permanent seats are maintained in the main auditorium (sanctuary or place of worship)
- F. Elementary and Middle School:** 2 per classroom, plus 1 per employee
- G. High School or College:** 10 per classroom, plus 1 per employee

- H. Ballet, Martial Arts, Dance & Gymnastics School/Academy/Studio or other like establishment:** 1 per 80 square feet of dance area
- I. Public Building:** 1 per 330 square feet of gross floor area
- J. Hospital:** 2 per bed
- K. Nursing Home:** 1 per 4 beds
- L. Industrial:** 2 per each 3 employees on maximum shift, plus vehicle use in connection therewith
- M. Warehouse:** 1 per 2,000 square feet of gross floor area
- N. Mini-Storage Warehousing:** 3 plus 1 per 100 storage units
- O. Eating & Drinking Establishment:** 1 per 66 square feet of seating floor plus 1 each for each 440 square feet of non-seating floor area
- P. Drive Through Food Restaurant:** per 66 square feet of seating floor plus 1 each for each 440 square feet of non-seating floor area plus, 5 Stacking spaces per drive-through, including service window and menu board areas.
- Q. Movie Theatre:** 1 per 4.5 seats
- R. Bowling Alley:** 4 per lane, plus one per employee on the largest shift
- S. Recreation Center:** 1 per 4 persons at maximum capacity
- T. Golf Course:** 1 per 3 holes, plus per each 2 employees

- U. Furniture and/or Major Appliance Stores:** 1 per 660 square feet of gross floor area
- V. Motor Vehicle (Including Boats) Sales, Display, and Rental:** Parking is used for customer and employee parking and is exclusive of outdoor display area 1 space for every 330 square feet of floor area except as provided as follows: floor area for indoor display, 1 parking space for each 660 square feet of gross floor area
- W. Transportation or Trucking Yards:** Parking for customers and employees shall be calculated by the individual component uses such as but not limited to offices for the dispatch areas, warehouses for transshipment or warehouse type areas.
- X. Medical Office:** 5 per principle medical professional
- Y. Beauty and Barber Shops:** 1 per employee plus 1.5 hairdresser/barber station
- Z. Funeral Homes, Chapels, Crematoriums, Mortuaries:** 1 per 4 persons at maximum capacity
- AA. Day Care/Child-Care Facilities:** 1 per employee plus 1 off-street passenger drop off/pick up space per 10 students
- BB. Hotel/Motel:** 1 per guest room
- CC. All Nonresidential Uses within the C-2 Central Commercial District:** No off-street parking required
- DD. All Other nonresidential Uses:** 1 per 330 Square Feet of gross floor area

In order to achieve the goal of not require more off street parking spaces than is necessary. Section 3 allows for the Site Plan Review Committee to reduce the number of required off street parking by up to 50% when it can be demonstrated that that the use of alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, user, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to off-street parking space requirements contained in Section 2 and such a reduction in the number of required off street parking spaces will not adversely impact the surrounding area. Section 3 also deliberately notes that costs associated with providing the required off-street parking spaces shall not be used a justification for a reduction in the number of required off-street parking spaces. Section 3 helps fulfil Policy LU.2.C of the Comprehensive Plan which calls for “...land use regulations contained within the zoning ordinance to have sufficient flexibility to preserve the unique character of individual neighborhoods.” This section is model on similar regulations that have been successfully implemented in Eugene, Oregon.

10-XXX-3 Reduction in the Number of Required Off-Street Parking Spaces

The Site Plan Review Committee, in accordance with the site plan review process contained in Section YYYYY, may authorize adjustments be made to the required number of off-street parking space provisions of XXXX based on the following criteria:

- A. The minimum number of off-street parking spaces may be reduced by up to 50% when the applicant for a development can demonstrate, to the satisfaction of the Site Plan Review Committee, that the use of alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, user, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to off-street parking space requirements contained in Section of XXXX and such a reduction in the number of required off street parking spaces will not adversely impact the surrounding area.
- B. Costs associated with providing the required off-street parking spaces shall not be used a justification for a reduction in the number of required off-street parking spaces.

Section 4 of the proposed regulations deals with handicap accessible parking lot regulation, the regulations and standards come from the Americans with Disabilities Act. Because these regulations are Federal law they already must be complied. They are being reproduced in this chapter in order to achieve the goal of creating a single document that contains all applicable regulations regarding off-street parking.

10-XXX-4 Accessible Parking Regulations

All parking facilities shall comply with 2010 ADA Standards for Accessible Design and all other applicable Federal or State code/regulations.

- A. Except as noted in Section 10-XXXXX-4(B), Section 10-XXXXX-4(C) and 10-XXXXX-4(D), the required number of accessible parking spaces is as indicated in the following table.

Total Parking Spaces in Lot	Minimum Number of Accessible Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1,000	2% of Total
1,001 & over	20, plus 1 each for each 100 over 1,000

- B. For outpatient medical offices and treatment facilities, 10% of total parking spaces, not including those that are restricted for the use of employees, shall be handicap accessible.
- C. For facilities that specialize in treatment or services for persons with mobility impairments, 20% of total parking spaces, not including those that are restricted for the use of employees, shall be handicap accessible.
- D. For residential facilities:
 - 1. Where at least one parking space is provided for each residential dwelling unit, at least one accessible space shall be provided for each residential unit that are required by the American with Disabilities Act to provide mobility features complying with Sections 809.2 through 809.4 of the 2010 ADA Standards for Accessible Design.

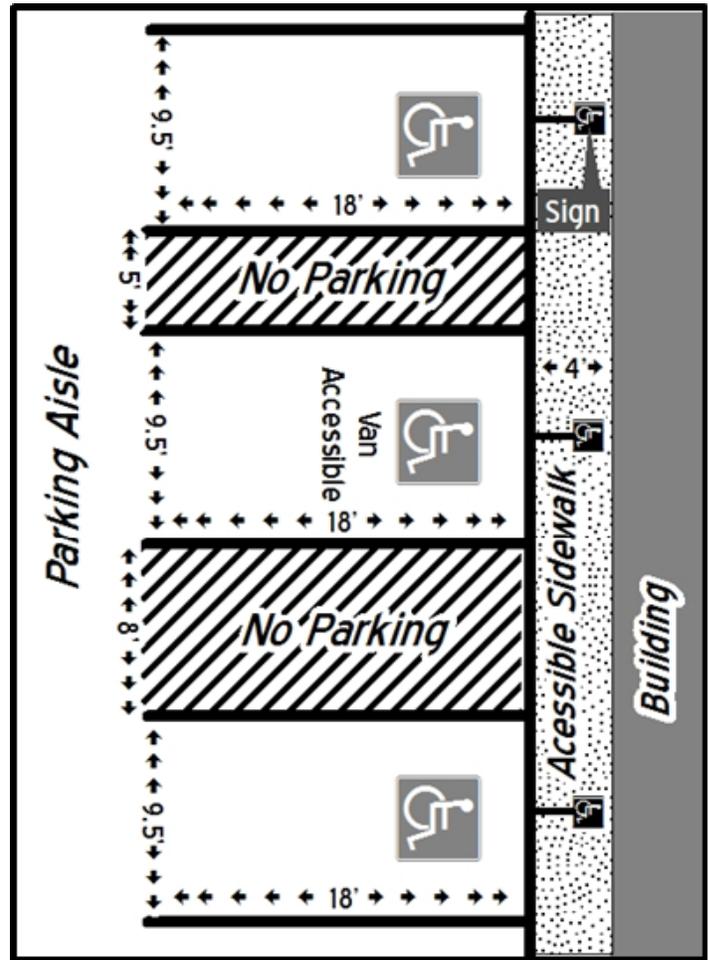


Figure A: Accessible Parking Dimensions

- 2. Where the total numbers of parking space provided for each unit exceed one per residential unit, 2% but no less than one accessible space shall be provided in addition to any space required by Section 10-XXX-4(D)(1).
- 3. Where parking spaces are provided for persons other residents, accessible spaces in a number that is accordance with Section 10-XXX-4(A) shall be provided.
- E. Individual accessible parking spaces shall have an additional 5 foot-wide, diagonally striped aisle abutting the passenger side of the space. If such spaces are provided in adjacent pairs, then one five foot aisle may be shared between the two spaces.
- F. One in every six accessible parking spaces, but not less than one, shall be served by a van accessible space, an accessible parking space with a loading area of at least 8 feet wide.
- G. Two accessible parking spaces may share a common access aisle.
- H. Parking access aisles shall be part of an accessible route to the building or facility entrance and shall comply with Americans with Disabilities Accessibility Guidelines accessible route requirements.
- I. Parked vehicle overhangs shall not reduce the clear width of an accessible route.
- J. Parking spaces and access aisles shall be level with surface slopes not exceeding 1:48 in all directions

- K. Each accessible must be accompanied by a sign with the international symbol of accessibility mounted at 5 feet above the ground. Signage for van accessible spaces shall include the written designation “van accessible”.
- L. Along the shortest accessible route of travel between the parking space and primary accessible entrance with a minimum 4’ wide sidewalk. In parking facilities that do not serve a particular building, accessible parking spaces shall be located on the shortest route an accessible pedestrian entrance to the parking facility. Where buildings have multiple accessible entrances with adjacent parking, accessible parking spaces shall be dispersed and located near the accessible entrances.

Section 5 contains requirements for off-street loading spaces. As with regulations regarding off street parking spaces, regulations regarding off-street loading were centralized into one section, updated to reflect a review of recently published research and of other communities that have recently revised their off-street loading space requirements, and includes a mechanism by which the Site Plan Review Committee can reduce in required number of off-street loading spaces in appropriate situations

10-XXX-5 Off-Street Loading Requirements

- A. On the same premises with every building or part thereof, erected and occupied for commercial, industrial or other similar use involving the receipt or distribution of vehicles, material or merchandise, there shall be provided and maintained on the lot adequate space for standing, loading or unloading services in order to avoid undue interference with street or parking areas.
- B. All nonresidential uses within the C-2 Central Commercial District are exempt from the requirements of this Section.
- C. Off-street loading space areas shall not be construed, as, or counted towards, the supplying of area required as off-street parking space area.
- D. The loading and unloading space, unless completely and adequately provided for within a building, shall be a minimum area of 10 feet by 25 feet with 14 foot height clearance.
- E. The minimum number off-street loading spaces required are as indicated in the following table:

Gross Floor Area (square feet)	Number of Loading Spaces Required
0 to 2,000	None
2,000 to 20,000	1
20,000 to 100,000	1 space plus 1 space for each 20,000 sq. ft. of gross floor area in excess of 20,000 sq. ft.
100,000 to 500,000	5 spaces plus 1 space for each 40,000 sq. ft. of gross floor area in excess of 100,000 sq. ft.
Over 500,000	15 spaces plus 1 space for each 80,000 sq. ft. of gross floor area in excess of 500,000 sq. ft.

- F. In all cases where the off-street loading space is located in a manner that a truck must back directly from a major street into a loading space, a maneuvering space of not less than 50 feet shall be provided on the subject parcel.
- G. All off-street loading spaces shall be paved and shall be screened from any front yard area, either by the building existing on the lot or by a planting screen or fence.
- H. The minimum of loading may be reduced by up to 50% when the applicant for a development can demonstrate, to the satisfaction of the Site Plan Review Committee, that the special characteristics of the customer, client, user, employee or resident population will reduce expected loading space demand for this development, as compared to the off-street loading space requirements contained in Section of XXXX.

Section 6 permits for the shared use of required parking spaces in certain situations, for example, if a parking lot is used in connection with an office building on Monday through Friday, but is 90% vacant on the weekends, another development that operates only on weekends could be credited with 90% of the spaces on that lot. Similarly, if a church parking lot is generally occupied only to 50% of capacity on days other than Sunday, another development could make use of 50% of the church's spaces on those other. Allowing for this will help reduce the amount of community that is taken up with parking lots.

Current regulations do allow for shared use of required parking spaces, but only in large scale retail developments. The proposed regulations expands the use of shared parking spaces to all situations where such an agreement can be shown to meet all the off-street parking needs of the uses that are proposing to share parking.

10-XXX-6 Shared Use of Required Parking Spaces

- A. One parking area may contain required spaces for several different uses but, except as otherwise provided in this section, the required space assigned to one use may not be credited to any other use.
- B. To the extent developments that wish to make joint use of the same parking spaces operate at different times, the same spaces may be credited to both uses. For example, if a parking lot is used in connection with an office building on Monday through Friday, but is 90% vacant on the weekends, another development that operates only on weekends could be credited with 90% of the spaces on that lot. Similarly, if a church parking lot is generally occupied only to 50% of capacity on days other than Sunday, another development could make use of 50% of the church's spaces on those other days.
- C. Joint use parking agreements between adjoining properties, or in planned developments on the same property, shall identify:
 1. The number of vehicle spaces provided for each land use activity(ies);
 2. The dates and times when said activities are conducted;
 3. Subsequently recorded with the County Recorder's Office prior to occupancy or use of said property or facilities.

Section 7 regulates the location of required parking spaces. This section is unchanged from what is contained in the current zoning organization. No comments regarding the location of parking lots were received during the extensive public outreach portion of the process to draft the new Comprehensive Plan, nor have any complaints been brought to staff’s attention through other means.

10-XXX-7 Location of Required Parking Spaces

All parking spaces required herein shall be located as follows:

- A. The parking spaces required for residential buildings or uses shall be located on the same lot with the building or use served and located behind the front building line.
- B. The parking spaces required for any other building or use may be located on an area within 300 feet of said building and 2 or more owners of buildings may join together in providing the required parking spaces. Where the required parking spaces are not located on the same lot with the building or use served, the usage of the lot or tract upon which said parking spaces are provided shall be restricted by an instrument of record describing the premises for which said parking is provided and assuring the retention of such parking so long as required by this Ordinance.
- C. No required parking spaces may be located in a front yard in any Residential District

Section 8 contains improvement and maintenance standards for parking lots. Nearly all of this section is unchanged from the standards in the current regulations. The only change was to add specificity to the type of paving that is required for parking lots. Current regulations state that parking lots “shall be surfaced with asphalt or concrete for all weather parking.” There have been numerous occasions where questions over the thickness, quality, and other technical features of this required paving have arisen. For this reason the proposed regulations specify a pavement structural number for both areas subject to automobile loading and those subject to truck loading. Pavement structural numbers are widely used design standard for both asphalt and concrete pavement. The specific pavement structural numbers were selected by surveying regulations in other communities to determine what the appropriate pavement structural number for parking lots should be

10-XXX-8 Standards for All Parking Lots and Garages

Parking lots and garages shall conform to the following improvement and maintenance standards:

- A. All parking lots shall have a paved surface and a minimum pavement structural number as follows:
 - 1. Areas subjected to only automobile loading: 2.5
 - 2. Areas subjected to truck loading: 3.0.
- B. Adequate provision shall be made for the disposal of storm water so that water will not flow onto adjoining property or adjacent sidewalks in a quantity or manner that would be detrimental thereto, or inconvenient to persons using the sidewalk.
- C. A structurally sound wall or other abutment approved by the City Engineer to ensure safety shall be installed around each side of the parking lot wherever necessary to prevent the washing of soil to and from adjoining property, and a wall or screen of such height and character as are necessary for adequate screening of the parking lot from adjacent property shall also be provided to meet requirements of the City Engineer.

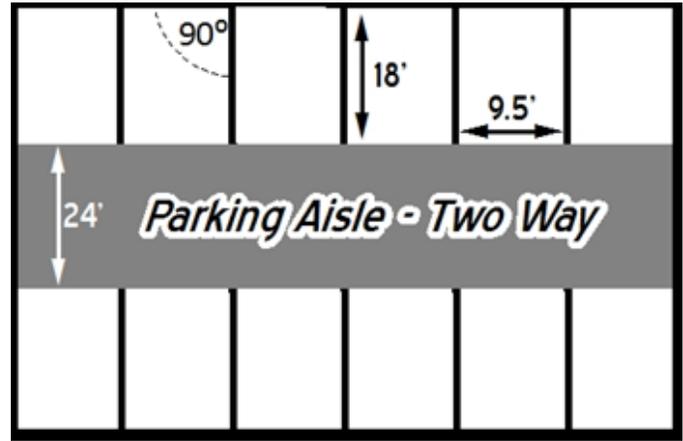
- D. The location and width of entrances and exits to and from the lot or garage shall be as determined by the City Engineer, but there shall not be more than one entrance and one exit, or one combined entrance or exit, along any one street, unless the same is deemed necessary by the Council for the alleviation of traffic congestion and interference of traffic movement along such street.
- E. The location of each parking space and the location and direction of movement along the drive-ways providing access thereto shall be indicated by painting upon the surface, by raised directional signs, or by markers or other similar measures placed in the surfacing, where required by the City Engineer.
- F. Wherever the parking lots or garages are to be used during darkness, a system of lighting shall be installed to provide an adequate standard of illumination over the entire parking lot.
- G. Light fixtures provided for any off-street parking area adjacent to a residential use or residentially zoned lot shall shield the source of light from sight and prevent the spillover of direct light onto the residential use, while still providing security to motorists, pedestrians and bicyclists.
- H. A sign, the size and character of which shall be approved by the Site Plan Review Committee, shall be installed showing the ownership of the lot or garage and the permitted use thereof. If the lot or garage is so operated that a charge is made for the use of the parking facilities, the rates for parking shall be legibly shown upon the sign.
- I. A temporary shelter for the use of parking lot attendants may be maintained on the lot, provided the location, construction, and design of the same shall first be approved by the Site Plan Review Committee.
- J. The parking lot or garage shall be maintained in a manner to keep it as free as practicable from dust, paper, and other loose particles, and snow and ice shall be promptly removed by the operator. All adjacent sidewalks shall be kept free from dirt, ice, sleet, and snow and in a safe condition for use by pedestrians. All signs, markers, or any other methods used to indicate direction of traffic movement and location of parking spaces shall be maintained in a neat and legible condition. Likewise, any walls, trees, and shrubbery, as well as surfacing of the parking lot or garage, shall be maintained in good condition throughout its use for parking purposes and the City Engineer shall have the authority to prohibit the use of the area for parking purposes, unless and until proper maintenance, repair, or rehabilitation is completed.

Section 9 specifies the minimum dimensions for off street parking spaces. Current regulations specify a minimum size of 9 feet by 20 feet for a total minimum size of 180 square feet. The proposed regulations set the minimum dimensions for an off street parking space at 9.5 feet by 18 feet. The proposed change in the minimum width and length will create parking spaces that both consume less land and are more comfortable to use. Reducing the required length of a parking space from 20 feet to 18 feet will bring Muscatine into line with what is required in nearly every other community that has recently updated parking regulations. The standard of 20 feet is a relic of the early seventies when on average vehicles were longer than they are today. Increasing the minimum width from 9 feet to 9.5 feet will make it easier for people, particularly the elderly, disabled, and those with small children, to enter and exited their vehicle. Such a change will also reduce the number of door dings. The prosed minimum dimensions represent a reduction of 5% in overall size of a parking space.

10-XXX-9 Minimum Off-Street Parking Space Dimensions

Width: 9.5 Feet
Length: 18 Feet

Section 10 contains standards specifying the minimum width of parking aisles. These standards are taken from *The Dimensions of Parking, Fourth Edition*, a joint publication of the Urban Land Institute and the National Parking association.



10-XXX-10 Minimum Parking Aisle Width

The minimum width of drive aisles providing access to parking spaces shall be as follows:

- Two Way Traffic:** 24'
- One-Way Traffic - 90° Parking Angle:** 24'
- One-Way Traffic - 75° Parking Angle:** 18'
- One-Way Traffic - 60° Parking Angle:** 14' 6"
- One-Way Traffic - 45° Parking Angle:** 12' 8"
- One-Way Traffic - 30° Parking Angle:** 11'



Figure B: Minimum Dimensions

Section 11 contains landscaping standards for parking lot stormwater management. The landscaping requirements contained in this section are intended to maximize the natural infiltration of rainwater, intercept and manage stormwater runoff, and aesthetically pleasing parking lots. Policy C.7.B of the Comprehensive Plan states, "Parking lots for new developments of a determined type and size will be required to meet minimum landscaping and aesthetical enhancement requirements." Policy C.16.B of the Comprehensive Plan states, "Promote management approaches and practices that reduce runoff and pollutant loading, and help manage runoff as close to its source as possible." Section 11 is structured to simultaneously accomplish both these Comprehensive Plan goals.

The regulation of Section 11 will apply to parking lots containing 20 or more spaces. These parking lots will be required contained landscaped open spaces that are at least equal in size to 10% of the total paved area of the parking. Most of this required landscaped open space will take the form of landscaped islands. Such islands will be required at the ends of each parking aisle, intermediate islands will also be required in long rows of spaces so that no more than 15 parking spaced are directly adjacent to one another. Islands are also required as separation between any pedestrian walkways and parking spaces

The Clean Water Act gives the Environmental Protection Agency regulatory authority over stormwater that is discharged into waterways. It is expected that in the near future that the EPA's Stormwater Phase II Rule will require the City of Muscatine to obtain a permit to discharge into the Mississippi River and other bodies of water that drain to the Mississippi River. This rule establishes the National Pollutant Discharge Elimination System (NPDES) stormwater program for communities similar in size Muscatine; Phase I was focused on communities with a larger population.

Low Impact Development is a management approach and set of practices, promoted by the EPA, that can reduce runoff pollutant loading, and help a community comply with requirements of the EPA's Stormwater Phase II Rule by managing runoff as close to its source as possible. LID includes overall site design approaches and individual small-scale stormwater management practices, such as bioretention systems for disposal of stormwater coming off parking lots.

The use of bioretention systems to manage stormwater running off parking lots would help Muscatine comply with these forthcoming regulations. Parking lots collect grease, oil, anti-freeze, and other vehicle leakage, heavy metals from brake dust, as well as litter, other debris, and pathogens. All of these pollutants are flushed into waterways by rain and melting snow. In addition, impervious areas hasten the movement of stormwater runoff across the surface, into a series of curbs, gutters, drains, and pipes, increasing flood occurrence and stream bank erosion. Bioretention systems are structural stormwater controls, which capture and temporarily store the water quality volume using soils and vegetation in shallow basins or landscaped areas to remove pollutants from stormwater runoff. The use of bioretention systems to handle runoff also eliminates the need for, or drastically shrinks the size of any potential detention basins, these offsite, rock-edged basins are often unattractive, unsafe, and a waste of valuable property

Section 11 is structured to jointly address the communities' desires for aesthetically pleasing parking lots which include landscaped open space and the forthcoming need to more proactively manage to quality of stormwater discharge. Subsection D requires the use of bioretention systems to manage stormwater runoff from parking lots. The landscaped islands that are required by Section 11 are under most circumstances the ideal location for such bioretention systems. In order to better address unique site conditions and provide for maximum design flexibility the proposed regulation do not mandate that bioretention systems be located within the landscaped islands.

Section 11 specifies that shall be constructed in accordance with the criteria and information, including technical specifications and standards, in the most current version of the Iowa Stormwater Management Manual. Section 2E-4 of the Iowa Stormwater Management Manual, which is published the Iowa Department of Natural Resources, provides design guidance, criteria, and specifications for the construction of effective bioretention systems. Adopting these standards by reference will ensure that current best practices are used when bioretention systems are constructed in Muscatine.



Bioretention System in a Landscaped Island



Bioretention System in a Landscaped Island



Bioretention System in a Landscaped Island



Bioretention System in a Landscaped Island

10-XXX-11 Landscaping Standards for Parking Lot Stormwater Management:

The landscaping requirements in this section are intended to maximize the natural areas retained in any parking lot in order to optimize natural infiltration of rainwater, intercept and manage stormwater runoff, and provide an aesthetic setting for development. In order to accomplish these goals the following standards shall apply:

- A.** Developments with proposed parking areas containing of 20 or more parking spaces shall also provide landscaped islands throughout the parking area planted with a mix of shrubs and trees. Such islands shall be located:
1. At the ends of each parking aisle;
 2. As intermediate islands in long rows of spaces, in a manner so that no more than 15 parking spaces are directly adjacent to one another;
 3. As separation between pedestrian walkways and parking spaces.

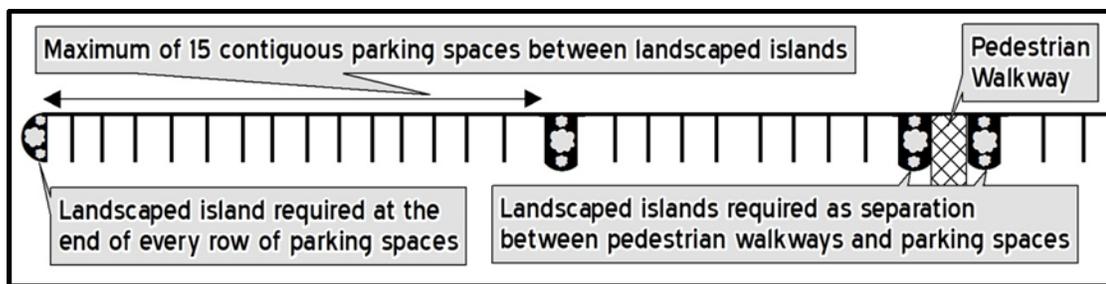


Figure C: Location of Required Landscaped Islands

- B.** The minimum size for a landscaped island shall be 171 square feet. If two required parking spaces in adjoining row of parking are combined the minimum size shall be 352 square feet.
- C.** A minimum of one deciduous or evergreen tree and two shrubs shall be planted on the parking lot islands for every 10 parking spaces.
- D.** Stormwater from parking lots shall drain into to bioretention systems. Bioretention systems are a structural stormwater controls used to capture and treat a volume of storm water runoff. They that consist of an excavated basin or trench that is filled with porous media and planted with vegetation. Stormwater ponds in the depression on top of the bio retention system and percolates through the sand/soil layer which removes fine sediment, trace metals, nutrients, bacteria and organics as the water is released to a storm sewer, open channel, or stream.
1. These bioretention systems shall be constructed in accordance with the criteria and information, including technical specifications and standards, in the most current version of the Iowa Stormwater Management Manual.
 2. Bioretention systems shall be designed and built to accommodate the runoff for the entire parking lot at an event rainfall depth of 1.25”.
 3. Bioretention systems may be located in landscaped islands required by this section.

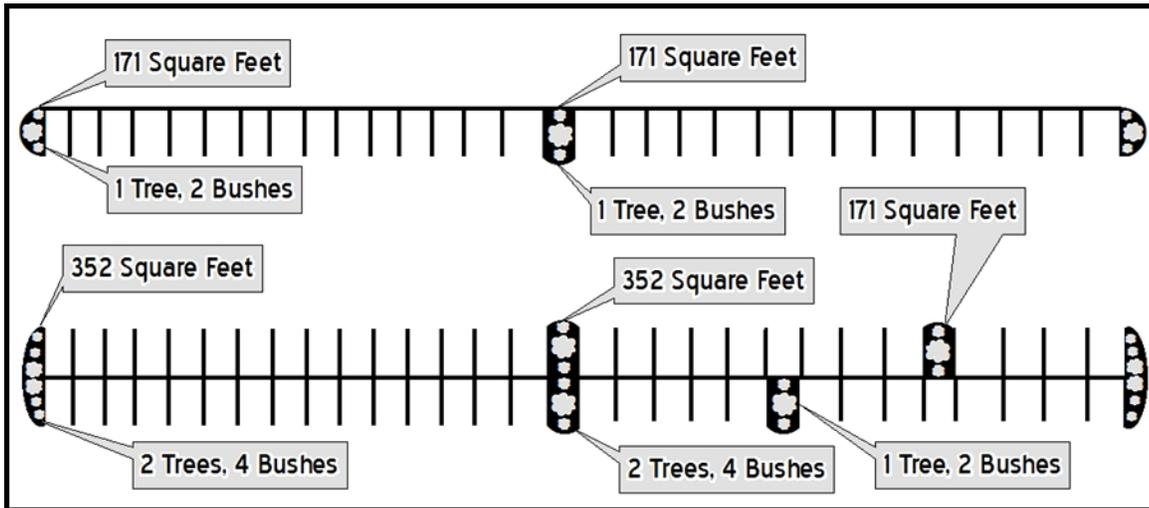


Figure D: Island Size and Landscaping Requirements

Section 12 contains provisions that require the landscaping, screening, and buffering of portions of the perimeters of parking lots under certain circumstance. These regulations require that a solid 6 foot wall be placed along the perimeter of parking lot wherever it is directly adjacent to a residentially zoned parcel. This is required in order to minimize the impact, on adjacent residences, the noise, light, blown trash, etc. emanating from a parking lot. Section 12 also requires the establishment of a landscaped buffer yard between a parking lot and any public street, and that one tree and 6 shrubs shall be planted in the landscaped buffer per 25 linear feet of street frontage. This requirement helps achieve the aim of Policy C.7.A of the Comprehensive Plan which states, “*Landscaping along the edges of parcels fronting a public street should be required for new developments.*”

10-XXX-12 Screening and Landscaped Buffers

A. Screening Parking Lots from Residential Properties

So that the adjacent residents are not unreasonably disturbed, either by day or by night, by vehicle operations, parking areas adjacent to any residentially zoned property shall be screened from view by a solid wall or fence with a minimum height of 6 feet.

B. Landscaped Buffers along Streets

1. Parking lots shall be visually screened from all other abutting streets by a landscaped buffer area at least 6 feet in width.
2. One tree and 6 shrubs shall be planted in the landscaped buffer per 25 linear feet of street frontage.
3. All fractional amounts of required trees or shrubs shall be rounded up to the next whole number. For example 2.15 trees rounds up to three trees.

Section 13 contains standards for trees and shrubs that are required by this proposed chapter. It details the required size of plantings both at the time they are planted and maturity. This section mandates that any required tree or shrub be maintained and replaced in a timely manner if it dies off. Further, this section requires that any tree or shrub planted in a landscaped parking lot island or in a landscaped buffer yard that is required by Section 10-XXX-12 shall be an approved species; a list of approved tree and shrub species will be created and maintained by the Parks and Recreation Department. This is required to both ensure that any plantings within a bioretention system are of a variety that will thrive in the wet growing conditions that they create, to ensure that trees and shrubs planted near roads and sidewalks will not be detrimental to their operation and maintenance, and fulfill Policy C.7.D of the Comprehensive Plan which states, *“In parking lots and near streets the planting of certain identified desirable varieties of trees is to be encouraged and the planting of certain identified undesirable varieties of trees will be discouraged and prohibited on municipal property, including right-of-ways.”*

10-XXX-13 Standards for Required Trees and Shrubs

A. Required Size

All trees and shrubs that are required by this chapter shall meet the following requirements.

1. Deciduous trees shall be planted at 3 inches in caliper with a mature height of at least 35 feet.
2. Evergreen trees shall be coniferous species planted at 6 feet in height
3. Shrubs shall be either deciduous species planted at 2½ feet in height or evergreen species planted at 2 ½ feet in spread.

B. Required Maintenance

All planting required by this Chapter shall be maintained to continue its effectiveness. If it deteriorates or dies, it shall be repaired or replaced during no later than the next planting season.

C. Permitted Tree & Shrub Varieties

Any tree or shrub planted in a landscaped parking lot island or in a landscaped buffer yard that is required by Section 10-XXX-12 shall be an approved species; a list of approved tree and shrub species will be created and maintained by the Parks and Recreation Department.