MATANUSKA-SUSITNA BOROUGH
WATERBODY SETBACK ADVISORY BOARD
AGENDA

Edna DeVries, Mayor

Michael Brown, Borough Manager

CJ Koan, (Vice-Chair) Planning Commission
Kendra Zamzow, MSB Fish and Wildlife
Matthew LaCrouix, Mat-Su Salmon Habitat Partnership
Tim Alley, Design & Construct Stormwater Abatement Background
Bill Klebasadel, Design & Construct Stormwater Abatement Background
William Haller, Home Builder, Lending, Real Estate Background
Carl Brent, At-Large
Bill Kendig (Chair), At-Large
Jeanette Perdue, At-Large

Support Staff: Alex Strawn, Planning & Land Use Director

PLANNING & LAND USE DEPARTMENT
Alex Strawn, Planning & Land Use Director
Kim Sollien, Planning Services Manager
Jason Ortiz, Development Services Manager
Fred Wagner, Platting Officer

Location:
Employee Break Room *of the*
Dorothy Swanda Jones Building
350 E. Dahlia Avenue, Palmer

REGULAR MEETING **6:00 P.M.** **January 9, 2024**

Ways to participate in the meeting:

IN PERSON: You will have 3 minutes to state your oral comment.

IN WRITING: You can submit written comments to Alex Strawn at alex.strawn@matsugov.us and Karol Riese at karol.riese@matsugov.us. Written comments are due at noon on Friday prior to the meeting.

TELEPHONIC TESTIMONY:

- Dial 1-855-290-3803; you will hear "joining conference" when you are admitted to the meeting.
- You will be automatically muted and able to listen to the meeting.
- When the Chair announces audience participation or a public hearing you would like to speak to, press *3; you will hear, "Your hand has been raised." (There may be a delay, please be patient with the system.)
- When it is your turn to testify, you will hear, "Your line has been unmuted." State your name for the record, spell your last name and provide your testimony.

I. CALL TO ORDER, ROLL CALL, AND DETERMINATION OF QUORUM

II. APPROVAL OF AGENDA

III. PLEDGE OF ALLEGIENCE

IV. APPROVAL OF MINUTES: December 14, 2023

V. AUDIENCE PARTICIPATION (*three minutes per person for items not scheduled for public hearing*)

VI. ITEMS OF BUSINESS

A. Presentation from State of Alaska Department of Conservation
Presenters: Ashley Oleksiak, Environmental Program Specialist 3, Nonpoint Source Water Quality and Sam Kito III, P.E., Engineer 2, Storm Water/Wetlands

B. Reschedule Meeting Dates for March 12 and April 9

C. Future Agenda Items

VII. BOARD MEMBER COMMENTS

VIII. ADJOURNMENT

MATANUSKA-SUSITNA BOROUGH **REGULAR MEETING**
WATERBODY SETBACK ADVISORY BOARD MINUTES **December 14, 2023**

The regular meeting of the Matanuska-Susitna Borough Waterbody Setback Advisory Board was held on December 14, 2023, at the Matanuska-Susitna Borough Employee Breakroom, 350 E. Dahlia Avenue, Palmer, Alaska. The meeting was called to order at 6:01 p.m. by Chair Kendig.

I. CALL TO ORDER, ROLL CALL, AND DETERMINATION OF QUORUM

Members present and establishing a quorum:
Kendra Zamzow
Tim LaCrouix
Tim Alley
Misty Massie
Carl Brent
Bill Kendig
Jeanette Perdue
William Klebesadel arrived at 6:13 p.m.

Members absent and excused were:
CJ Koan

Staff in attendance:
Mr. Alex Strawn, Planning and Land Use Director
Ms. Karol Riese, Planning Department Administrative Specialist
Ms. Peggy Horton, Current Planner
Mr. Nicholas Spiropolous, Borough Attorney

II. APPROVAL OF AGENDA

Chair inquired if there were any changes to the agenda.

The agenda was approved without objection.

III. PLEDGE OF ALLEGIENCE

IV. APPROVAL OF MINUTES

Regular Meeting Minutes: November 1, 2023

The minutes were approved without objection.

V. AUDIENCE PARTICIPATION (Three minutes per person.)

The following persons spoke regarding: Jean Holt – hoping the group will get further down the road than before. Should be more simplified. Hopefully come up with some fresh ideas.

VI. ITEMS OF BUSINESS

A. Borough Code Review/Analysis (Staff: Alex Strawn, Planning & Land Use Director)
1. MSB 1.45: Violations, Enforcement, and Penalties

2. MSB 17.02: Mandatory Land Use Permit
3. MSB 17.55: Setbacks and Screening Easements
4. MSB 17.65: Variances
5. MSB 17.80: Nonconforming Structures

Mr. Strawn provided an overview of the codes.

Discussion ensued during the presentation.

Mr. Spiropolous provided details on injunctive relief.

VII. BOARD MEMBER COMMENTS

Commissioner LaCrouix: The vacancy; the mayor does have someone in mind – should be available to attend the meeting in January if oath is complete.

Commissioner Zamzow: Appreciate Matt's suggestion to get the data; it could really help.

Commissioner Klebasadel: If there is a category would the borough consider a 65' setback? We probably can't fix all the problems. It would be nice to complete a bio.

Commissioner Alley: The water quality is only one issue; the visual is something to think about.

Commissioner Brent: There is a process that some people can follow to get into conforming process. If the land use was still in affect, we probably wouldn't be here.

Commissioner Kendig: I am happy with what we are accomplishing.

Nick Spiropolous: Thank you for doing this. I won't be coming to all the meetings but Alex knows where to find me.

VIII. ADJOURNMENT

The regular meeting adjourned at 7:45 p.m.

BILL KENDIG, Chair

ATTEST:

KAROL RIESE, Clerk
Minutes approved: *January 9, 2024*

FSA5027

Riparian Buffers: Types and Establishment Methods

Kyle Cunningham
Forestry Instructor

Chris Stuhlinger
UA System Forest Manager

Hal Liechty
Professor of Forest Ecology and Hydrology

A riparian buffer is a strip of vegetation established next to waterways in managed landscapes (such as urban or agriculture) that is designed to capture stormwater runoff, nutrients and sediment (Figure 1). These

Figure 1. A riparian forest buffer.
Photo by USDA NRCS

areas also improve habitat for aquatic organisms. In essence, riparian buffers lessen the impact of land management practices on waterways and help maintain healthy aquatic communities (for more information on the role of buffers, see fact sheet FSA5026, *Riparian Buffers: Functions and Values*).

There are several types of riparian buffers that can be implemented. The specific buffer type employed depends on the conditions near the waterway, the type or size of the waterbody and the primary objectives of the buffer. There are six common buffer styles including grass buffers, three-zone forest buffers, two-zone forest buffers, wildlife buffers, urban buffers and naturalized buffers. Alterations to the common buffer types can be made to generate modified versions. All of these buffers can help to maintain water quality while meeting other associated objectives.

Types of Riparian Buffers

Grass Buffer

This buffer consists only of grasses and forbs (such as wildflowers) and is typically used along small streams and other drainages that flow through crop fields and pastures. Grass filter strips are usually narrow and contain several grass species that slow and disburse runoff. Grass buffers also can provide valuable wildlife habitat. Native grasses, which are often better adapted than non-natives and less invasive, are desirable for planting. Grasses are most effective at filtering sediment. Grass buffers may require periodic maintenance to control invasion by unwanted plant species and to reestablish grasses. Suggested buffer width is 20 to 30 feet (Figure 2).

Figure 2. A grass buffer in an agricultural field.
Photo by USDA NRCS

Three-Zone Forest Buffer

A three-zone forest buffer system has the flexibility to achieve both water quality and other landowner objectives (Figure 3). Zone 1, ranging in width from 15 to 30 feet, contains trees along the edge of the stream and

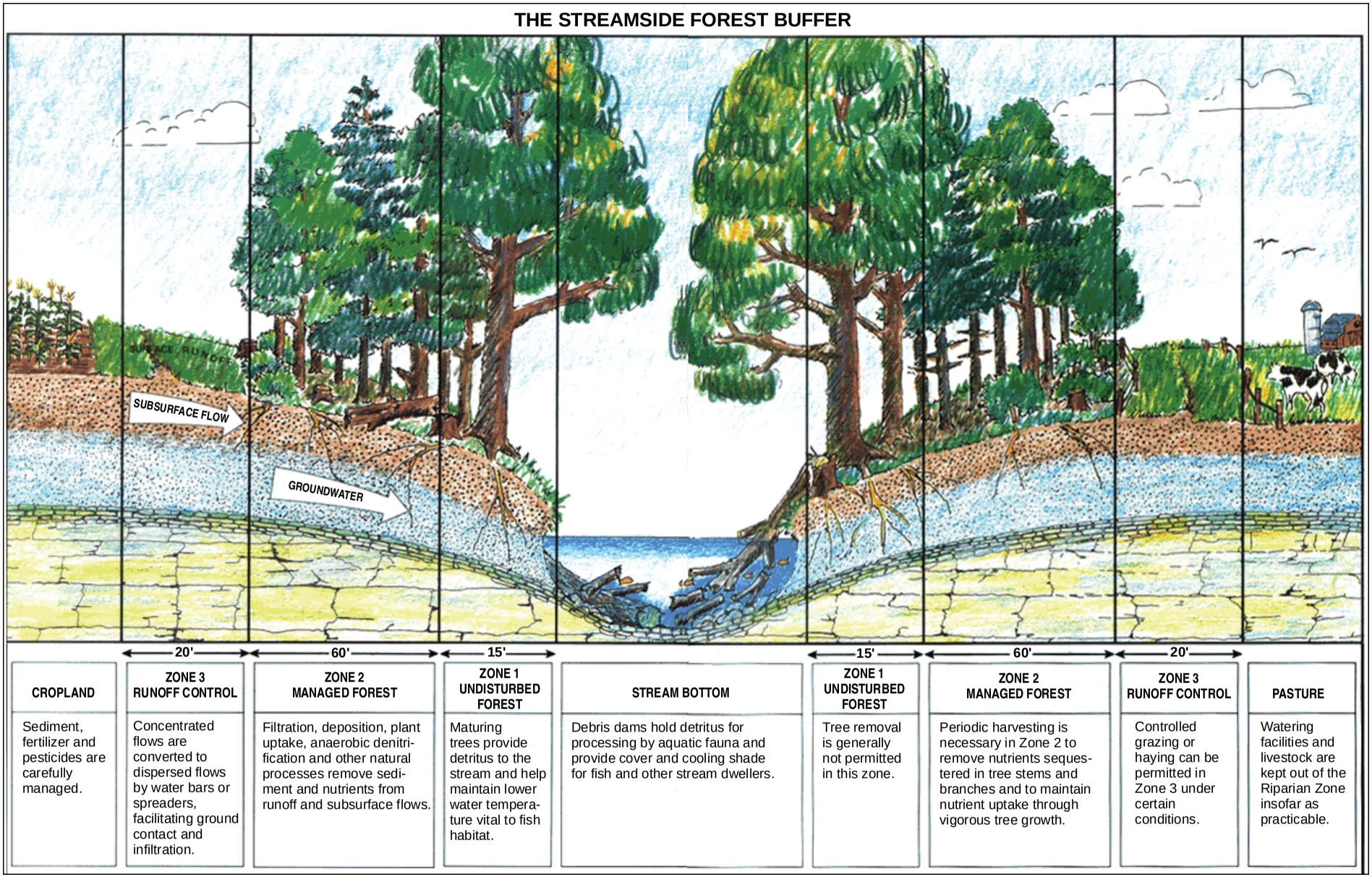

Figure 3. Illustration of a three-zone riparian forest buffer.

Source: USDA Forest Service

is usually left undisturbed. Trees in this zone stabilize the streambank and provide shade and habitat for aquatic organisms. Zone 2, ranging in width from 30 to 100 feet, filters sediment that passes through zone 3 and absorbs nutrients while providing wildlife habitat. This zone contains trees that can be utilized for timber production. Zone 3, 20 to 30 feet wide, is usually a grass strip that functions to slow down and spread runoff. A modified three-zone buffer contains a shrub and small tree zone between the edges of zones 2 and 3 to give a feathered effect which may be more desirable for wildlife and aesthetically pleasing. Suggested minimum total buffer width on each side of a stream is 50 to 100 feet, but this width should be wider with increasing slope.

Two-Zone Forest Buffer

A two-zone forest buffer would simply be a modification to the three-zone forest buffer, where the grass zone would not be established. This buffer would result in managed and unmanaged forest zones. While this buffer type may be desirable to some landowners, excluding the grass buffer will result in a loss of value and environmental function of the riparian buffer.

Wildlife Buffer

Riparian forest buffers, with multiple vegetation layers and various habitat features, support a greater diversity of wildlife than adjacent upland forests. This buffer is similar to the three-zone buffer but puts more emphasis on trees, shrubs and grasses that are beneficial to wildlife for food and shelter. A wildlife buffer is usually wider, up to 300 feet, to better function as a travel corridor and connector between larger tracts of forest. Suggested buffer width is up to 300 feet.

Urban Buffer

Buffers in urban areas are important for intercepting runoff and pollutants from developed areas. These buffers are designed to better withstand human impacts and utilize larger planting stock. The larger trees and shrubs also provide a more immediate visual impact while being more resistant to human use. Using species that display colorful spring flowers and fall leaves adds to the aesthetic appeal. Urban buffers can also function as greenways along streams and may include a recreational trail. Urban buffers and greenways can be used to teach homeowners and developers about the importance of protecting streams and water quality and still allow limited use. Suggested buffer width is 50 to 100 feet (Figure 4).

Naturalized Buffer

This buffer is established from tree, shrub and grass seed that has been blown in or otherwise carried in naturally from the surrounding area. Vegetation that already exists or establishes naturally can be supplemented by interplanting tree and shrub seedlings as needed to achieve desired stocking densities. This buffer type represents an inexpensive buffer that can still effectively intercept runoff. Suggested buffer width is 50 to 100 feet.

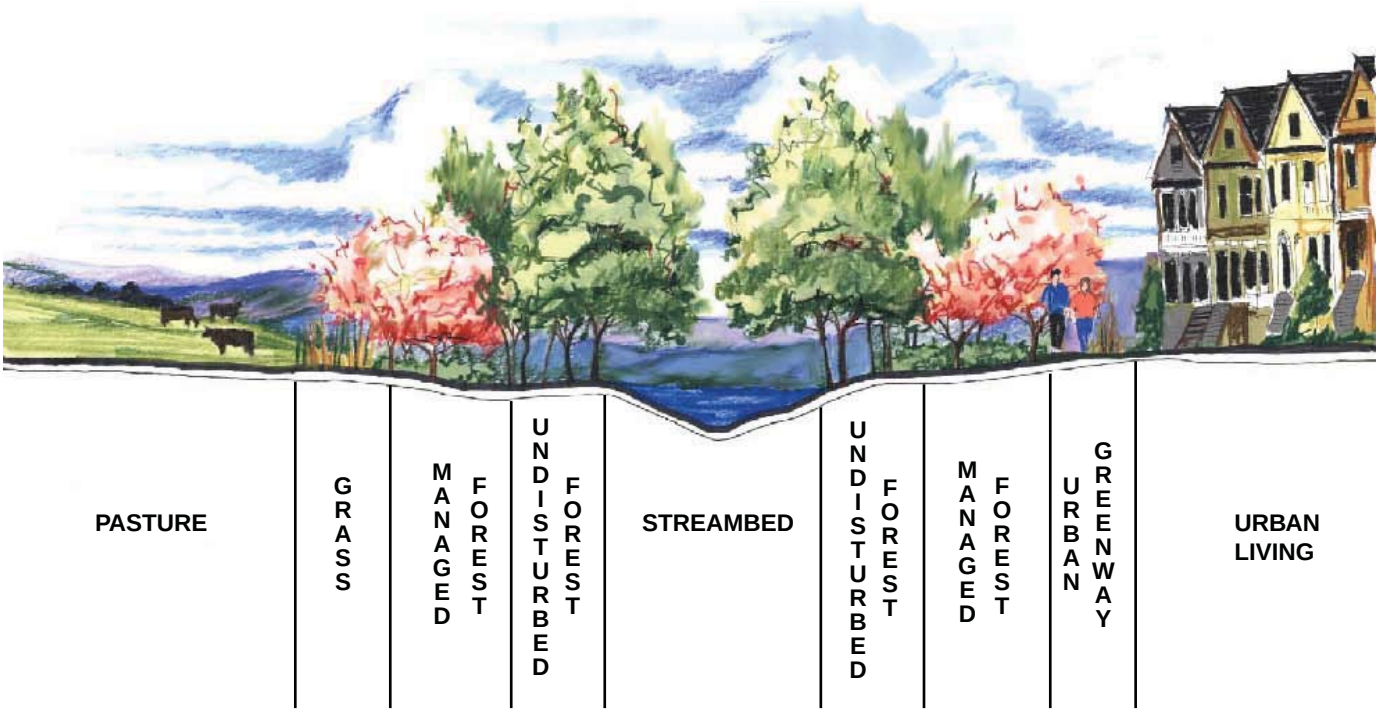

Figure 4. An example of an urban buffer.

Choosing a Buffer Type

There are many considerations that must be accounted for when establishing a riparian buffer. The first step is to determine which buffer type will best fit the current environment (site conditions), meet a landowner's objectives for management and fit within available cost-share programs.

Site Analysis

A site analysis involves determining factors such as soil type, soil productivity, soil moisture, type of waterway, slope and many others. A good source for much of this information is county soil surveys. These surveys published by the USGS are available at local NRCS and county Extension offices. A valid site analysis will assist in making sure the proper buffer and vegetation types are selected for the site conditions.

Ownership Objective

Establishing the proper objectives should be based on three concepts: (1) the landowner's desired values, (2) the desired environmental function and (3) the site conditions. Establishing the proper management objectives can make the difference in buffer success or failure.

For example, a landowner with agricultural land may wish to maintain some economic production from the riparian area and increase wildlife value. This landowner would probably best benefit from a three-zone riparian forest buffer. The three-zone buffer would provide the environmental benefit needed and produce merchantable trees while also providing habitat for wildlife. On the other hand, another farmer's objective may be to remove as little land area as possible from production. In this case, the farmer should probably choose the grass buffer, as it is typically much narrower than other buffer types while still providing necessary buffer functions.

Cost-Share Programs

There are several cost-share programs available to landowners for establishing buffers. These programs help pay for items such as fencing, site preparation, seed or seedlings, planting and many other practices. Some programs will provide rental payments while others focus on cost share for establishment practices. Some of the programs offer both rental payments and cost share for establishment. An interested landowner should contact their local FSA, NRCS or county Extension agent for guidance to finding the proper cost-share program (Table 1).

Table 1. Some available cost-share programs for riparian buffers.

Program	Oversight
Conservation Reserve Enhancement Program (CREP)	USDA – Farm Service Agency (FSA)
Wetland Reserve Program (WRP)	USDA – Natural Resources Conservation Service (NRCS)
Conservation Reserve Program (CRP)	
Environmental Quality Incentives Program (EQIP)	USDA – Natural Resources Conservation Service (NRCS)
Wildlife Habitat Incentives Program (WHIP)	USDA – Natural Resources Conservation Service (NRCS)

Establishing a Riparian Buffer

As with any natural resource, proper planning is essential to successful buffer establishment. In addition to matching buffer type to the site and ownership objectives, many factors must be considered prior, during and after buffer establishment including vegetation type, site preparation, quality planting job, post-establishment care and evaluation and maintenance.

Vegetation Type

Major considerations for selecting vegetation types are not only dictated by the type of buffer being established but factors such as species/site relationships, species/objective relationships, proper stock sizes and planting access (Table 2). The type of soils present and the management objectives (such as timber, wildlife, etc.) should always drive the selection of tree, shrub and grass species to be established. Stock size may be driven more by buffer type than other considerations. Tree and shrub stock types include cuttings, bare-root seedlings, container-grown and balled and burlapped (B&B). For example, the urban buffer will generally require larger stock sizes to allow for immediate impact on buffer usage by people.

Site Preparation

When establishing a buffer, some form of site preparation will almost always be required. This could involve either mechanical or chemical operations. Mechanical operations are usually directed at preparing the soil for tree or grass planting. Agricultural areas will typically have a layer of hardened soil under the surface that can prevent tree roots from reaching proper depths for water and mineral uptake. A "ripping" operation is typically utilized to break the

Table 2. Examples of species (natives are preferable) that are suitable for planting in riparian buffers.

TREES (by flood tolerance)		
Tolerant	**Moderately Tolerant**	**Intolerant**
Bald cypress	Sycamore	Black walnut
Overcup oak	Sugarberry	Persimmon
Black willow	Swamp chestnut oak	White oak
Water tupelo	Green ash	Blackgum
Swamp tupelo	River birch	Loblolly pine
	Eastern cottonwood	Shortleaf pine
	American elm	White ash
	Water oak	Sweet pecan
	Willow oak	Cherrybark oak
	Nutall oak	
OTHER VEGETATION TYPES		
Small Trees	**Shrubs**	**Grasses**
Redbud	Roughleaf dogwood	Indiangrass
American plum	Elderberry	Little bluestem
Serviceberry	Red chokeberry	Big bluestem
Fragrant sumac	Shrub willow	Switchgrass
Crabapple	Beautyberry	
Flowering dogwood		

"hardpan" in the soil. Ripping or subsoiling involves opening a slit in the ground 18 to 30 inches deep. Ripping is typically performed a few months prior to planting (Figure 5).

Figure 5. A mechanical sub-soiler.

Chemical applications are employed to help control unwanted, competing vegetation and are almost always needed. Because hardwoods (not pine) are typically planted in the tree zones of buffers, the herbicides available for use are few in number. The most common is sulfometuron methyl, which is labeled for preemergent applications (before March) in hardwood plantings. Proper application is critical to avoid seedling damage to hardwood tree species. Therefore, always consult with a professional when planning a herbicide application and always refer to the respective herbicide label.

Chemical competition control in grass zones may be required as well. Often these areas contain non-native species (such as fescue) which must be controlled prior to establishing more favorable native grasses. There are several herbicides for controlling fescue – Imazipic (Plateau) is a common herbicide that is available through the Arkansas Game and Fish Commission (contact your local AG&FC wildlife biologist for more information). Other herbicides, including sulfometuron methyl, control a range of grasses including fescue. Because the grass zone borders the tree zone, applying chemicals such as imazapyr to control grasses (usually bermuda) may have negative impacts on nearby hardwood seedlings. Again, consult with a licensed herbicide applicator when conducting an application.

Quality Planting Job

Quality seedlings should be obtained from nurseries located less than 200 miles north or south of the planting location. They should be properly cared for prior to and during planting. This care can make the difference in survival success or failure. With hardwood seedlings, survival rates can be increased by ordering 10 to 20 percent more seedlings than are required and selecting only the best 80 or 90 percent of the seedlings for planting. This "culling" operation may ensure that the better seedlings (larger seedlings with 8 to 10 lateral roots) which have a greater chance of surviving are planted. Always store the seedlings properly prior to planting (this usually means in a cooler at 45ºF) and keep the roots moist. If a planting crew is being used to plant seedlings, discuss the planting job prior to planting and maintain oversight throughout the planting operation.

Post-Establishment Care

Post-planting care can be an important step in ensuring seedling survival and rapid growth. Additional herbicide applications may be required to control grasses, forbs and brush around seedlings (note: most post-planting herbicide applications are constrained to grass-only herbicides). Tree shelters can also be beneficial to recently planted hardwood seedlings. The shelters provide a "greenhouse effect"

that enhances the growth of seedlings (Figure 6). However, they may be difficult to maintain in flood-prone areas. If larger trees are planted (such as in the urban buffer), mulching, staking and irrigation may be required.

Figure 6. Tree shelters can improve survival and growth of seedlings.

Evaluation and Maintenance

As with most vegetation establishment operations, evaluation of establishment success is the basis for making additional management decisions for a particular buffer. Survival checks can be conducted by identifying a small sample of seedlings to be monitored over time. Most cost-share programs will have this as a component of the contract. It is often required to have a survival rate of 70 percent or higher. In the event of significant mortality, supplemental planting may be required.

Checklist for Riparian Buffer Success

- ✓ *Establish objectives*
- ✓ *Site analysis*
- ✓ *Choose correct buffer type*
- ✓ *Select proper vegetation types*
- ✓ *Perform site preparation*
- ✓ *Quality planting job*
- ✓ *Post-establishment operations*
- ✓ *Evaluation and maintenance*

Riparian buffers provide an excellent opportunity to provide multiple environmental, ecological and social benefits while assisting landowners in creating multiple-use opportunities for their lands. Landowners should examine the options available for establishing buffers, make a plan based on objectives, establish a timeline of activities and stick to the schedule. There are many operations that must be performed sequentially and must be properly timed in their application (such as mechanical site preparation and timing of tree planting). The old saying “plan your work and work your plan” certainly applies to riparian buffer establishment.

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FSA5027-PD-5-09N

Stormwater Best Management Practice

Bioretention (Rain Gardens)

Minimum Measure: Post Construction Stormwater Management in New Development and Redevelopment
Subcategory: Filtration

Description

Bioretention practices, such as rain gardens, are landscaped depressions that treat on-site stormwater discharge from impervious surfaces such as roofs, driveways, sidewalks, parking lots and compacted lawns. They are used to collect stormwater and filter it through a mixture of soil, sand and/or gravel. The designs of bioretention practices mimic volume reduction and pollutant removal mechanisms that work in natural systems. The filtered stormwater soaks into the ground, provides water to plants and can help recharge the local groundwater supply. Through these processes, bioretention practices reduce peak flows within downstream sewer systems and allow pollutant removal through filtration and plant uptake.

Applicability

Bioretention practices are well suited to small sites in urbanized settings and can filter stormwater from small to medium storms. Designers generally bypass stormwater discharges from larger storms past a bioretention practice to a larger stormwater control or the storm drain system.

Urban Areas

Developers can easily install bioretention practices in densely developed urban areas with few pervious surfaces. Bioretention practices can fit into existing parking lot islands, along roads, at intersections or in other landscaped areas as part of a retrofit, redevelopment or new construction. Bioretention practices generally need a footprint of approximately 5 to 10 percent of the surrounding drainage area (Tetra Tech, Inc., 2011).

Stormwater Hot Spots

Stormwater hot spots are areas where certain land uses or related activities generate highly contaminated discharges with pollutant concentrations exceeding those typical of stormwater. Typical examples include gas stations and some industrial areas. Design engineers can tailor a bioretention practice to treat a stormwater hot spot by adding an impervious liner to the bottom of the gravel layer to prevent groundwater or surface water contamination.

A bioretention practice in a suburban road median, capturing stormwater during a rain event.

Photo Credit: Image reproduced with permission from Montgomery County, MD Department of Environmental Protection

Cold Water (Trout) Streams

Heat from paved surfaces like parking lots and roads can increase the temperature of stormwater discharge as it flows into nearby surface waters. Some wildlife species in cold water streams like trout are sensitive to temperature changes. Bioretention practices can decrease the temperature of stormwater by temporarily detaining stormwater discharge beneath the ground surface.

Regional Applicability

Bioretention practices are applicable almost anywhere in the United States. A three-year study in the Twin Cities, Minnesota, region concluded that bioretention practices perform well in cold climate conditions (LeFevre et al., 2009). In this study, soil type was the most important design consideration. In addition, the presence of frost only influenced performance in cases where pore spaces became frozen, halting infiltration.

In arid and semiarid climates, drought-tolerant plants are the best landscaping option for bioretention practices. Houdeshel et al. (2015) evaluated the effectiveness of three bioretention practices in a semiarid climate and concluded that by increasing native vegetation densities or by using gray water to irrigate vegetation during dry periods, nutrient retention performance in this climate was similar to that of other wetter climates.

Siting Considerations

Important site conditions to consider when designing bioretention practices include the size of the drainage area, slopes, soil and subsurface conditions, and the depth of the seasonal high groundwater table. Design engineers can incorporate design features that improve the longevity and performance of the bioretention practice while minimizing maintenance.

Drainage Area

Design engineers typically use bioretention practices to treat small drainage areas that are less than 5 acres. When treating areas larger than one-half acre, bioretention practices often use pretreatment systems such as forebays or filter strips to prevent clogging. In addition, it can be difficult to convey flow from a large drainage area to a bioretention practice. In these cases, multiple successive bioretention practices may work better than a single large system.

Slope/Topography

Parking lots or residential landscaped areas with gentle slopes around 5 percent are ideal for bioretention practices. A design engineer should include sufficient elevation difference between the bioretention practice inflow and outflow to ensure that water can flow through the filtering media in a specified amount of time, typically less than 24-48 hours (design requirements vary by location). Depending on the design variation, the bioretention practice may need 2 to 6 feet of elevation difference to meet this requirement.

Soils

Design engineers can use bioretention practices with almost any soil type. In soils with poor infiltration rates, adding underdrains allows stormwater to percolate through the media and move downstream. In soils with naturally high infiltration rates, design engineers may exclude underdrains from the plans. In all cases, preliminary design steps should include site-specific soil testing by a qualified professional and should adhere to local design standards that specify when conditions warrant an underdrain.

Groundwater

Design engineers should separate the bottom layer of a bioretention practice from the seasonal high groundwater table by a minimum of 2 feet. This separation ensures that the groundwater table does not intersect with the bed of the bioretention practice, maintains infiltration rates throughout the system, and prevents possible groundwater contamination from contaminated stormwater. In areas where groundwater contamination is a concern, design engineers should add an impervious liner around the bottom of the bioretention practice. Bioretention practices without underdrains and with high infiltration rates may also help maintain groundwater recharge rates.

Design Considerations

Bioretention practice designs can vary considerably, depending on site constraints or preferences of the design engineer or community. Some consistent design features fall into five basic categories described below: pretreatment, treatment, conveyance, maintenance reduction and landscaping.

Pretreatment

Bioretention practices that treat large drainage areas greater than one-half acre use pretreatment, which includes design features that settle coarse sediment particles and their associated pollutants. Pretreatment can reduce the maintenance burden and the likelihood that the soil bed will clog over time. Design engineers can use several different mechanisms to provide pretreatment in bioretention practices, including grass channels or filter strips and pea gravel diaphragms. The system directs stormwater to these pretreatment features to reduce flow rates and filter out coarse materials before the stormwater flows into the filter bed. Larger systems often use wet or dry forebays as pretreatment.

Treatment

Treatment design features help enhance a bioretention practice's ability to remove pollutants. Design engineers should consider several basic design features to enhance the bioretention practice's pollutant removal:

1. A footprint whose size is between 5 and 10 percent of the impervious area draining to it (Tetra Tech, Inc., 2011).

2. A soil bed that is a sand/soil matrix to serve as plant growing media.
3. A design to temporarily pond a small amount of water (typically 6 to 12 inches) above the filter bed.

In addition to the standard features above, design engineers may add various media amendments to the soil bed layer to enhance specific pollutant removal performance. For example, a literature review by Hirschman et al. (2017) found that adding iron and aluminum amendments can reduce total phosphorus in bioretention practice effluent.

Conveyance

Stormwater flow into and through a bioretention practice is a critical component of its design. If surrounding soils have low infiltration rates, bioretention practices should include a perforated underdrain system to collect and convey filtered stormwater to the storm drain system. Design engineers should place the underdrain in a gravel bed at the bottom of the filter bed. Design engineers should also provide an overflow structure to convey flows that are too large for the system to handle.

Landscaping

Landscaping with appropriate plants is vital to the function and aesthetic value of bioretention practices. Using native plants that also provide wildlife habitat provides multiple benefits and can help boost plant survival, given these plants should tolerate the local hydrologic regime. For example, plants on the bottom of the bioretention practice should tolerate both wet and dry conditions. At the edges, upland species used to dry conditions can thrive. Finally, it is best to plant a combination of shrubs and herbaceous vegetation where site conditions allow. Design engineers can include trees after considering any overhead or underground infrastructure such as power lines or pipes.

Design Variations

Design engineers can implement multiple design variations for bioretention practices to serve different objectives. Some variations promote percolation into the native soil and groundwater recharge, while others exclusively focus on filtration. The Minnesota Pollution Control Agency offers examples of bioretention design variations. The main differences pertain to the presence or absence of an underdrain, an impermeable liner or an internal water storage chamber. One common design variation is the rain garden, a shallow depression containing a layer for planting media. However, rain gardens do not have sand or gravel layers to treat stormwater through infiltration.

Limitations

Bioretention practices are not suitable for treating large drainage areas. Surface soil layers can clog over time in areas with excessive sediment loadings. Although bioretention practices typically have small footprints, incorporating them into a parking lot design may reduce the number of parking spaces available if the design did not previously include islands. In addition, bioretention practices should leave space between the system and permanent structures, including buildings (with the exception of the bioretention planter box design variation).

Bioretention practices can reduce local flooding but may not provide flood control during extreme storms. They can, however, alleviate the stress on other flood control measures by reducing peak flows and stormwater volumes within their drainage areas.

Maintenance Considerations

Bioretention practices require landscaping maintenance as well as measures to ensure that the practice is functioning properly. Bioretention practices may initially require more labor for maintenance than a traditional landscaped island, but maintenance needs generally decrease over time. If they contain appropriate vegetation, landscaping maintenance may require fewer resources than traditional landscaped islands in parking areas.

Table 1 below provides a general overview of the typical maintenance activities, frequency and maintenance notes for bioretention practices. Local stormwater manuals often include specific maintenance considerations.

Bioretention Planter Box

A *bioretention planter box* can be designed to infiltrate stormwater and act as a bioretention practice. This type of practice is typically a concrete box that contains planting media, sand and gravel layers that promote infiltration. Bioretention planter boxes can be used in rights of way. If used beside buildings, then designers should consider potential impacts of infiltration on building foundations.

Table 1. Typical maintenance activities for bioretention practices (consult local stormwater manuals for specific considerations).

Activity	Frequency	Maintenance Notes
Pruning	1 to 2 times per year	Vegetation often grows vigorously during rainy seasons. Prune vegetation to maintain capacity and flow rates.
Mowing	2 to 12 times per year	Frequency depends on location and desired aesthetic appeal. Providing clarity as to the timing is important so that maintenance staff do not include these areas as part of more regular mowing procedures.
Watering	Once every 2 to 3 days for first 1 to 2 months; sporadically after establishment	If drought conditions exist, plants may need watering after the initial year. Native vegetation may flourish without watering.
Fertilization	Once initially	One-time spot fertilization for *first-year* vegetation.
Dead plant removal and replacement	Once per year	Within the first year, 10 percent of plants can die. Survival rates increase with time. Removing dead plants also removes nutrients that would otherwise enter the system.
Inlet inspection	Once after first rain of the season, then monthly during the rainy season	Check for sediment accumulation to ensure that flow into the bioretention practice is as designed. Remove any accumulated sediment.
Outlet inspection	Once after first rain of the season, then monthly during the rainy season	Check for erosion at the outlet, and remove any accumulated mulch or sediment.
Miscellaneous upkeep	Once per month	Tasks include collecting trash, checking plant health, spot weeding, removing invasive species and removing mulch from the overflow device.
Replacement of top few inches of filter media	If ponding occurs for more than 48 hours	Replace top few inches of filter media. Sediment accumulation reduces the bioretention practice's performance and the facility's ability to drain.

Sources: Tetra Tech, Inc., 2011; MDE, 2009

Effectiveness

Effective bioretention practices reduce stormwater flows and remove pollutants. Bioretention practices reduce stormwater discharge from smaller-storm events, though they can also remove a limited amount of pollutants from larger events under the right conditions. Like most stormwater treatment systems, bioretention practices by design capture a specific treatment volume associated with local climate conditions. For example, Maryland defined this volume as the stormwater produced from a 1-inch storm event (MDE, 2009). Treatment performance generally diminishes for larger storm events above the design capacity, though these events tend to be less frequent and often make up a small fraction of the total annual rainfall and stormwater discharge to a given location.

Bioretention practices reduce stormwater discharge by enhancing infiltration and evapotranspiration. Infiltration enhancement depends on the design variation. Figure 1 shows the results of an analysis looking at the volume reduction performance of 20 different bioretention practices with underdrains (left) and without underdrains (right) (Geosyntec Consultants and Wright Water Engineers, Inc., 2012). Both design variations consistently provided volume reduction, though systems without underdrains (right) provided greater volume reduction (as measured by zero-discharge events) due to increased infiltration losses. Systems with underdrains provided an average volume reduction of 56 percent across all measured storm events, while those without underdrains provided an average volume reduction of 89 percent.

These areas enhance evapotranspiration (the sum of evaporation and vegetation transpiration) by providing prolonged storage of stormwater discharge within bioretention media and gravel layers where plant roots have greater access.

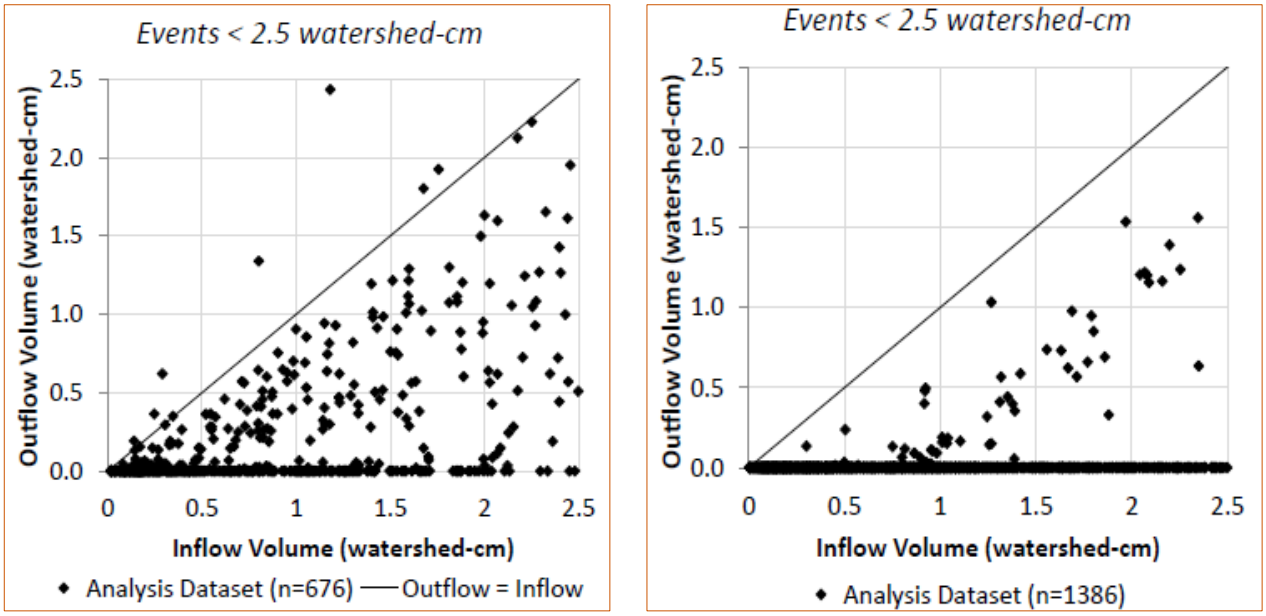

Figure 1. Discharge volume versus inflow volume for bioretention areas with and without underdrains. Tile A shows results for 676 monitored events across 14 individual systems with underdrains. Tile B shows results for 1,386 monitored events across six individual systems without underdrains.

Source: Geosyntec Consultants and Wright Water Engineers, Inc. 2012. Reprinted with permission. © Water Environment Research Foundation.

Pollutant removal performance is more variable and, due to volume losses described above, can be misleading when looking at influent and effluent concentrations. For example, data summaries in the National Pollutant Removal Database (Clary et al., 2017) indicate positive removals for metals, bacteria, total suspended solids and total nitrogen but negative removals for total phosphorus when measured using concentration. However, to determine actual mass removal performance, analysts should incorporate the volume reduction performance discussed above. For example, in a detailed assessment of a subset of the same National Pollutant Removal Database data, Leisenring et al. (2013) found that bioretention systems with underdrains showed statistically significant removal of total suspended solids but not total nitrogen or total phosphorus.

Cost Considerations

Bioretention practices can vary depending on size, maintenance required and cost of materials. Costs can range from $50,000 to $200,000 per acre of impervious surface treated,[1] with smaller systems being more expensive per acre. In addition, retrofits with complex existing infrastructure may be more expensive than new construction (King and Hagan, 2011).

An important consideration when evaluating bioretention practice maintenance costs is that they are often in areas that already require landscape maintenance, such as parking lot islands or rights-of-way. Maintenance activities for bioretention practices are similar to traditional landscaping and may cost less than typical vegetative cover—such as turfgrass or ornamental vegetation—because they require less watering and less frequent mowing.

Like other volume reduction practices, bioretention practices can save costs compared to the use of traditional structural stormwater conveyance systems. For example, the use of bioretention practices can decrease the cost of constructing stormwater conveyance systems and reduce the required size of traditional stormwater detention ponds.

Helpful EPA Resources

- What is Green Infrastructure?
- What is EPA Doing to Support Green Infrastructure?
- Green Infrastructure Modeling Tools
- Green Infrastructure Design and Implementation
- Green Infrastructure Funding Opportunities
- Tools, Strategies and Lessons Learned from EPA Green Infrastructure Technical Assistance Projects
- Manage Flood Risk
- Build Resiliency to Drought
- Green Infrastructure Webcast Series

Additional Information

Additional information on related practices and the Phase II MS4 program can be found at EPA's National Menu of Best Management Practices (BMPs) for Stormwater website

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[1] Prices updated to 2019 dollars. Inflation rates obtained from the Bureau of Labor Statistics CPI Inflation Calculator Web site https://data.bls.gov/cgi-bin/cpicalc.pl. Reference dates for the calculation are October 2011 and September 2019.

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Disclaimer

This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices. State or local requirements may apply.

Aquatic Buffer Model Ordinance

☞ *This ordinance focuses primarily on stream buffers. Communities creating coastal buffers may wish to incorporate additional features. For an example of a coastal buffer ordinance, see the Rhode Island ordinance.*

Section I. Background

Buffers adjacent to stream systems and coastal areas provide numerous environmental protection and resource management benefits that can include the following:

1) Restoring and maintaining the chemical, physical, and biological integrity of the water resources
2) Removing pollutants delivered from urban stormwater
3) Reducing erosion and sediment entering the stream
4) Stabilizing stream banks
5) Providing infiltration of stormwater runoff
6) Maintaining base flow of streams
7) Contributing the organic matter that is a source of food and energy for the aquatic ecosystem
8) Providing tree canopy to shade streams and promote desirable aquatic organisms

☞ *This benefit applies primarily to forested buffer systems. In some communities, such as prairie settings, the native vegetation may not be forest. See the example ordinance from Omaha, Nebraska, for an example.*

9) Providing riparian wildlife habitat
10) Furnishing scenic value and recreational opportunity

It is the desire of the _____(*Natural Resources or Planning Agency*) to protect and maintain the native vegetation in riparian and wetland areas by implementing specifications for the establishment, protection, and maintenance of vegetation along all stream systems and/or coastal zones within our jurisdictional authority.

Section II. Intent

The purpose of this ordinance is to establish minimal acceptable requirements for the design of buffers to protect the streams, wetlands, and floodplains of _____ (*jurisdiction*); to protect the water quality of watercourses, reservoirs, lakes, and other significant water resources within _____(*jurisdiction*); to protect _____'s (Jurisdiction's) riparian and aquatic ecosystems; and to provide for the environmentally sound use of _____'s (*jurisdiction's*) land resources.

Section III. Definitions

Active Channel	The area of the stream channel that is subject to frequent flows (approximately once per one and a half years) and that includes the portion of the channel below the floodplain.
Best Management Practices (BMPs)	Conservation practices or management measures that control soil loss and reduce water quality degradation caused by nutrients, animal wastes, toxics, sediment, and runoff.

Buffer	A vegetated area, including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake, reservoir, or coastal estuarine area. Alteration of this natural area is strictly limited.
Development	1) The improvement of property for any purpose involving building 2) Subdivision or the division of a tract or parcel of land into two or more parcels 3) The combination of any two or more lots, tracts, or parcels of property for any purpose 4) The preparation of land for any of the above purposes
Nontidal Wetlands	Those areas not influenced by tidal fluctuations that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

☞ *The definition of "nontidal wetland" here is adapted from the definition of "wetland" used by the USEPA and the US Army Corps of Engineers.*

Nonpoint Source Pollution	Pollution that is generated by various land use activities rather than from an identifiable or discrete source and is conveyed to waterways through natural processes, such as rainfall, stormwater runoff, or groundwater seepage rather than direct discharges.
One Hundred-Year Floodplain	The area of land adjacent to a stream that is subject to inundation during a storm event that has a recurrence interval of 100 years.
Pollution	Any contamination or alteration of the physical, chemical, or biological properties of any waters that will render the waters harmful or detrimental to 1) Public health, safety, or welfare 2) Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses 3) Livestock, wild animals, or birds 4) Fish or other aquatic life
Stream Channel	Part of a watercourse either naturally or artificially created that contains an intermittent or perennial base flow of groundwater origin. Base flows of groundwater origin can be distinguished by any of the following physical indicators: 1) Hydrophytic vegetation, hydric soil, or other hydrologic indicators in the area(s) where groundwater enters the stream channel in the vicinity of the stream headwaters, channel bed, or channel banks 2) Flowing water not directly related to a storm event 3) Historical records of a local high groundwater table, such as well and stream gauge records.
Stream Order	A classification system for streams based on stream hierarchy. The smaller the stream, the lower its numerical classification. For example, a first-order stream

does not have tributaries and normally originates from springs and/or seeps. (See Figure 1.)

Stream System — A stream channel together with one or both of the following:
1) 100-year floodplain
2) Hydrologically related nontidal wetland

Streams — Perennial and intermittent watercourses identified through site inspection and US Geological Survey (USGS) maps. Perennial streams are those which are depicted on a USGS map with a solid blue line. Intermittent streams are those which are depicted on a USGS map with a dotted blue line.

☞ *Defining the term "stream" is perhaps the most contentious issue in the definition of stream buffers. This term determines the origin and the length of the stream buffer. Although some jurisdictions restrict the buffer to perennial or "blue line" streams, others include both perennial and intermittent streams in the stream buffer program. Some communities do not rely on USGS maps and instead prepare local maps of all stream systems that require a buffer.*

Water Pollution Hazard — A land use or activity that causes a relatively high risk of potential water pollution.

Section IV. Applications

A) This ordinance shall apply to all proposed development except for that development which meets waiver or variance criteria as outlined in Section IX of this regulation.

B) This ordinance shall apply to all timber harvesting activities, except those timber harvesting operations which are implementing a forest management plan that has been deemed to be in compliance with the regulations of the buffer ordinance and has received approval from _____(*state forestry agency*).

C) This ordinance shall apply to surface mining operations except that the design standards shall not apply to active surface mining operations that are operating in compliance with an approved _____(*state or federal agency*) surface mining permit.

D) The ordinance shall not apply to agricultural operations that are covered by an approved Natural Resources Conservation Service (NRCS) conservation plan that includes the application of BMPs.

☞ *Communities should carefully consider whether exempt agricultural operations from the buffer ordinance because buffer regulations may take land out of production and impose a financial burden on family farms. Many communities exempt agricultural operations if they have an approved NRCS conservation plan. In some regions, agricultural buffers may be funded through the Conservation Reserve Program (CRP). For further information, consult the Conservation Technology Information Center (CTIC) at www.ctic.perdue.edu.*

☞ *Livestock operations near and around streams may be regulated by communities. Livestock can significantly degrade the stream system and accelerate streambank erosion. The King County Livestock Management Ordinance is one example of a local livestock ordinance. For more information, contact the King County Department of Development and Environmental Services at (206) 296-6602.*

E) Except as provided in Section IX, this ordinance shall apply to all parcels of land, structures, and activities that are causing or contributing to

1) Pollution, including nonpoint source pollution, of the waters of the jurisdiction adopting this ordinance
2) Erosion or sedimentation of stream channels
3) Degradation of aquatic or riparian habitat

Section V. Plan Requirements

A) In accordance with Section IV of this ordinance, a plan approved by the appropriate agency is required for all development, forest harvesting operations, surface mining operations, and agricultural operations.
B) The plan shall set forth an informative, conceptual, and schematic representation of the proposed activity by means of maps, graphs, charts, or other written or drawn documents so as to enable the agency an opportunity to make a reasonably informed decision regarding the proposed activity.
C) The plan shall contain the following information:

☞ *The ordinance can identify the scale of maps to be included with the analyses in items 2) through 7). A 1"=50' to 1"=100' scale will generally provide sufficient detail.*

1) A location or vicinity map
2) Field-delineated and surveyed streams, springs, seeps, bodies of water, and wetlands (include a minimum of 200 feet into adjacent properties)
3) Field delineated and surveyed forest buffers
4) Limits of the ultimate 100-year floodplain

☞ *The limits of the ultimate floodplain (i.e., the floodplain under "built-out" conditions) might not be available in all locations.*

5) Hydric soils mapped in accordance with the NRCS soil survey of the site area
6) Steep slopes greater than 15 percent for areas adjacent to and within 200 feet of streams, wetlands, or other waterbodies

☞ *The ordinance may also explicitly define how slopes are measured. For example, the buffer may be divided into sections of a specific width (e.g., 25 feet) and the slope for each segment reported. Alternatively, slopes can be reported in segments divided by breaks in slope.*

7) A narrative of the species and distribution of existing vegetation within the buffer

D) The buffer plan shall be submitted in conjunction with the required grading plan for any development,and the forest buffer should be clearly delineated on the final grading plan.
E) Permanent boundary markers, in the form of signage approved by _____(*natural resources or planning agency*), shall be installed prior to final approval of the required clearing and grading plan. Signs shall be placed at the edge of the middle zone (See Section VI.I).

Section VI. Design Standards for Forest Buffers

A) A forest buffer for a stream system shall consist of a forested strip of land extending along both sides of a stream and its adjacent wetlands, floodplains, or slopes. The forest buffer width shall be adjusted to include contiguous sensitive areas, such as steep slopes or erodible soils, where development or disturbance may adversely affect water quality, streams, wetlands, or other waterbodies.

B) The forest buffer shall begin at the edge of the stream bank of the active channel.
C) The required width for all forest buffers (i.e., the base width) shall be a minimum of 100 feet, with the requirement to expand the buffer depending on
   1) Stream order
   2) Percent slope
   3) 100-year floodplain
   4) Wetlands or critical areas

☞ *The width of the stream buffer varies from 20 feet to 200 feet in ordinances throughout the United States (Heraty, 1993). The width chosen by a jurisdiction will depend on the sensitivity and characteristics of the resource being protected and the political realities in the community.*

B) In third-order and higher streams, 25 feet shall be added to the base width of the forest buffer.
C) The forest buffer width shall be modified if steep slopes are within close proximity to the stream and drain into the stream system. In those cases, the forest buffer width may be adjusted.

☞ *Several methods may be used to adjust buffer width for steep slopes. Two examples ifollow:*

Method A

Percent	Width of Buffer
15%-17%	add 10 feet
18%-20%	add 30 feet
21%-23%	add 50 feet
24%-25%	add 60 feet

Method B

	Type of Stream Use	
Percent Slope	Water Contact Recreational Use	Sensitive Stream Habitat
0% to 14%	no change	add 50 feet
15% to 25%	add 25 feet	add 75 feet
Greater than 25%	add 50 feet	add 100 feet

D) Forest buffers shall be extended to encompass the entire 100-year floodplain and a zone with a minimum width of 25 feet beyond the edge of the floodplain.
E) When wetland or critical areas extend beyond the edge of the required buffer width, the buffer shall be adjusted so that the buffer consists of the extent of the wetland plus a 25-foot zone extending beyond the wetland edge.

H) Water Pollution Hazards
The following land uses and/or activities are designated as potential water pollution hazards

and must be set back from any stream or waterbody by the distance indicated below:

1) Storage of hazardous substances—(150 feet)
2) Aboveground or underground petroleum storage facilities—(150 feet)
3) Drainfields from onsite sewage disposal and treatment systems (i.e., septic systems)—(100 feet)
4) Raised septic systems—(250 feet)
5) Solid waste landfills or junkyards—(300 feet)
6) Confined animal feedlot operations—(250 feet)
7) Subsurface discharges from a wastewater treatment plant—(100 feet)
8) Land application of biosolids—(100 feet)

☞ *For surface water supplies, the setbacks should be doubled.*

☞ *A community should carefully consider which activities or land uses should be designated as potential water pollution hazards. The list of potential hazards shown above is not exhaustive, and others may need to be added depending on the major pollutants of concern and the uses of water.*

I) The forest buffer shall be composed of three distinct zones, with each zone having its own set of allowable uses and vegetative targets as specified in this ordinance. (See Figure 2.)

☞ *Although a three-zone buffer system is highly recommended, the widths and specific uses allowed in each zone may vary between jurisdictions.*

I) Zone 1, Streamside Zone
   a) Protects the physical and ecological integrity of the stream ecosystem.
   b) Begins at the edge of the stream bank of the active channel and extends a minimum of 25 feet from the top of the bank.
   c) Allowable uses within this zone are highly restricted to
      i) Flood control structures
      ii) Utility right of ways
      iii) Footpaths
      iv) Road crossings, where permitted
   d) Target for the streamside zone is undisturbed native vegetation.

☞ *This ordinance assumes that the native vegetation in the stream corridor is forest. In some regions of the United States, other vegetation such as prairie may be native. See the Omaha, Nebraska, buffer ordinance for an example of a stream buffer ordinance that protects nonforested systems.*

2) Zone 2, Middle Zone
   a) Protects key components of the stream and provides distance between upland development and the streamside zone.
   b) Begins at the outer edge of the streamside zone and extends a minimum of 50 feet plus any additional buffer width as specified in this section.
   c) Allowable uses within the middle zone are restricted to
      i) Biking or hiking paths
      ii) Stormwater management facilities, with the approval of _____ *(local agency responsible for stormwater*).

iii) Recreational uses as approved by _____ (*planning agency*).
iv) Limited tree clearing with approval from _____ (*forestry agency or planning agency*).

d) Targets mature native vegetation adapted to the region.

3) Zone 3, Outer Zone
a) Prevents encroachment into the forest buffer and filters runoff from residential and commercial development.
b) Begins at the outward edge of the middle zone and provide a minimum width of 25 feet between Zone 2 and the nearest permanent structure.
c) Restricts septic systems, permanent structures, or impervious cover, with the exception of paths.
d) Encourages the planting of native vegetation to increase the total width of the buffer.

Section VII. <u>Buffer Management and Maintenance</u>

A) The forest buffer, including wetlands and floodplains, shall be managed to enhance and maximize the unique value of these resources. Management includes specific limitations on alteration of the natural conditions of these resources. The following practices and activities are restricted within Zones 1 and 2 of the forest buffer, except with approval by _____ _____ (*forestry, planning or natural resources agency*)
1) Clearing of existing vegetation
2) Soil disturbance by grading, stripping, or other practices
3) Filling or dumping
4) Drainage by ditching, underdrains, or other systems
5) Use, storage, or application of pesticides, except for spot spraying of noxious weeds or non-native species consistent with recommendations of _____(*forestry agency*)
6) Housing, grazing, or other maintenance of livestock
7) Storage or operation of motorized vehicles, except for maintenance and emergency use approved by _____(*forestry, planning, or natural resources agency*)

B) The following structures, practices, and activities are permitted in the forest buffer, with specific design or maintenance features, subject to the review of _____ (*forestry, planning, or natural resources agency)*:
1) Roads, bridges, paths, and utilities:
a) An analysis needs to be conducted to ensure that no economically feasible alternative is available.
b) The right-of-way should be the minimum width needed to allow for maintenance access and installation.
c) The angle of the crossing shall be perpendicular to the stream or buffer to minimize clearing requirements
d) The minimum number of road crossings should be used within each subdivision, and no more than one fairway crossing is allowed for every 1,000 feet of buffer.
2) Stormwater management:
e) An analysis needs to be conducted to ensure that no economically feasible alternative is available and that the project either is necessary for flood control or significantly improves the water quality or habitat in the stream.
f) In new developments, onsite and nonstructural alternatives will be preferred over larger facilities within the stream buffer.

g) When constructing stormwater management facilities (i.e., BMPs), the area cleared will be limited to the area required for construction and adequate maintenance access as outlined in the most recent edition of _____ (*refer to stormwater manual*).

☞ *Rather than placing specific stormwater BMP design criteria in an ordinance, it is often preferable to reference a manual. With this approach, specific design information can be changed over time without going through the formal process needed to change ordinance language.*

☞ *The* Maryland Stormwater Design Manual *is one example of an up-to-date stormwater design manual. For more information, go to www.mde.state.md.us. Under topics, choose "Stormwater Design Manual."*

h) Material dredged or otherwise removed from a BMP shall be stored outside the buffer.

3) Stream restoration projects, facilities, and activities approved by _____ (*forestry, planning, or natural resources agency*) are permitted within the forest buffer.
4) Water quality monitoring and stream gauging are permitted within the forest buffer, as approved by _____(*forestry, planning or natural resources agency*):.
5) Individual trees within the forest buffer that are in danger of falling, causing damage to dwellings or other structures, or causing blockage of the stream may be removed.
6) Other timber cutting techniques approved by the agency may be undertaken within the forest buffer under the advice and guidance of _____ (*state or federal forestry agency*) if necessary to preserve the forest from extensive pest infestation, disease infestation, or threat from fire.

C) All plans prepared for recording and all right-of-way plans shall clearly
1) Show the extent of any forest buffer on the subject property
2) Label the forest buffer
3) Provide a note to reference any forest buffer stating: “There shall be no clearing, grading, construction or disturbance of vegetation except as permitted by the agency.”
4) Provide a note to reference any protective covenants governing all forest buffer areas stating: “Any forest buffer shown hereon is subject to protective covenants that may be found in the land records and that restrict disturbance and use of these areas.”

D) All forest buffer areas shall be maintained through a declaration of protective covenant, which is required to be submitted for approval by _____ (*planning board or agency*). The covenant shall be recorded in the land records and shall run with the land and continue in perpetuity.

☞ *This protective covenant can be kept either by the local government agency responsible for management of environmental resources or by an approved nonprofit organization. An example conservation easement is included later in this section.*

E) All lease agreements must contain a notation regarding the presence and location of protective covenants for forest buffer areas and shall contain information on the management and maintenance requirements for the new property owner.

F) An offer of dedication of a forest buffer area to the agency shall not be interpreted to mean that this automatically conveys to the general public the right of access to this area.

G) _____ (*responsible individual or group*) shall inspect the buffer annually and immediately following severe storms for evidence of sediment deposition, erosion, or concentrated flow channels and corrective actions taken to ensure the integrity and functions

of the forest buffer.

☞ *A local ordinance will need to designate the individual or group responsible for buffer maintenance. Often, the responsible party will be identified in protective covenants associated with the property.*

H) Forest buffer areas may be allowed to grow into their vegetative target state naturally, but methods to enhance the successional process such as active reforestation may be used when deemed necessary by _____ (*natural resources or forestry agency*) to ensure the preservation and propagation of the buffer area. Forest buffer areas may also be enhanced through reforestation or other growth techniques as a form of mitigation for achieving buffer preservation requirements.

☞ *Explicit forestry management criteria are often included in a forestry or natural resources conservation ordinance. An example forest conservation ordinance from Frederick County, Maryland is included in the miscellaneous ordinances section of this site.*

Section VIII. Enforcement Procedures

A) _____ (*director of responsible agency)* or his/her designee is authorized and empowered to enforce the requirements of this ordinance in accordance with the procedures of this section.

B) If, upon inspection or investigation, the director or his/her designee is of the opinion that any person has violated any provision of this ordinance, he/she shall with reasonable promptness issue a correction notice to the person. Each such notice shall be in writing and shall describe the nature of the violation, including a reference to the provision within this ordinance that has been violated. In addition, the notice shall set a reasonable time for the abatement and correction of the violation.

C) If it is determined that the violation or violations continue after the time fixed for abatement and correction has expired, the director shall issue a citation by certified mail to the person who is in violation. Each such notice shall be in writing and shall describe the nature of the violation, including a reference to the provision within this ordinance that has been violated and what penalty, if any, is proposed to be assessed. The person charged has 30 days within which to contest the citation or proposed assessment of penalty and to file a request for a hearing with the director or his/her designee. At the conclusion of this hearing, the director or his/her designee will issue a final order, subject to appeal to the appropriate authority. If, within 30 days from the receipt of the citation issued by the director, the person fails to contest the citation or proposed assessment of penalty, the citation or proposed assessment of penalty shall be deemed the final order of the director.

B) Any person who violates any provision of this ordinance may be liable for any cost or expenses incurred as a result thereof by the agency.

C) Penalties that may be assessed for those deemed to be in violation may include the following:

1) A civil penalty not to exceed $1,000.00 for each violation. Every day that such violation(s) continue will be considered a separate offense.
2) A criminal penalty in the form of a fine of not more than $1,000.00 for each violation, imprisonment for not more than 90 days, or both. Every day that such violation(s) continue will be considered a separate offense.
3) Anyone who knowingly makes any false statements in any application, record, or plan required by this ordinance shall upon conviction be punished by a fine of not more than $1,000.00 for each violation, imprisonment for not more than 30 days, or both.

☞ *Specific penalties will vary between communities, and should reflect realistically enforceable penalties given the political realities of a jurisdictin.*

F) In addition to any other sanctions listed in this ordinance, a person who fails to comply with the provisions of this buffer ordinance shall be liable to the agency in a civil action for damages in an amount equal to twice the cost of restoring the buffer. Damages that are recovered in accordance with this action shall be used for the restoration of buffer systems or for the administration of programs for the protection and restoration of water quality, streams, wetlands, and floodplains.

Section IX. **Waivers/Variances**

A) This ordinance shall apply to all proposed development except for activities that were completed prior to the effective date of this ordinance and had received the following:
   1) A valid, unexpired permit in accordance with development regulations
   2) A current, executed public works agreement
   3) A valid, unexpired building permit
   4) A waiver in accordance with current development regulations.

B) The director of the agency may grant a variance for the following:
   1) Those projects or activities for which it can be demonstrated that strict compliance with the ordinance would result in a practical difficulty or financial hardship
   2) Those projects or activities serving a public need where no feasible alternative is available
   3) The repair and maintenance of public improvements where avoidance and minimization of adverse impacts to nontidal wetlands and associated aquatic ecosystems have been addressed
   4) Those developments which have had buffers applied in conformance with previously issued requirements

C) Waivers for development may also be granted in two additional forms, if deemed appropriate by the director:
   1) The buffer width made be reduced at some points as long as the average width of the buffer meets the minimum requirement. This averaging of the buffer may be used to allow for the presence of an existing structure or to recover a lost lot, as long as the streamside zone (Zone I) is not disturbed by the reduction and no new structures are built within the 100-year floodplain.
   2) _____ (*planning agency*) may offer credit for additional density elsewhere on the site in compensation for the loss of developable land due to the requirements of this ordinance. This compensation may increase the total number of dwelling units on the site up to the amount permitted under the base zoning.

D) The applicant shall submit a written request for a variance to the director of the agency. The application shall include specific reasons justifying the variance and any other information necessary to evaluate the proposed variance request. The agency may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal impact will occur as a result of the project or development.

E) In granting a request for a variance, the director of the agency may require site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse impacts on water quality, streams, wetlands, and floodplains.

Section X. Conflict With Other Regulations

Where the standards and management requirements of this buffer ordinance are in conflict with other laws, regulations, and policies regarding streams, steep slopes, erodible soils, wetlands, floodplains, timber harvesting, land disturbance activities, or other environmental protective measures, the more restrictive shall apply.

Figure 1: Stream Order (Source: Schueler, 1995)

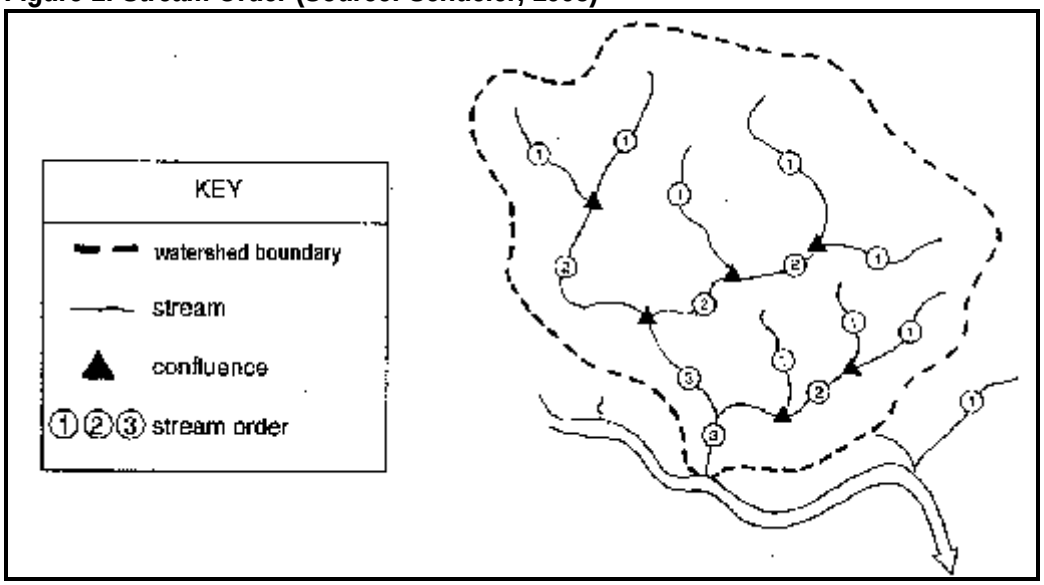
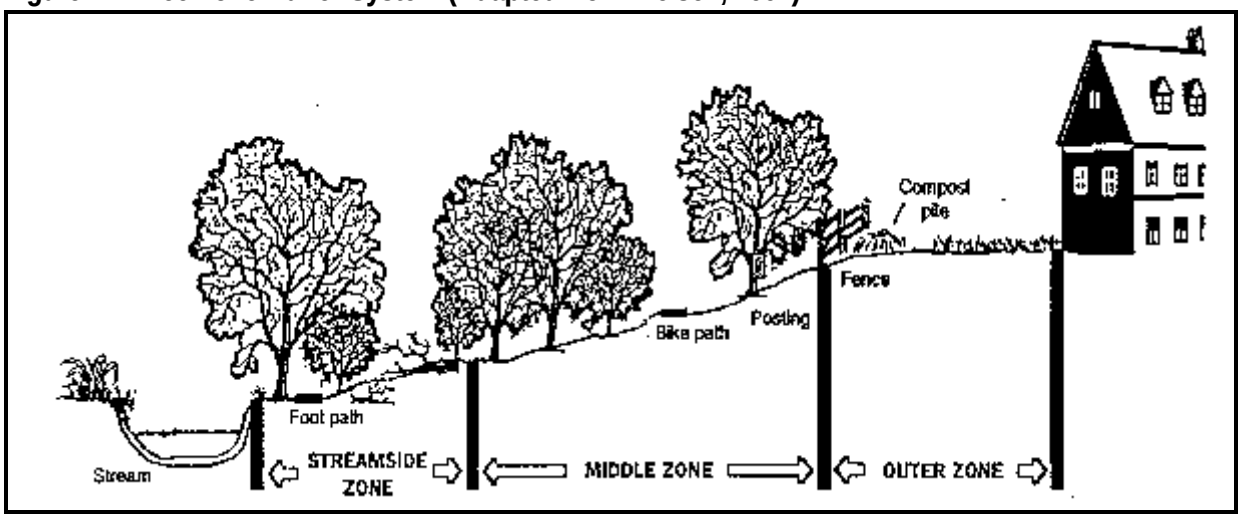


Figure 2: Three Zone Buffer System (Adapted from Welsch, 1991)



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CHAPTER 21.07: DEVELOPMENT AND DESIGN STANDARDS

CHAPTER 21.07: DEVELOPMENT AND DESIGN STANDARDS

21.07.010 GENERAL PROVISIONS

A. Purpose

The development and design standards set forth in this chapter shall apply to the physical layout and design of development in the municipality. These provisions address the physical relationship between development and adjacent properties, public streets, neighborhoods, and the natural environment, in order to implement the comprehensive plan vision for a more attractive, efficient, and livable community. The specific purposes of this chapter include:

1. To encourage the proper use of the land by promoting an appropriate balance between the built environment and the preservation and protection of open space and natural resources;

2. To provide standards that reasonably balance community goals, economic growth, quality of life, and development costs;

3. Promote the protection of natural features and resources, water quality and hydrological functions, and important or hazardous environmental areas;

4. To provide appropriate standards to ensure a high quality appearance for the municipality and promote good design while also allowing flexibility, individuality, creativity, and artistic expression;

5. To provide development and design standards that address and are tailored to the municipality's northern climate and winter city character;

6. To protect and enhance residential neighborhoods, commercial districts, and other areas by encouraging physical development that is of high quality and is compatible with the character, scale, and function of the surrounding area;

7. To encourage developments that relate to adjoining public streets, open spaces, and neighborhoods with building orientation and physical connections that contribute to the surrounding network of streets, walkways, pathways, and trails.

B. Buildings to Have Access

Every building shall be on a lot abutting on a constructed public street with principal access to such street, or with access to a constructed private street approved by the appropriate fire authority, public works department, and community development department. This standard may be waived by approval of the municipal engineer, traffic engineer, and the director.

C. Addresses

It is the responsibility of the property owner to affix street address numbers assigned by the municipality to the affected building(s) or on another structure (natural or otherwise) nearer to the street, to be plainly visible and legible from the street named in the address. Sub-addresses shall also be visible when approaching the building and on each applicable entrance.

D. Alternative Equivalent Compliance

1. Purpose

Alternative equivalent compliance is a procedure that allows development to meet the intent of this chapter through an alternative design. The procedure permits a site-specific plan that is equal to or better than the strict application of a design standard specified in this title. This procedure is not intended as a substitute for a variance or administrative modification or as a vehicle for relief from standards in this chapter.

2. Applicability
The alternative equivalent compliance procedure shall be available only for the following sections of this title:

a. Subsection 21.06.030D.8., *Height Transitions for Neighborhood Compatibility*;

b. Subsection 21.07.090M.3., *Structured Parking; Façade Treatment*;

c. Section 21.07.110, *Residential Design Standards*;

d. Section 21.07.120, *Large Commercial Establishments*; and

e. Subsection 21.09.080, *Building Design Standards* (Girdwood).

3. Pre-Application Conference Required
An applicant proposing to use alternative equivalent compliance under this section shall request and attend a pre-application conference prior to submitting the site plan for the development, to determine the preliminary response from the director. Based on that response, the site plan application shall include sufficient explanation and justification, in both written and graphic form, for the alternative compliance requested.

4. Decision-Making Responsibility
Final approval of alternative equivalent compliance under this section shall be the responsibility of the decision-making body responsible for deciding upon the application. By-right projects that are reviewed for compliance with this title through the land use permit process, yet which are proposing alternative equivalent compliance, shall receive written approval of the alternative equivalent compliance from the director.

5. Timing of Decision
If the director is the decision-making body, the director shall render a written decision within 21 days of receipt of an application for alternative compliance. Should a decision not be rendered within 30 days, the application shall stand as approved.

6. Criteria
To grant a request for alternative equivalent compliance, the decision-making body shall find that all of the following criteria are met:

a. The proposed alternative design achieves the intent of the subject design standard to the same or better degree than the subject standard.

b. The proposed alternative design achieves the goals and policies of the comprehensive plan to the same or better degree than the subject standard.

c. The proposed alternative design results in benefits to the community that are equivalent to or better than compliance with the subject design standard.

7. Effect of Approval
Alternative compliance shall apply only to the specific site for which it is requested and does not establish a precedent for assured approval of other requests.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13)

21.07.020 NATURAL RESOURCE PROTECTION

A. Purpose

The municipality contains many natural amenities including streams, natural drainages, wildlife habitat areas, water bodies, scenic features such as mountains and coastal areas, wetlands, and hillsides, as well as significant amounts of native forest, tree cover, and open space, all of which contribute to the municipality's character, public health, quality of life, and property values. The

requirements of this section are intended to ensure that the natural character of the municipality is reflected in patterns of development and redevelopment, where feasible and appropriate.

B. Stream, Water Body, and Wetland Protection

1. Purpose

The following requirements are intended to promote, preserve, and enhance the important hydrologic, biological, ecological, aesthetic, recreational, and educational functions provided by streams, associated riparian areas, water bodies, and wetlands, particularly by minimizing impervious surface and by reducing erosion and the contamination of streams, wetlands, and water bodies by pollutants or invasive plants.

It is the intent of the municipality to follow the adoption of the Title 21 Rewrite Project (2002-2012) within six months with a separate public process to complete the development of a stream protection setback amendment to title 21. Objectives include:

a. To provide wider stream protection setbacks; and

b. To provide relief for property that would be impacted or rendered nonconforming by such wider setbacks.

2. Applicability

This subsection 21.07.020B. shall apply to new development, except for the following development or activities:

a. Maintenance and repair of existing public roads, utilities, and other public facilities within an existing right-of-way or easement, or otherwise within a setback;

b. Flood prevention or rehabilitation work carried out by a government agency or approved by a government agency;

c. Maintenance and repair of flood control structures and activities in response to a flood emergency; and

d. Wetland, stream channel, and wildlife habitat restoration, construction, and/or enhancement that improves or restores the wetland or stream functions, provided that the proposed activity is approved by the appropriate agency such as the U.S. Corps of Engineers or the Alaska department of fish and game.

3. Relationship to Other Regulations

a. This subsection 21.07.020B. does not repeal or supersede any existing federal, state, or local laws, easements, covenants, or deed restrictions. When this subsection imposes a higher or more restrictive standard than found in another applicable ordinance, statute, or regulation, this subsection shall apply.

b. No person shall engage in any activity that will disturb, remove, drain, fill, dredge, clear, destroy, or alter any area, including vegetation, within a wetland that falls in the jurisdiction of the federal government and its agencies, except as may be expressly allowed under a permit issued by the appropriate federal agency.

c. The decision-making body may grant final approval to any development or activity, including subdivisions and rezonings, in a wetland that falls within the federal government's jurisdiction conditioned upon all necessary federal approvals and permits having been obtained.

4. Buffer/Setback Requirements

a. ***Water Courses***

i. In all zoning districts except for the R-10 district and the area covered by the *Hillside District Plan*, buildings, accessory structures, and parking lots

shall be set back at least 25 feet horizontally from the ordinary high-water mark on each side of streams or, if not readily discernible, from each side of the defined bank of the stream. In the R-10 district and in the area covered by the *Hillside District Plan*, the setback shall be 50 feet. Except as provided in B.6. below, no disturbance is permitted in the setback area.

ii. In all zoning districts, buildings, accessory structures, and parking lots shall be set back at least 10 feet horizontally from the edge of each side of above-ground drainageways and ephemeral channels defined or verified by the public works department. Except as provided in B.6. below, no disturbance is permitted in the 10-foot setback area. The public works department may require a greater setback, if in their professional judgment, the additional setback is necessary to provide for groundwater discharge zones or infiltration areas, the disturbance of which would alter natural flow characteristics.

iii. Segments of streams or tributaries that are contained underground in pipes or culverts have no setback.

iv. For parcels where there are wetlands contiguous with a stream, setback requirements are listed in table 2 of the *Anchorage Wetlands Management Plan*.

b. ***Alternate Setback Option for Stream Corridor***

i. A stream channel alteration or restoration project may create a "stream corridor" containing appropriate meander widths based on topographic conditions and hydraulic design. Where established, the "stream corridor" shall be the stream setback for the purposes of municipal code.

ii. The stream corridor width shall be subject to public works department approval.

iii. Stream corridor widths shall be based on appropriate reference stream reaches, considering slope, soils, discharge, elevation, and channel pattern and function and shall not be less than 100 feet wide.

iv. The design of the new stream channel may meander within this corridor. Channel alteration design shall comply with subsections 6.c. and 6.d. below. The ordinary high water mark of the designed channel shall not come within 25 feet of the edge of the corridor, and not more than 20 percent of its length shall be within 25 to 35 feet of the edge of the corridor.

v. Before site work begins, the stream corridor shall be established by a recorded survey or an approved plat.

c. ***Wetlands***

i. To the maximum extent feasible, class A and those class B wetlands which, as a result of a U.S. Corps of Engineers decision or permit condition, are not authorized for development, shall be platted into separate tracts and not included as part of a development lot. Wetland classes are defined and delineated in the *Anchorage Wetlands Management Plan*.

ii. Except as provided in B.6. below, all buildings, accessory structures, fills and other storage of materials, and parking lots shall be set back at least 15 feet horizontally from the delineated edge of all class A wetlands, and all portions of class B and C wetlands not authorized for development; no disturbance is permitted in the 15-foot setback area.

d. ***Water Bodies***

In all districts, buildings, accessory structures, and parking lots shall be set back at least 25 feet horizontally from the ordinary high water mark of water bodies. The setback shall be vegetated, except for minimal areas to allow for access to those uses such as docks, boathouses, and floatplane storage that require direct access to a water body by their very nature or function.

e. ***Credit for Other Requirements of this Title***

Stream, water body, and wetland setback areas shall be credited toward any applicable private open space requirements or landscaping requirements only if such setback areas serve the purposes of those requirements as set forth in this title.

5. Boundary Delineation

a. ***Official Definitions and Standards***

i. In cases where water courses or water bodies are not mapped and recorded in official plans or other documents, delineation of such features shall be made according to public works department procedures, and shall be subject to formal verification by the public works department.

ii. In cases where wetlands are not mapped and recorded in official plans or other documents, including the *Anchorage Wetlands Management Plan*, delineation of such features shall be performed using procedures as described by the U.S. Corps of Engineers. Delineations shall be subject to formal verification by the U.S. Corps of Engineers.

b. ***Water Course Boundaries***

Water course boundaries shall be delineated at the ordinary high-water mark or, if not readily discernible, the defined bank of the stream, as those terms are defined in chapter 21.14. In those instances where the defined bank of the water course is not readily discernible, the public works department shall establish the effective ordinary high-water mark. The public works department shall maintain the official record of all water course boundaries.

c. ***Wetland Boundaries***

i. *Mapped Wetlands*

Boundary delineation of wetlands shall be established by reference to the *Anchorage Wetlands Management Plan*, which is available for reference in the department and which is hereby adopted and incorporated into this title by reference. Plats shall depict class A and B wetland boundaries, and boundaries of class C wetlands that are not authorized for development.

ii. *Unmapped Wetlands*

The review of a development proposal may discover a potential wetland that has not been mapped or for which the boundaries have not been clearly established. In such instances, the boundaries of the wetland shall be delineated according to subsection 5.a.ii. above. Any new wetland boundaries delineated herein shall be submitted to the U.S. corps of engineers for approval.

6. Development Standards

a. ***Activities, Uses, and Structures Allowed in a Required Water Course or Wetland Setback With Prior Approval, As Noted***

i. With the appropriate approvals and/or permits and in accordance with the conditions of subsection 6.c. below, maintenance, including placement of riprap, debris removal, glaciation control, sediment removal, protection of adjacent or downstream property from flooding, soil stabilization, and

erosion control, may be performed within the water course and/or the setbacks described in B.4. above. Appropriate approvals and/or permits may include a U.S. Corps of Engineers permit, a municipal flood hazard permit, or a storm water treatment plan approval.

ii. Channel alteration, including restoration and relocation projects, with appropriate state and federal permits and in accordance with the conditions of 6.c. below, are allowed.

iii. Culvertization of water courses, with any appropriate permits, is allowed.

iv. Redevelopment of structures or uses existing on January 1, 2014 is allowed in the setback where:

(A) The director determines there is no practical or feasible alternative to encroaching into the setback; and

(B) The redevelopment does not increase the encroachment over the existing situation.

v. On undeveloped platted lots existing before January 1, 2014 where the director determines the setback precludes practical or feasible development of the lot, the director shall approve a site plan that allows but minimizes encroachment into the setback.

b. ***Activities, Uses, and Structures Allowed in a Required Water Course or Wetland Setback Without Prior Approval, Unless Specifically Noted***

i. The following structures and uses of land or structures are permitted generally perpendicular to the setback or stream edge within the stream, drainageway, ephemeral channel, wetland, and water body setback, where it is necessary in order to cross or enter the feature:

(A) Roads, driveways, trails, and other transportation and public recreation facilities;

(B) Utility facilities pursuant to 6.e. below;

(C) Drainage facilities, in accordance with subsection 21.07.040 and approved by the public works department.

ii. The following structures and uses of land or structures are permitted parallel to the stream within the outer 10 feet (15 feet in the R-10 district and in the area covered by the *Hillside District Plan*) of the setback:

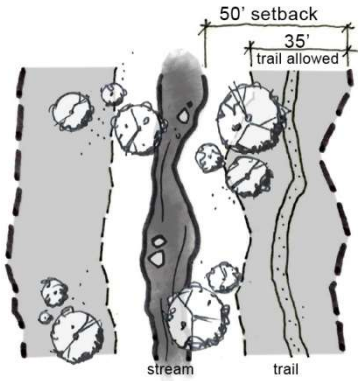
(A) Public recreation facilities such as trails;

(B) Utility facilities pursuant to 6.e. below;

(C) Drainage facilities, in accordance with subsection 21.07.040 and approved by the public works department.

The structures and uses listed in subsections ii.(A)-(C) above are allowed provided that utility facilities and applicable drainage facilities are buried, and provided that all disturbed areas shall be revegetated with trees, shrubs, and ground cover similar to natural vegetation in the area. Revegetation is to occur during the same growing season, except as otherwise permitted by the director.

iii. Only in the area covered by the *Hillside District Plan*, trails are permitted parallel to the stream within the outer 35 feet of the setback. Through the design and permitting process, trails may be located closer to the stream for a justified reason, such as overcoming a physical, topographical, or land ownership constraint, or taking advantage of a viewpoint.



iv. All disturbed areas associated with permitted activities shall be revegetated with landscaping similar to the natural vegetation of the area. Revegetation shall occur during the same growing season as the permitted activity, unless otherwise permitted by the director.

c. ***Conditions***

All work within a water course or water course setback, whether permitted by-right or allowed through a specific approval process, shall meet the following conditions, along with any other required permits:

i. Materials used or the removal of ground cover shall not create turbidity or other water quality problems;

ii. There shall be no increase in flooding or erosion problems upstream or downstream;

iii. If applicable, flow lines of the altered section of the water course shall match those in the existing water course at the endpoints of the alteration;

iv. If applicable, the gradient/meander balance, grade control, and bed stability shall be adequate to maintain the natural stream function of water conveyance and sediment transport, in accordance with the judgment of the public works department; and

v. If applicable, the alteration shall have no negative effect on fish habitat.

d. ***Prohibited Activities***

i. No person shall engage in any activity that will disturb, remove, fill, drain, dredge, clear, destroy, or alter an area, including vegetation, within water courses, water body edges, wetlands, or their associated setback areas, except as may be expressly allowed in this section or title.

ii. Except as allowed in 6.a. and 6.b. above, channel alteration is prohibited unless required in emergency situations. In emergency situations, the municipal engineer shall be notified on the next business day after channel alteration has begun. After inspection, the municipal engineer shall prescribe any measures necessary to meet the conditions of 6.c. above. For the purposes of this standard, an "emergency" is a situation which

would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken immediately.

iii. No storage or processing of hazardous materials or other substances that would constitute a violation of AMC chapter 15.40 is permitted.

e. ***Utilities***

Utilities and potable water wells may be allowed in a setback area only if the decision-making body determines that there is no practical alternative. Any disturbance of the setback area shall be reclaimed by regrading to original contours and revegetation with native species. Provisions for reclamation of the disturbed area shall be included in any development or improvements agreement for the project, with adequate collateral to guarantee the reclamation will be completed. Utility corridors in setback areas shall be located at the outside edge of the area or if crossing the setback laterally shall disturb only the minimum area necessary to install the utility. Access roads for maintenance of utilities shall be located outside the setback area to the maximum extent feasible. Access for maintenance of utilities in setback areas shall be at specific points rather than parallel to the utility corridor whenever possible.

f. ***Recreation, Education, or Scientific Activities***

Structures and improvements for recreational, educational, or scientific activities such as trails, swimming beaches, docks, fishing access, and wildlife management and viewing may be permitted in a setback area by the appropriate government agency.

7. Preservation and Restoration of Vegetation

All existing vegetation within the stream or wetland setback area shall be preserved and, where necessary to repair damaged riparian areas, supplemented with additional native planting and landscaping. The removal of trees or vegetation that are a threat to the public health, safety, or welfare; the removal of species identified as invasive by the state of Alaska; or the removal of dead or naturally fallen trees or vegetation, shall be exempt from this requirement.

8. Implementation of Anchorage Wetlands Management Plan

a. ***Zoning and Platting Actions***

Zoning and platting actions taken under this title shall be consistent with the *Anchorage Wetlands Management Plan*.

b. ***Application of Plan to Approved Projects***

Conditional uses and preliminary plats approved prior to March 12, 1996, the date of adoption of the revised *Anchorage Wetlands Management Plan*, shall not have additional conditions imposed upon them as a result of requirements of the plan except as follows:

i. The "A" designation shall apply regardless of prior approvals.

ii. Approved plats or conditional uses in wetlands that are returned to the platting authority or planning and zoning commission for major amendment may be examined for conformity with goals and enforceable policies of the *Anchorage Wetlands Management Plan*.

iii. A new U.S. Corps of Engineers permit is required.

C. Steep Slope Development

1. Purpose

The purpose of this subsection 21.07.020C. is to establish standards that help achieve the following objectives for development on steep slopes:

a. Prevent soil erosion and landslides;

b. Provide safe circulation of vehicular and pedestrian traffic to and within hillside areas and to provide access for emergency vehicles necessary to serve the hillside areas;

c. Encourage only minimal grading that relates to the natural contour of the land and discourage mass grading of large pads and excessive terracing;

d. Encourage building types, grading ***design***, lot sizes, site design, density, arrangement, and spacing of buildings in developments in sloped areas that integrate into the natural terrain with minimal re-contouring, in accordance with adopted goals and policies;

e. Encourage innovative architectural, landscaping, circulation, and site design;

f. Encourage the protection of visually significant and/or prominent natural features, such as ridgelines and rock outcroppings;

g. Incorporate drainage design that does not adversely impact neighboring or nearby properties, downstream properties, receiving waters, and public infrastructure; and

h. Encourage the retention of natural, indigenous vegetation that provides wildlife habitat, helps retain runoff, and maintains the area's visual character.

2. Applicability

a. Except as noted in subsection 2.b. and 2.c below, any lot with an average slope of 20 percent or greater, or where adverse conditions associated with slope stability, erosion, or sedimentation are present as determined by the municipal engineer, shall comply with the standards of this subsection 21.07.020C. Lots being subdivided shall comply with chapter 21.08, including subsection 21.08.030H., *Subdivisions on Slopes*, if applicable.

b. This section applies to naturally occurring steep slopes and not to those that result from human activities, such as gravel extraction.

c. Buildings within Class A zoning districts (subsection 21.08.050B.) are exempt from these requirements.

3. Standards

Except as allowed in subsection C.4. below, all proposed development subject to this section shall comply with the following standards.

a. ***Determination of Original/Natural Grade***

Original/natural grade shall be as defined in chapter 21.14. If there has been previous development on the lot (e.g., gravel extraction), the director shall determine original/natural grade, taking into account the previous development, the existing grade of surrounding lots, the availability of information on pre-development grade, and the feasibility of using pre-development grade.

b. ***Slopes Greater than 30 Percent***

That contiguous portion of any lot which is 5,000 square feet or larger with slopes steeper than 30 percent shall remain undisturbed, except as allowed in subsection C.4. below.

c. ***Site Disturbance Envelope***

i. There shall be a site disturbance envelope on each applicable lot. Earth disturbance and vegetation clearing shall be limited to the site disturbance envelope. Clearing, grubbing, or grading outside the site disturbance envelope is prohibited except to modify fuels in order to reduce fire risk, or to accommodate utility service connections.

ii. The size of the site disturbance envelope shall be as follows:

(A) Lots less than 40,000 square feet: 10,000 square feet maximum or 50 percent of the lot area maximum, whichever is less.

(B) Lots 40,000 square feet to two acres in area: 20,000 square feet maximum.

(C) Lots over two acres but less than five acres: 30,000 square feet maximum.

(D) Lots five acres or greater: 40,000 square feet maximum.

iii. Areas outside the site disturbance envelope shall not be used for stockpiling materials or excess fill, construction vehicle access, storage of vehicles during construction, or similar uses. Temporary construction fencing shall be installed around the perimeter of the site disturbance envelope, to be removed after the final certificate of zoning compliance is issued.

iv. The front setback of the lot may be reduced to 10 feet.

v. If the average slope of the site disturbance envelope is less than 20 percent, the development is exempt from subsections 3.e., 3.f., 3.g., 3.h., and 3.i.

d. ***Cutting, Grading, and Filling***

i. Cutting and grading to create benches or pads for buildings or structures shall be limited to within the site disturbance envelope.

ii. Cut and fill slopes shall be entirely contained within the site disturbance envelope. The toe of any fill slope not utilizing an engineered retaining structure, and any engineered retaining structure shall be a minimum of 15 feet from any property line, except for the property line abutting the street from which driveway access is taken.

iii. Cut and fill slopes shall be designed to provide a natural transition into the existing terrain by feathering and rounding.

e. ***Raising or Lowering of Natural Grade***

The original, natural grade of a lot shall not be raised or lowered more than four feet at any point for construction of any structure or improvement, except:

i. The site's original grade may be raised or lowered a maximum of six feet if retaining walls are used to reduce the steepness of constructed slopes,

provided that the retaining walls comply with the requirements set forth in this subsection.

ii. As necessary to construct a driveway from the street to a garage or parking lot, grade changes or retaining walls up to six feet may be allowed.

iii. For the purposes of this subsection 21.07.020C.3.e., basements and buildings set into a slope are not considered to lower the natural grade within their footprint.

f. ***Retaining Walls***

Retaining walls may be used to maximize the usable area on a lot within the site disturbance envelope. Generally, a retaining wall shall be no higher than six feet, except that a wall varied in height to accommodate a variable slope shall have an average height no greater than six feet and a maximum height no greater than eight feet in any 100-foot length. Parallel retaining walls may be used to overcome steep slopes, provided the following standards are met:

i. The minimum distance between walls shall be six feet;

ii. The maximum allowable slope between walls shall be 3H:1V; and

iii. The area between the walls shall be landscaped with one of the following per 20 linear feet, measured along the length of the lower retaining wall:

(A) One tree and six shrubs; or

(B) Three shrubs that are at least five feet high at the time of planting, and four other shrubs meeting the standards of section 21.07.080.

A higher wall is permitted:

i. Where used internally at the split between one- and two-story portions of a building; and

ii. Where substantially hidden from public view at the rear of a building, where it may not exceed the eave height of the building.

g. ***Natural Drainage Patterns***

i. Site design shall not change natural drainage patterns, except as provided below.

ii. All grading and drainage shall comply with section 21.07.040, title 23, the *Design Criteria Manual* (current approved edition), and the municipality's *Storm Water Treatment Plan Review Guidance Manual*.

iii. Except where otherwise provided in this section, development shall preserve the natural surface drainage pattern unique to each site as a result of topography and vegetation. Grading shall ensure that drainage flows away from all structures. Natural on-site drainage patterns may be modified on site only if the applicant shows that there will be no significant adverse environmental impacts on site or on adjacent properties. If natural drainage patterns are modified, appropriate stabilization techniques shall be employed.

iv. Development shall not adversely impact adjacent and surrounding drainage patterns.

h. ***Ground Cover and Revegetation***

Ground cover and vegetation shall be maintained to control erosion and sedimentation. All areas that are denuded for any purpose shall be revegetated or the soils stabilized to prevent erosion and sedimentation prior to November 1 of the year of construction. No excavation shall be permitted after November 1 or before May 1 except under emergency conditions, as determined by the building official.

i. ***Building Design Standards***
The purpose of the building design standards is to minimize site disturbance, avoid extreme grading required by large building pads on steep slopes, and reduce the risk of damage from natural hazards.

i. All buildings and structures shall have a foundation which has been designed by a professional engineer, architect, or other qualified professional.

ii. In all Class B zoning districts, where option b. (subsection 21.06.030D.4.b.) is used to establish the grade plane, structures are limited to three stories on the downslope side (except those area governed by chapter 10, where the number or stories is not limited).

4. Slopes Greater Than 30 Percent

a. ***Purpose***
The requirements of this section are intended to allow consideration of development on slopes up to 50 percent. In order to assure the safety and stability of such development and to reduce offsite impacts, additional submittals are required as described in this subsection. Nothing in this subsection guarantees approval to disturb slopes greater than 30 percent.

b. ***Applicability***
If the site disturbance envelope as defined in C.3.c. above contains slopes over 30 percent, the standards of this section shall apply.

c. ***Slopes Greater Than 50 Percent***
All slopes greater than 50 percent shall remain undisturbed.

d. ***Existing Lots***
Notwithstanding other standards of this section, lots existing on January 1, 2014 that, due to the prevalence and/or distribution of slopes over 50 percent, are not able to meet these standards, are allowed a site disturbance envelope of 20,000 square feet. Within this site disturbance envelope, slopes over 50 percent are allowed to be disturbed.

e. ***Administrative Site Plan Review Required***
Development on slopes greater than 30 percent but not exceeding 50 percent requires an administrative site plan review. In addition to the site plan approval criteria set forth in subsection 21.03.180F., the approval criteria in subsection 4.g. below shall apply.

f. ***Additional Submittal Requirements***
In addition to the submittal requirements for an administrative site plan review, the following information is required:

i. A geotechnical engineering report, stamped by an engineer licensed in the state of Alaska, to include the following:

(A) Nature, distribution, strength, and stability of soils; conclusions and recommendations for grading procedures; recommendations

for frequency of soil compaction testing, design criteria for corrective measures; and opinions and recommendations covering the adequacy of the site to be developed.

(B) Slope stability analysis: conclusions and recommendations concerning the effects on slope stability of excavation and fill, introduction of water (both on and offsite), seismic activity, and erosion.

(C) Foundation investigation: conclusions and recommendations concerning the effects of soil conditions on foundation and structural stability, including permeability, bearing capacity, and shear strength of soils.

(D) Specific recommendations for cut and fill slope stability, seepage and drainage control, or other design criteria to mitigate geologic hazards, slope failure, and soil erosion.

(E) Depth to groundwater in the wettest seasonal conditions, and to bedrock, if less than 15 feet.

(F) Complete description of the geology of the site, a complete description of bedrock and subsurface conditions and materials, including artificial fill, soil depth, avalanche and mass wasting hazard areas, fractures, or other significant features.

(G) A summary of field exploration methods and tests on which the report is based, such as probings, core drillings, borehole photography, or test pits. The public works department shall confirm that the analysis methods and age of data are a reliable gauge of the site conditions and the potential impacts.

ii. A site development plan showing the following:

(A) Site disturbance envelope as set forth in C.3.c. above.

(B) Location of all driveways, and utility lines and installations.

(C) Location of all structures.

(D) Elevation drawings of all structures.

iii. Grading and drainage plans that provide the following:

(A) Topographic survey of existing conditions depicting at a minimum two foot contour intervals on a legible site map of one inch equaling 50 feet, or better.

(B) Proposed grading plan indicating limits of disturbed area, finished grade at minimum two foot contour intervals, proposed elevations of improvements, driveway grading at minimum 10 foot intervals measured on centerline, delineation of cut and fill areas, constructed slopes, proposed drainage features, and related construction.

(C) Drainage plans showing approximate locations for all surface and subsurface drainage devices, retaining walls, dams, sediment basins, storage reservoirs, and other protective devices to be constructed with, or as part of, the proposed work, together with a

map showing drainage area, how roof and other impervious surface drainage will be disposed, the complete drainage network, including outfall lines and natural drainage ways which may be affected by the proposed development, and the estimated volume and rate of runoff of the area served by the drains.

(D) A plan for erosion control and other specific control practices to be employed on the disturbed area where necessary.

iv. A revegetation plan that shows:

(A) The type, size, location, and grade of vegetation that will be used to complete the development plan and restore areas disturbed during construction, on a scaled plan of one inch equaling 30 feet, or better.

(B) Slope stabilization measures to be installed.

g. ***Standards***

The following subsections apply to development under this subsection C.4.:

i. 21.07.020C.3.c., *Site Disturbance Envelope*;

ii. 21.07.020C.3.d., *Cutting, Grading, and Filling*;

iii. 21.07.020C.3.g., *Natural Drainage Patterns*;

iv. 21.07.020C.3.h., *Ground Cover and Revegetation*; and

v. 21.07.020C.3.i., *Building Design Standards*.

h. ***Approval Criteria***

i. The proposed development minimizes disruption of the natural topography and protects natural features on the site in their natural state to the greatest degree possible.

ii. The principal and accessory structures have been sited in such a manner as to protect natural features of the site, minimize grading, preserve the appearance of scenic vistas, and minimize the risk of property damage and personal injury from natural hazards.

iii. The design of the structures includes massing, roof lines, exterior materials and colors, and decking that complements the terrain and complies with the building design standards set forth in paragraph C.3.i. above.

iv. Proposed landscaping preserves the natural character of the area while minimizing erosion and fire hazard risks to persons and property.

v. The drainage design of the development will have no adverse impact on neighboring or nearby properties.

vi. Areas not well suited for development due to soil stability characteristics, geology, hydrology limitations, or wastewater disposal, have been avoided.

D. Wildlife Management Corridors

1. Intent

The purpose of this section is to reduce wildlife-human conflicts by managing certain linear stream corridors to minimize adverse human-wildlife interactions and to facilitate more safely the movement of wildlife in those corridors identified in this section. It is not the intent of this section to reduce density that is otherwise allowed.

2. Applicability

This subsection shall apply within 200 feet on either side of the ordinary high water mark of the following streams: Peters Creek and its tributaries upstream of the Old Glenn Highway, Eagle River, South Fork of Eagle River (below the falls), Ship Creek (upstream from Reeve Blvd.), Campbell Creek (upstream from Lake Otis Parkway), North Fork of Little Campbell Creek (upstream from Elmore Road), Rabbit Creek, Little Rabbit Creek, Indian Creek, Bird Creek, Penguin Creek, California Creek, Glacier Creek, Virgin Creek and Portage Creek.

3. Standards

Within the area identified in subsection D.2. above, the following mandatory standards shall apply:

a. No new landfills, solid waste transfer stations, schools, or campgrounds are allowed.

b. All outdoor trash receptacles shall be bear-resistant, and food shall not be stored outside.

c. Roads, driveways, or trails, including bridges, shall be designed to facilitate wildlife passage along streams and to minimize wildlife-human conflicts.

d. Trails shall be sited with direct consultation with the state department of fish and game.

4. Discretionary Approvals

a. For discretionary approvals before the planning and zoning commission, the urban design commission, the platting board, or the zoning board of examiners and appeals that include the area identified in subsection D.2. above, the following shall be considered during deliberations:

i. Location of new buildings, permanent structures, trails, and fences.

ii. Long-term retention of natural vegetation and terrain in a landscape pattern that provides cover for wildlife movement and directs wildlife away from residential structures or other structures occupied on a frequent basis.

b. All applicable discretionary approvals under this section shall be referred to the Alaska department of fish and game, wildlife division, for their review, comments, and recommendations, which shall be considered by the decision-making body.

5. Review Report

All applications affected by this section shall be referred to the Alaska Department of Fish and Game for its review, comments, and recommendations, which shall be considered by the decision-making body. Recommendations for approval shall be supported by evidence in the report submitted by that department.

E. Flood Hazard Area Regulations

1. Purpose and Intent

The purpose of the flood hazard area regulations is to promote the public health, safety, and general welfare, and to minimize loss due to flood. The provisions of this section are intended to be an addition to all other land use regulations and to:

a. Restrict or prohibit uses and structures that are dangerous to health, safety, or property in time of flood, or that cause increased flood heights or velocities;

b. Require that uses vulnerable to floods, including public facilities that serve such uses, be provided with flood protection or flood proofing at the time of initial construction;

c. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

d. Minimize prolonged business interruptions;

e. Minimize damages to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of flood hazard;

f. Help maintain a stable tax base by providing for the sound use and development of areas of flood hazard so as to minimize future flood blight areas;

g. Ensure that potential buyers are notified that property is in an area of flood hazard; and

h. Ensure that those who occupy the areas of flood hazard assume responsibility for their actions.

2. Notice

Property owners affected by changes to the boundaries of the flood hazard area or by changes in the base flood elevations shall be noticed by mail.

3. Interpretation of Section; Disclaimer of Liability

a. In the interpretation and application of this section, all provisions shall be:

i. Considered as minimum requirements;

ii. Liberally construed in favor of the governing body; and

iii. Deemed neither to limit nor repeal any other powers granted under state statutes.

b. The degree of flood protection required by this section is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by manmade or natural causes. This section does not imply that land outside the areas of flood hazard or uses permitted within such area will be free from flooding or flood damages. This section shall not create liability on the part of the municipality, any officer or employee thereof, or the Federal Insurance Administration for any flood damages that result from reliance on this section or any administrative decision lawfully made thereunder.

4. Creation of Flood Hazard Area; Official Flood Hazard Reports and Maps

a. ***Creation of Area; Adoption of Reports and Maps***

There is hereby created a flood hazard area. This area shall be defined in its territorial extent by the following reports and maps:

i. Flood insurance study for the municipality of Anchorage, prepared by the Federal Insurance Administration, Federal Emergency Management Agency (FEMA).

ii. Flood insurance rate map (FIRM) prepared by the Federal Insurance Administration, FEMA, including the current digital flood insurance rate map (DFIRM) prepared by the Federal Insurance Administration.

iii. Flood boundary and floodway map, prepared by the Federal Insurance Administration, FEMA, including the current digital flood boundary and floodway map prepared by the Federal Insurance Administration.

iv. Flood hazard boundary map (FHBM), prepared by the Federal Insurance Administration, FEMA, including the current digital flood hazard boundary map (DFHBM) prepared by the Federal Insurance Administration.

The current editions of each of the maps and reports listed in this subsection are made a part of this section. Subsequent maps and reports prepared by the Federal Insurance Administration or the municipality delineating the flood hazard area, floodway and floodplain areas within the municipality shall become part of this chapter upon publication. A copy of the reports and maps cited in this subsection shall be on file in the department. Definitions of terms appearing on the maps and reports appear in 41 CFR 19.09.1.

b. ***Flood Hazard Areas***

Within the flood hazard area, areas at a hazard for flooding include:

i. Areas within the limit of the boundary of the base flood;

ii. Areas within the highest extreme tide;

iii. Areas covered in flood hazard studies prepared for the public works department that supplement the information prepared by FEMA; and

iv. The stream setback area defined in subsection 21.07.020B.4.

c. ***Review of Maps***

As necessitated by FEMA or the municipal engineer, the flood hazard district maps will be reviewed. The review may be conducted by the municipality, the U.S. corps of engineers, or the Federal Insurance Administration, and any new map panels or restudies affecting the boundaries of the flood hazard district, floodway, or floodway fringe area shall then be submitted to the planning and zoning commission for a recommendation and assembly for final adoption as part of this chapter.

d. ***Rules for Interpretation of Flood Hazard Area Boundaries***

The boundaries of the flood hazard areas established by this chapter shall be determined from the cited maps and reports. Where interpretation is needed as to the exact location of the boundaries, the public works department, upon advice from the U.S. corps of engineers or FEMA, shall make the necessary interpretation.

5. Regulations Applicable to Flood Hazard Area

a. ***Applicability***

The regulations within this section shall apply to all areas of the flood hazard area.

b. ***Prohibited Development***

i. Any encroachments, new construction, fill, obstructions, substantial improvements and other development or action within the regulatory floodway that would result in any increase in flood levels during the occurrence of a base flood are prohibited.

ii. Critical facilities shall not be located in the flood hazard area. For the purposes of this subsection only, critical facilities are defined as fire stations, police stations, hospitals, emergency shelters, schools, and emergency operations centers.

c. ***Standards for Issuance of Building or Land Use Permit***

No building permits, encroachment permits, manufactured home permits, or other land use permits shall be issued for any development activity within the flood hazard area unless the plans show that, in addition to compliance with all other ordinances, regulations and permit requirements, the development shall meet the following requirements:

i. Prior to final approval of a permit it must be demonstrated that all necessary permits have been received from those governmental agencies from which approval is required by federal or state law, including section 404 of the Federal Water Pollution Control Act amendments of 1972.

ii. It must be demonstrated that structures will be reasonably safe from flooding. If a proposed building site is in a floodplain, all new construction and improvements shall be designed and adequately anchored to prevent flotation, collapse or lateral movement of the structure, be constructed with materials and utility equipment resistant to flood damage, and be constructed by methods and practices that minimize flood damage.

iii. The approval of a subdivision application or multi-unit development shall require proof that:

(A) The proposed construction is consistent with the need to minimize flood damage within the floodplain;

(B) All public utilities and facilities such as sewer, gas, electrical and water systems are to be located and constructed to minimize or eliminate flood damage;

(C) Adequate drainage, as required by the *Design Criteria Manual* (current approved edition), is provided to reduce exposure to flood hazards. The actions of one project shall not adversely impact the receiving waters and the rights of other property owners, as measured by increased flood peaks, flood stage, flood erosion, and sedimentation through storm waters or drainage systems; and

(D) Base flood elevation data has been provided for subdivision proposals and other proposed development that contains at least 50 lots or five acres, whichever is fewer.

iv. Construction within floodplains shall require that new and replacement water supply systems be designed to minimize or eliminate infiltration of floodwaters into the systems.

v. Construction within floodplains shall require that:

(A) New and replacement sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters; and

(B) On-site waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.

d. ***Storage of Materials or Equipment in the Floodplain***
The storage or processing of equipment or materials that are buoyant, flammable, explosive or injurious to safety, or which would cause a violation of state water quality standards upon contact with water, are prohibited in the floodplain.

6. Regulations Applicable to Subdistricts

a. ***Floodway Area***
Since the floodway is an extremely hazardous area due to the velocity of floodwaters, which carry debris and potential projectiles and have erosion potential, the following provisions apply:

i. Permitted uses and structures are parks, parkways, greenbelts, land reserves, golf courses, playgrounds, playfields, and related facilities.

ii. Permitted accessory uses and structures are picnic tables, playground equipment, outdoor cooking facilities and like structures.

iii. The following structures and activities are permitted only by flood hazard permit including certification by a registered professional engineer demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge or result in violation of the state water quality standards: excavation of sand, gravel and other natural resources, railroad and tramway tracks, streets, bridges, utility installations and pipelines, storage yards for equipment and materials, commercial farming, and land reclamation.

iv. The following uses are prohibited: landfills, storage yards containing hazardous materials (as defined by the EPA), encroachments not otherwise excepted in this section, including fill, new construction, substantial improvements and other development.

b. ***Floodway Fringe Area***
The regulations listed in this subsection are applicable to the floodway fringe area:

i. Permitted uses and structures are parks, parkways, greenbelts, land reserves, golf courses, playgrounds, playfields and related facilities.

ii. Permitted accessory uses and structures are picnic tables, playground equipment, outdoor cooking facilities and like structures.

iii. The following uses, structures and activities are permitted only by flood hazard permit: any use permitted by flood hazard permit as set forth in subsection a. of this section, and all other uses, structures and activities which are in accordance with all other land use regulations provided they are adequately floodproofed as set forth in subsection E.8. below, *Flood Hazard Permit*.

iv. The following uses are prohibited: uses, structures and activities which are not permitted under subsections 6.b.i. through iii. of this section or which would cause violations of state water quality standards.

7. Construction Requirements

a. ***Generally***

All new construction and substantial improvements in areas designated on the flood insurance rate map as zones A, A1-30, AE, and AH shall meet the following conditions:

i. The lowest floor, including basement or crawl space, of residential structures shall be elevated to at least one foot above the base flood level. Within the structure, attendant utility and sanitary facilities shall be elevated to at least one foot above the base flood or completely floodproofed.

ii. The lowest floor, including basement, of nonresidential structures shall be elevated to at least one foot above the base flood level, unless the structure, with all utility and sanitary facilities, is designed so that below base flood level the structure is watertight with walls substantially impermeable to the passage of water and so that it is capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

iii. All fully enclosed areas below the lowest floor that are usable solely for parking, building access, or storage in an area other than a basement or crawlspace shall have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area according to FEMA specifications. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

iv. Where floodproofing is utilized a registered professional engineer or architect shall certify that the floodproofing methods are adequate.

v. For new manufactured home parks and manufactured home subdivisions; for expansions to existing manufactured home parks and manufactured home subdivisions; for existing manufactured home parks and manufactured home subdivisions where the repair, reconstruction or improvement of the streets, utilities and pads equals or exceeds 50 percent of value of the streets, utilities and pads before the repair, reconstruction or improvement has commenced; and for manufactured homes not placed in a manufactured home park or manufactured home subdivision, require that the repair, and on all property not within a manufactured home park or subdivision stands or lots are elevated on compacted fill or on pilings so that:

(A) The lowest floor of each manufactured home must be at least one foot above the base flood level.

(B) Adequate surface drainage and access for a hauler must be provided.

(C) For manufactured homes placed on pilings, pilings must be stable and no more than ten feet apart and reinforced if more than six feet above the ground level.

(D) Lots must be large enough to permit steps.

vi. All manufactured homes to be placed or substantially improved shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at least one foot above the base flood elevation, and be securely anchored to an adequately anchored foundation system.

vii. All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include but are not limited to use of over-the-top or frame ties to ground anchors.

b. ***Standards for Shallow Flood Areas (AO Zones)***

Shallow flooding areas appear on the flood insurance rate maps as AO zones with depth designations. The base flood depths in these zones range from one to three feet where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas, the following provisions apply:

i. New construction and substantial improvements of residential structures within AO zones shall have the lowest floor, including basement or crawl space, elevated above the highest adjacent grade of the building site, to at least one foot above the depth number specified on the flood insurance rate map (at least two feet if no depth number is specified).

ii. New construction and substantial improvements of nonresidential structures within AO zones shall either:

(A) Have the lowest floor, including basement, elevated above the highest adjacent grade of the building site, to at least one foot above the depth number specified on the flood insurance rate map (at least two feet if no depth number is specified); or

(B) Together with attendant utility and sanitary facilities, be completely floodproofed to or above that level so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect.

iii. Adequate drainage paths are required around structures on slopes to guide floodwaters around and away from proposed structures.

8. Flood Hazard Permit

a. ***Required***

No person shall engage in development within the flood hazard area unless a flood hazard permit is first issued, pursuant to section 21.03.090, *Flood Hazard Permits*.

b. ***Conditions***

Special conditions may be attached as a condition to the issuance of a flood hazard permit. Conditions shall include any floodproofing measures deemed necessary by the issuing official to further the purposes of this chapter. Floodproofing measures may include requirements that:

i. The finished surface of the first or main floor shall be at least one foot above the level of the regulatory flood protection elevation.

ii. Structures or uses below the level of the regulatory flood shall be restricted to those not involving habitual human habitation, such as working space, living space, sleeping space, etc.

iii. The anchorage shall be suitable to resist flotation and lateral movement.

iv. For all construction and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exits of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided to FEMA specifications. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers or other coverings or devices provided that they permit the automatic entry and exits of floodwaters.

v. All areas below the level of the regulatory flood protection levels shall be coated with paint, membranes, or mortars substantially impermeable to the passage of water.

vi. Water supply and waste treatment systems must prevent infiltration of water.

vii. All interior drains must be connected to the sanitary sewer system.

9. Nonconforming Uses

A structure or the use of a structure or premises located within the flood hazard area that was lawful before the original passage of applicable regulations, but that is not in conformity of the provisions of such regulations, may be continued subject to the following conditions:

a. No such use shall be expanded, changed, enlarged, or altered in any way which increases its nonconformity with respect to the provisions of this chapter.

b. If such use is discontinued for 12 consecutive months, any future use of the structure or premises shall conform to this chapter.

c. Uses or adjuncts thereof which are or have become nuisances shall not be entitled to continuance as nonconforming uses.

d. Any permitted alteration, addition, or repair to any nonconforming structure the cost of which equals or exceeds 50 percent of the fair market value of the structure which would result in substantially increasing the flood damage potential shall be adequately floodproofed in accordance with subsection 8.b.

10. Duties of the Director of the Public Works Department

a. The director of the public works department shall grant or deny development permit applications in accordance with the provisions of this chapter, except that the platting board is directed and authorized to consider this chapter in relation to any matter brought before that board.

b. The director of the public works department shall maintain all records required by the Federal Insurance Administration and shall file an annual report with the federal insurance administrator.

c. Additional duties and responsibilities of the director of the public works department are as follows:

i. *Permit Review*
The director of the public works department shall:

(A) Review all flood hazard permits to determine that the permit requirements of this chapter have been satisfied.

(B) Review all flood hazard permits to determine that all necessary permits have been obtained from those federal, state, or local governmental agencies from which prior approval is required.

(C) Review all flood hazard permits to determine if the proposed development is located in the floodway, and, if located in the floodway, ensure that the encroachment provisions of subsection 6.a. above are met.

ii. *Use of Other Base Flood Data*
When base flood elevation data have not been provided in accordance with subsection E.4. above, the director of the public works department shall obtain, review and reasonably utilize any base flood elevation data available from a federal, state or other source in order to administer subsections E.6. through E.9. above.

iii. *Information to be Obtained and Maintained*
The director of the public works department shall:

(A) Obtain and record the actual elevation, in relation to mean sea level, of the lowest habitable floor, including basement, of all new or substantially improved structures, and whether or not the structure contains a basement.

(B) For all new or substantially improved floodproofed structures:

(1) Verify and record the actual elevation, in relation to mean sea level; and

(2) Maintain the floodproofing certifications required in subsection 7.a.iv. above.

(C) Maintain for public inspection all records pertaining to the provisions of this section.

iv. *Duties Regarding Alteration of Watercourses*
The director of the public works department shall:

(A) Notify adjacent communities and the state coordinating agency prior to any alteration or relocation of a watercourse and submit evidence of such notification to the Federal Insurance Administration.

(B) Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood-carrying capacity is not diminished.

v. *Interpretation of FIRM Boundaries*
The director of the public works department shall make interpretations, where needed, as to exact location of the boundaries of the areas of flood

hazard, for example, where there appears to be a conflict between a mapped boundary and actual field conditions. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in subsection E.11. below.

11. Appeal Procedure

Appeals alleging error by the director of the public works department charged with the enforcement or interpretation of this chapter may be taken to the zoning board of examiners and appeals in accordance with the provisions of section 21.03.050, *Appeals*.

12. Standards and Conditions for Variances and Appeals

a. In passing upon variances or appeals, the zoning board of examiners and appeals shall consider all technical evaluations, all relevant factors, standards specified in other sections of this section and:

i. The danger that materials may be swept onto other lands to the injury of others;

ii. The danger to life and property due to flooding or erosion damage;

iii. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

iv. The importance of the services provided by the proposed facility to the community;

v. The necessity of the facility of a waterfront location, where applicable;

vi. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

vii. The compatibility of the proposed use with existing and anticipated development;

viii. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

ix. The safety of access to the property in time of flood for ordinary and emergency vehicles;

x. The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and

xi. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems and streets and bridges.

b. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the items in subsections 12.a.i. through xi. of this section have been fully considered. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance increases.

c. The zoning board of examiners and appeals may attach such conditions to the granting of variances or appeals as it deems necessary to further the purposes of this chapter.

d. The director of the public works department shall maintain the records of all variance and appeal actions and report any variances to the Federal Insurance Administration upon request.

e. Conditions for variances are as follows:

i. Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the national register of historic places or the state inventory of historic places, without regard to the procedures set forth in the remainder of this section.

ii. Variances shall not be issued within any designated floodway if any increase in flood levels during the basic flood discharge would result.

iii. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

iv. Variances shall only be issued upon:

(A) A showing of good and sufficient cause;

(B) A determination that failure to grant the variance would result in exceptional hardship to the applicant; and

(C) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

v. Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2016-34(S), 4-12-16; AO 2017-11, 2-14-17)

21.07.030 PRIVATE OPEN SPACE

A. Purpose

1. In residential development, private open space is intended to provide residents with opportunities for active and passive outdoor recreation, relaxation, and enjoyment. Specific residential objectives of this section include:

a. Integrate usable open space into the project design and site plan.

b. Enhance the livability and value of new developments in existing neighborhoods.

c. Create attractive spaces that invite outdoor stays, physical activity, and social interaction, such as gardening, children's play, barbeques, etc.

d. Retain vegetated spaces on site and connect to natural surroundings or scenic views where they may exist off site.

e. Provide residents with space for their private or common use that is immediately accessible from their residences, and under their surveillance and sense of proprietorship.

2. In nonresidential development, private open space is intended for the general quality of the public domain, and to provide employees and customers with space for active or passive recreation and relaxation.

B. Applicability and Open Space Requirement

Development shall be required to set aside private open space according to the following minimum requirements.

1. General: For townhouse-style structures, the required open space may be provided as either individual or common private open space, except where common open space is required in subsection 21.07.110F.2. For multifamily-style construction, at least half the required open space shall be provided as common private open space, and no individual private open space is required. Required open space for residential uses shall not be combined with required open space for nonresidential uses.

2. R-2M districts: 400 square feet of private open space per dwelling unit, or an area equal to five percent of the gross floor area of group living uses or nonresidential development.

3. R-3 district: 250 square feet of private open space per dwelling unit. Group living uses and nonresidential development shall provide an area equal to five percent of the gross floor area for open space.

4. R-4 and R-4A districts: 100 square feet of private open space per dwelling unit. Group living uses and nonresidential development shall provide an area equal to five percent of the gross floor area for open space.

5. B-1A, B-1B, B-3, RO, and nonresidential development in residential districts:

a. Private open space equal to five percent of the gross floor area of the nonresidential portion of the development shall be provided, up to a maximum requirement of 2,000 square feet.

b. Where dwelling units are part of the development, an additional 100 square feet of private open space per dwelling unit shall be provided.

6. DT districts: [to be determined through Downtown Plan and regulations processes]

C. Exemptions

The following are exempt from the private open space requirement:

1. Single-family, two-family, mobile home, and townhouse residential uses;

2. Parks, Public Safety Facility, Transportation Facility, Utility Facility, Telecommunication Facility, Agricultural Uses, Animal Boarding, Large Domestic Animal Facility;

3. Vehicles and Equipment, Manufacturing and Production, Warehouse and Storage, and Waste and Salvage use categories;

4. Any building floor area devoted to parking and/or loading;

5. Any building floor area provided as indoor private open space that meets the standards of subsection D.3. below; and

6. Any nonresidential building with less than 5,000 square feet of gross floor area.

D. Standards

1. Areas Not Credited

Lands within the following areas shall not be counted towards required private open space areas:

a. Setbacks with slopes over 10 percent;

b. Swales with side slopes over 10 percent, and drainage ditches;

c. Required site perimeter (except as specifically allowed below) and parking lot landscaping;

d. Public or private streets or street rights-of-way;

e. Parking facilities, driveways, other motor vehicle circulation areas, loading areas, and refuse collection areas, except as provided in subsection 21.07.060F.18., *Parking Courtyards*; and

f. Land covered by structures not intended solely for recreational uses.

2. Private Open Space Areas

In accordance with various open space requirements in subsection B. above, some required open space may be allocated to individual units (individual private open space) and some must be common to all residents/employees/visitors (common private open space).

a. ***Individual Private Open Space***

i. Required private open space may be private yard, garden, patio, deck, balcony, or other open space reserved for the exclusive use of a single dwelling unit. It shall be designed for the occupants of a specific dwelling, and provided immediately adjacent to, and with direct access from the dwelling.

ii. The minimum inside dimension for such an area used to meet the private open space requirement shall be no less than 15 feet for ground level spaces such as yards, or four feet for upper story spaces such as balconies. The 15-foot dimension may be reduced by three feet where abutting required site perimeter landscaping on the site, as long as the open space and the landscaping are not separated by a fence or other separating feature.

iii. An unenclosed porch, deck, or stoop, that is a minimum of 60 square feet in area and at least 24 inches above the adjacent finished grade may be counted as individual private open space for the unit to which it is attached.

iv. Individual private open space for the exclusive use of each dwelling unit shall have a slope of 10 percent or less.

v. Private open space shall be separated from refuse collection areas by L1 visual enhancement landscaping.

b. ***Common Private Open Space***

Private open space areas to be used in common by residents and/or associated with nonresidential uses or mixed uses are intended to be usable spaces that incorporate user amenities facilitating passive or active recreation and relaxation. These areas shall meet the following standards:

i. At least half of the required common private open space shall be contiguous, up to a maximum of 3,000 square feet.

ii. The minimum inside dimension for an area used to meet the requirement shall be 18 feet for residential uses and 15 feet for nonresidential uses. This dimension may be reduced by three feet where abutting required site perimeter landscaping on the site, as long as the open space and the landscaping are not separated by a fence or other separating feature.

iii. Common private open space may include lawn areas; picnic areas; gardens; natural vegetation; equipped recreation areas; sports courts; hard surfaced pedestrian spaces such as patios, decks, courtyards, housing courtyards, or plazas; indoor private open space pursuant to D.3. below; and/or roof tops or terraces.

iv. Up to 25 percent of the total required open space area may be developed for active recreation, such as with play equipment or delineated sports field.

v. Private open space shall be separated from refuse collection areas by L1 visual enhancement landscaping.

3. Indoor Private Open Space Option

Up to 25 percent of the total required private open space for residential uses, and up to 50 percent of the total required private open space for nonresidential uses, may be indoors. Such space:

a. Shall be located and designed to maximize daylight access by providing one square foot of transparent window and/or skylight area for each two square feet of floor area of the indoor private open space;

b. Shall be climate controlled and furnished with features and amenities that encourage its use;

c. Shall be available and accessible to all residents, or to all employees and customers of the development;

d. May include areas such as common recreation areas, fitness facilities, common meeting spaces, seating areas, swimming pools, spas, and hot tubs; and

e. Shall not be combined with some other function, such as laundry or storage.

4. Incentive for High Quality Spaces

The total open space area requirement may be reduced by 25 percent if the largest common open space area meets all the other requirements of this section and the following standards:

a. Has less than an average five percent slope;

b. Is well-drained and not wetlands;

c. Has a minimum inside dimension of 23 feet for residential uses, or 20 feet for nonresidential uses; and

d. Receives sunlight access on the majority of the open space for at least four hours per day between the spring and fall equinox.

5. Ownership
All private open space areas not reserved for the exclusive use of a single dwelling unit shall be owned jointly or in common by the owners of the development or permanently preserved through some other mechanism satisfactory to the director. While private open space may be platted into separate tracts, those tracts which provide required private open space shall not be sold separately from the development.

6. Fee In Lieu Prohibited
The payment of fees in lieu of the set-aside of land for private common open space is prohibited.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2015-100, 10-13-15)

21.07.040 DRAINAGE, STORM WATER TREATMENT, EROSION CONTROL, AND PROHIBITED DISCHARGES

A. Purpose

1. Drainage plans and the requirements of this section and the *Design Criteria Manual* are intended to implement the following principles of drainage planning:

a. The design of a drainage system shall not transfer a problem from one location to another.

b. Adequate space shall be provided for drainage conveyance and storage.

c. Good drainage design incorporates the effectiveness of the natural systems, rather than negating, replacing, redirecting, or ignoring them. The features, capacity, and function of the existing natural system shall be considered and utilized.

d. Drainage and storm water management facilities shall be designed with ease of maintenance, long-term function, sub-arctic climate function, protection of public safety, and accessibility as primary considerations.

2. Other purposes of this section include:

a. Regulating development preparation and land-disturbing activity in order to control erosion and sedimentation and accordingly to prevent water pollution from sedimentation, to prevent accelerated erosion and sedimentation of lakes and natural watercourses; and to prevent damage to public and private property by erosion and/or sedimentation during and after construction;

b. Regulating storm water discharge to improve the quality of the environment for residents of the municipality, administer the Municipal Separate Storm Sewer permit, and manage impacts to the watersheds in the municipality; and

c. Minimizing point and non-point source pollution into the water bodies of the municipality.

B. Guidance Documents

The municipal engineer shall develop, implement, and maintain various guidance manuals which shall provide standards and guidelines for this section 21.07.040. The *Design Criteria Manual* and the *Storm Water Treatment Plan Review Guidance Manual* are examples of such manuals.

C. Emergencies

Where site work deviates from approved plans due to an emergency, the municipal engineer shall be notified on the next business day. Changes to an approved plan shall be submitted within 14 days to the public works department. For the purposes of this section, an “emergency” is a situation

which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken immediately.

D. Drainage

1. Intent

A drainage plan shall show the post-development drainage patterns of the site.

2. Applicability

This section applies to all development within the municipality.

3. Drainage Plan Required

a. Applications for the following entitlements shall include a drainage plan:

i. A permit from the development services department, for projects that include land disturbance;

ii. Subdivision plat (both preliminary and abbreviated plats);

iii. Site plan review (administrative and major); and

iv. Conditional use.

The drainage plan submittal requirement may be waived by the director and the municipal engineer if both agree that such a plan is not necessary.

b. The drainage plan shall show the area affected by the application, as well as watercourses, drainage and water quality easements, appropriate drainage outfall for surface water, roof drainage, and other impervious surfaces, and any other pertinent information, and shall address surface and subsurface drainage. The drainage plan shall also indicate impacts, if any, on adjacent, up-gradient, and down-gradient properties.

c. An approved drainage plan is required before any site work commences.

4. Standards

Drainage plans shall comply with the requirements of municipal code and the guidance of the *Design Criteria Manual*. Post-development drainage plans shall be designed in a manner such that there will be no adverse off-site impacts. Any net increase of water volumes shall be mitigated and/or directed to an adjacent drainage system or receiving water that has the demonstrated capability to handle the new flows. The municipality may require a dedicated drainage easement(s) to ensure the drainage is consistent and compatible with surrounding drainage patterns.

5. When No Permit is Required

a. In situations where a building or land use permit is not required, all design and construction activities shall comply with municipal code.

b. If the municipal engineer reasonably believes that a project is significant in nature or that it will have negative impacts on surrounding property, water quality, drainage, or the roadways, the municipal engineer may require submittal of a drainage plan and a full review of the project. The applicant shall pay the appropriate review fees for the review. If the project is under construction, the municipal engineer may issue a stop work order until the project has been reviewed and approved.

c. If a project has been completed and there are negative impacts on surrounding property, water quality, drainage, or the roadways, the municipal engineer may pursue enforcement actions under chapter 21.13.

6. Exposure of Subsurface Flows

If, during site work, unexpected subsurface flows are exposed, the municipality shall be informed immediately. If the subsurface flow cannot be contained within the site and has a significant off-site impact, work shall cease immediately and shall not be resumed until a temporary flow management plan has been submitted to and accepted by the municipality. In addition, the developer shall amend the drainage plan to address the exposed flows and potential for glaciation and shall submit it to the municipality and receive approval before resuming site work other than temporary flow management.

E. Storm Water Treatment and Erosion and Sediment Control

1. Intent

A storm water treatment plan shall show both the controls put in place during construction and any needed post-development controls to prevent erosion and protect water quality.

2. Applicability

Storm water treatment plan approval is required prior to commencement of land clearing or ground disturbing activities; the discharge of surface water (including from snow disposal sites); the construction, alteration, installation, modification, or operation of a storm water treatment or disposal system; demolition or utility work; connection to the municipal separate storm sewer system; work in water bodies, wetlands, or watercourses; or dewatering activities, except as listed in E.4. below. All construction, development, and maintenance activities shall be in accordance with the approved storm water treatment plan.

3. Nonconformities

No nonconforming rights are granted for this section 21.07.040E.

4. Exceptions

A storm water treatment plan shall not be required for the following. An erosion control plan may still be required if the discharge is so concentrated as to cause soil disturbance. The municipal engineer may waive the requirement for a storm water treatment plan for other activities that, in his or her judgment, will not create erosion or impair water quality.

a. Building improvements where no earth is disturbed;

b. Any earth disturbance that is less than 500 square feet in area;

c. Agricultural activities (not including site landscaping). Discharges from agricultural activities are still subject to water quality standards and potential enforcement for illicit discharges to watercourses or the storm sewer system;

d. Discharges of the following into the municipal separate storm sewer system:

i. Uncontaminated water line flushing;

ii. Residential irrigation water;

iii. Rising ground waters;

iv. Uncontaminated ground water infiltration;

v. Uncontaminated discharges from potable water sources;

vi. Foundation drains;

vii. Air conditioning condensate;

viii. Springs;

ix. Uncontaminated water;

x. Individual residential car washing;

xi. Flows from riparian habitats and wetlands;

xii. De-chlorinated swimming pool discharges;

xiii. Street wash waters; or

xiv. Flows from emergency fire fighting activity.

5. Submittal Requirements and Review Procedure

Storm water treatment plans shall be submitted to the public works department on the form provided. The submittal shall include plans for both temporary (during construction) and permanent storm water treatment and erosion control, and any supplementary information required in the user's guide or the *Design Criteria Manual*.

a. ***Storm Water Treatment Plan Review Guidance Manual***

The *Storm Water Treatment Plan Review Guidance Manual* shall be used to develop, review, and approve storm water treatment plans. Applicants submitting plans under this subsection shall comply with the manual regarding plan requirements and reviews, and if necessary shall gather data to confirm storm water conditions.

b. ***Changes to an Approved Storm Water Treatment Plan***

Any changes to permanent storm water controls from an approved storm water treatment plan require approval by the municipal engineer. Changes in temporary or construction storm water treatment controls or best management practices necessary to maintain effective storm water treatment do not require municipal approval but shall be documented.

c. ***New Application Required***

If dewatering, land clearing, construction, alteration, installation, modification, or operation has not begun within one year after issuance of a storm water treatment plan approval, the approval is void, and a new application shall be submitted to the public works department for review and approval.

d. ***Project-Wide Approval***

The municipal engineer may issue a project-wide approval to an applicant who plans to conduct an operation with the same runoff characteristics at various discharge locations. He or she may require the submittal of site-specific plans, including a schedule and description of all planned discharge activities, for approval, and may restrict that approval to certain proposed discharge activities.

6. Land Clearing

Mechanized land clearing of one acre or greater requires an approved storm water treatment plan. Until a subsequent use is approved, a temporary native vegetation buffer shall be retained on the perimeter of the lot being cleared, equal to or greater than the specified minimum setback required in the zoning district. This buffer shall be at least 15 feet wide on the perimeter of lots in commercial and industrial zoning districts, except where these are adjacent to PLI and/or residential zoning districts, where the temporary buffer shall be a minimum of 30 feet wide. Those areas of native vegetation in commercial and industrial zoning districts not essential to the parcel's development and situated on the

perimeter of the site shall be retained and protected from disturbance as specified in subsection 21.07.080F.3.

7. Erosion and Sediment Control Administrator

A qualified erosion and sediment control administrator, who shall be responsible for the erosion, sedimentation, and best management practices during construction, shall be identified in each storm water treatment plan submitted for approval, except for storm water treatment plans for owner-built single- and two-family dwellings. Evidence of contractual liability shall be provided when requested.

a. In order to be identified as a qualified administrator, a person shall successfully complete a training course and associated test for certification from a training program approved by the public works department.

b. The qualified administrator shall maintain their certification in active status throughout the length of the project. In the case where the qualified administrator's certification becomes expired or revoked, a new qualified person shall be selected to be the erosion and sediment control administrator and shall be identified on the storm water treatment plan.

8. Alternate Materials, Design, and Method of Construction

a. The provisions of this section are not intended to prevent the use of any alternate material, design, or method of construction not specifically prohibited by this code, provided any alternate has been approved and its use authorized by the municipal engineer.

b. The municipal engineer may approve any such alternate, provided that he or she finds that the proposed design complies with the intent and purpose of this code, and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that required in this code in suitability, effectiveness, durability, safety, sanitation, and degree of structural integrity. The details of any action granting modifications or the acceptance of a compliance alternative shall be recorded and entered in the public works department's files.

c. Whenever there is insufficient evidence of compliance with any of the provisions of this code or evidence that any material or construction does not conform to the requirements of this code, the municipal engineer may require tests as proof of compliance to be made at no expense to the municipality. Test methods shall be as specified by this code or by other recognized test standards. If there are no recognized and accepted test methods for the proposed alternative, the municipal engineer shall determine test procedures. All tests shall be made by an approved agency. Reports of such tests shall be retained by the municipal engineer for the period required for the retention of public records.

9. Inspections

a. ***Required Inspections***

Prior to the commencement of or during land clearing or ground disturbing activities of one acre or greater, the discharge of surface water, or dewatering activities subject to this section, an inspection of approved best management practices associated with the storm water treatment plan shall be conducted. Prior to the issuance of a certificate of zoning compliance, permanent site controls shall be verified by inspection or other means, as determined by the municipal engineer. The owner or contractor of record is responsible for requesting the required inspections at the appropriate times.

b. ***Other Inspections Authorized***

i. A municipal official, upon presentation of proper identification, may enter the premises at reasonable times to inspect or perform duties imposed by

this code, for the purpose of determining whether the owner or operator thereof is in compliance with the specific requirements of this section. If such premises are unoccupied, the official shall first make a reasonable effort to locate the owner or other person having charge or control of the premises and request entry. If entry is refused, any approvals issued under this section may be immediately suspended until an inspection is conducted, and the official shall have recourse to the remedies provided by law to secure entry. Permittees, owners, or operators shall immediately stop all work upon the site being posted with a stop work order for failure to allow inspection.

ii. A municipal official may inspect any property or facility suspected as the source of illicit discharges in violation of 33 USC 1342 (1987) as amended.

iii. No inspection for which a warrant would be required under the constitution of this state or the United States may be conducted under this section without the proper warrant.

c. ***Availability and Production of Plans and Records***
Approved plans and specifications shall be available on site for review by municipal inspectors at the time of requested inspections. At the request of municipal officials and during normal working hours, owners or operators of facilities, construction sites, premises, or areas shall produce and make available for inspection or copying all records or information required to be maintained or reported under the provisions of this section.

F. Snow Storage and Disposal

1. Intent

This section addresses seasonal storage and management of plowed snow from on-site parking lots and other motor vehicle areas. It requires developments to provide space to accommodate plowed snow, and also allows alternative and innovate solutions. This section is not designed to increase the amount of area already used for snow storage by existing developed residential and commercial property; instead it is intended to clarify applicable regulations and encourage thoughtful site planning and snow management with respect to adjacent property and other requirements of this title. Its objectives are:

a. Ensure water quality treatment and drainage control of snow melt;

b. Maintain safe and convenient access and circulation; and

c. Protect adjacent landscaping, walkways, streets, and property.

2. Applicability

Except where stated otherwise, all existing and new uses with on-site surface areas to be plowed for motorized vehicle access or parking shall comply with this section. For example, this includes surface areas such as parking spaces, circulation and parking aisles, associated driveways, queuing lanes, emergency vehicle access lanes, loading areas, tractor trailer areas, and vehicle sales and display areas. The following uses and surfaces are exempt:

a. Single-family, two-family, three-unit multifamily, townhouse, and mobile home dwellings on individual lots;

b. Snow disposal sites subject to subsection 21.05.060E.8.; and

c. Ice-free (snow-melting) surfaces and/or covered surfaces.

3. Operational Standards

For all applicable uses (including existing uses and new development):

a. Plowed snow shall not interfere with required pedestrian or vehicle circulation or sight distance.

b. Snow storage shall not interfere with access to utility equipment or create a hazard around utility equipment, in accordance with utility tariffs. For example, snow piles shall not be placed underneath an overhead utility line such that the snow pile reduces clearances to less than National Electrical Safety Code (NESC) ground clearance requirements.

c. Plowed snow may be removed to an approved snow disposal site, or shared among abutting or contiguous lots jointly managed for snow storage and disposal purposes. Plowed snow shall not be otherwise removed from the property. Snow shall not be moved to a right-of-way or other public place without a valid right-of-way permit pursuant to title 24.

d. Snow piles stored longer than on a 72 hour temporary basis shall not result in direct offsite drainage such as onto neighboring properties or public rights-of-way, except for snow melt drainage directed into an approved drainage facility.

e. Winter trash accumulation from plowed snow shall be removed and paved snow storage areas swept by June 1 (or as soon as snowmelt conditions permit).

4. Snow Storage Areas on New Development Sites

Developments involving the construction of new principal buildings, the removal and replacement of existing principal buildings, and/or the expansion or redevelopment of on-site surface areas to be plowed for motorized vehicle access and parking shall provide for snow storage and disposal on the site plan, as provided below. Tenant improvements, renovations, alterations, and enlargements of existing developments are exempt, except that the addition or expansion of parking lots or other areas for motorized vehicle parking and access by the greater of either 10 parking spaces or 10 percent of the existing area shall comply.

a. If snow will be stored on-site, snow storage areas shall be designated on the site plan as provided in 4.b. through 4.g. below. If snow will be removed off-site to a snow disposal facility or another alternative snow management strategy is used as provided in subsection F.5. below, then the snow storage areas may be reduced or eliminated from the site plan.

b. For residential uses, an area equal to at least 10 percent of the surface area on the site to be plowed for motorized vehicle parking and access (as identified in subsection F.2.) shall be designated for snow storage. For nonresidential uses, this area requirement shall be five percent.

c. As an alternative to 4.b. above, the applicant shall provide a calculation stamped by a professional registered with the Alaska State Board of Registration for Architects, Engineers, and Land Surveyors, that indicates the proposed snow storage and disposal strategy will be adequate to accommodate the plowed snow in an average snow year, considering the site plan layout, the amount of surface area to be plowed for motorized vehicles (as identified in subsection F.2.), and the proposed method(s) of snow storage and disposal.

d. Snow storage areas shall be located to comply with the operation standards of subsection F.3. above, and shall abut the surface area to be plowed.

e. Snow storage areas shall have a minimum dimension of eight feet to accommodate snow piling from a plow blade.

f. The site plan shall not, unless allowed through an administrative site plan review, designate snow storage areas in required perimeter landscaping or on required trees. Designation of required residential private open space for snow storage shall be permitted.

g. Snow storage areas shall be planted with ground-cover (such as grass), or paved subject to subsection 21.07.090H.12., *Paving*.

5. Alternative Snow Management Strategies
Alternative snow management strategies such as snow melters, underground storage, or removal to an approved snow disposal site, may be approved by the municipal engineer in lieu of a required snow storage area, subject to the following:

a. The owner shall either set aside the area that would otherwise be needed to provide the required snow storage area on the site, or enter into an agreement with the municipality, in conformance with the title 21 user's guide, which is recorded, runs with the use of the land, and ensures continuation of the alternative strategy and the future implementation of contingency measures if such contingency measures are ordered by the municipal engineer.

b. Areas to be used for temporary storage of plowed snow awaiting removal or disposal shall be depicted on the site plan.

c. The method of treatment and disposal shall comply with subsection F.8. below.

6. Setbacks
Plowed snow shall be set back from streams, watercourses, wetlands, and water bodies as specified in section 21.07.020, and is prohibited within ten feet of storm water outfalls and discharge points.

7. Snow Melt Drainage
Developments shall comply with subsection 21.07.040D., *Drainage*, to address drainage of snow melt in areas of the site affected by the development.

8. Snow Melt Treatment
Detention and treatment practices and/or facilities for chloride, particulates, and other pollutants shall be provided prior to discharge of snow melt from a site sufficient to comply with subsection 21.07.040E., and shall be subject to review and approval by the municipal engineer.

G. Prohibited Discharges

1. Applicability
This section applies throughout the municipality.

2. Prohibited Discharges or Acts
No person shall cause or permit illicit discharges:

a. Into any waters of the state, or waters of the United States, unless such is first treated in a manner approved by the federal, state, or other agencies having jurisdiction; or

b. Into a storm sewer of the municipality, other than pursuant to a dewatering permit, an approved storm water treatment plan, a national pollutant discharge elimination system permit, or a permit issued by a local, state, or other agency having jurisdiction. Examples of discharges that are prohibited include:

i. Grease, fatty materials, offal, or garbage;

ii. Sand, sand dust, dirt, gravel, sawdust, metal filings, broken glass, or any material which may cause or create an obstruction in the sewer;

iii. Gasoline, benzene, fuel oil, or a petroleum product or volatile liquid;

iv. Milk or any liquid milk waste product in quantities in excess of ten gallons during any 24-hour period;

v. Wax, cyanide, phenols, or other chemical or substance that may cause damage to materials of which the sewer system is constructed; or

vi. Wastewater, as defined in AMC section 15.20.010.

For the purposes of this section, "illicit discharges" means pollutants or any materials other than storm water.

3. Dumping in Watercourses and Water Bodies
No person shall deposit, dump, abandon, throw, scatter, or transport solid waste, garbage, rubbish, junk, fill, soil, dirt, snow, ice, vegetation, or other material in such a manner as to obstruct, impound, or cause siltation of any river, stream, creek, watercourse, water body, stream or water body or wetland setback, water quality easement, storm sewer, ditch, drain, or gutter except as otherwise allowed by valid federal, state, and other permits or licenses relative to water pollution, water impoundment, or water quality control.

H. Hazardous Sites

1. For the purposes of this section, any site meeting any or all of the conditions and defects described below shall be deemed to be hazardous, provided that such conditions or defects exist to the extent that the health of the watershed, the requirements of the Municipal Separate Storm Sewer System permit, or the safety of the public are endangered, as determined by the municipal engineer.

a. Any site that causes sediment to be discharged in such a way that it may be delivered directly or indirectly to the storm sewer or receiving waters;

b. Any site that causes pollution to be discharged in such a way that they may be delivered to the watershed;

c. Any property for which the owner, manager, or tenant fails to install and/or maintain properly permitted BMPs; or

d. Any site where actions are causing soil masses to be in danger of sloughing, destabilizing, failing, or collapsing as a mass wasting event.

2. All sites which are determined after inspection by the municipal engineer to be a hazardous shall be abated as determined by the municipal engineer.

I. Violations and Penalties

1. Violations

a. Any person who violates any provisions of this section shall report such violation to the project management and engineering department and shall make available any information or records related to the contents of the substance discharged.

b. In addition to any other remedy or penalty provided by this title, any person who violates any provision of this title or regulations adopted there under shall be

subject to the civil penalties or injunctive relief, or both, as provided by AMC section 1.45.010B.

c. In any action under this section, the municipality, if not a party, may intervene as a matter of right.

2. Penalties

a. All sites operating without approval under this section may be immediately posted with a stop work order and shall pay double fees for all required permits or inspections under this section, as well as any fines which may be assessed. In addition to any other remedy permitted by law, fines may be assessed for failure to have a permit or approved plan, failure to allow inspections, or failure to obey a properly issued stop work order. Violators of this section may also be charged $1,000 per day until the violation(s) is corrected.

b. Any person who negligently or intentionally permits or causes a discharge in violation of this section shall, upon conviction, be subject to a civil fine penalty of $5,000 to $10,000 per day, or injunctive relief to cease the violation, or both. In addition to any fine assessed under this section, any person who violates any provision of this section or any rule or regulation adopted pursuant to this section shall be subject to a further civil penalty of up to double the cleanup and remediation costs incurred as a result of the violation.

c. Any person who permits or causes a discharge in violation of this section shall be strictly liable, regardless of intent, for the full amount of any fines or other liquidated penalties incurred by the municipality for any violations of federal law which are caused by the discharge.

d. No certificate of zoning compliance shall be issued until all fines levied under this section have been paid.

J. Appeals

1. Appeals of orders, decisions, or determinations made by the municipal engineer shall be heard by the zoning board of examiners and appeals, pursuant to subsection 21.03.050B.

2. The zoning board of examiners and appeals shall have no authority over the interpretation of the administrative provisions of this section, nor shall the board be empowered to waive requirements of this section.

(AO 2012-124(S), 2-26-13; AO 2015-100, 10-13-15)

21.07.050 UTILITY DISTRIBUTION FACILITIES

A. Underground Placement Required for New or Relocated Lines

1. Except as provided in subsection B. below, all newly installed or relocated utility distribution lines (as defined in section 21.14.040) shall be placed underground.

2. Utility distribution lines owned or operated by utilities that are parties to a joint trench agreement shall be placed underground in a joint trench.

3. Nothing in this section restricts the maintenance, repair, or reinforcement of existing overhead utility distribution lines.

B. Exceptions

1. Except where an assessment district has been formed to convert overhead utility distribution lines as provided in title 19.60, utility distribution lines need not be placed underground in the class B improvement area defined in subsection 21.08.050B., or in the

I-2 zoning district. However, in the following areas newly installed or relocated utility distribution lines shall be placed underground: Lower Hillside, between and including Abbott Road, Rabbit Creek Road, Hillside Drive and the New Seward Highway.

2. Except where an assessment district has been formed to convert overhead utility distribution lines as provided in AMC chapter 19.60, CATV utility distribution lines need not be placed underground where there are other overhead utility distribution lines; provided that, when all of the other overhead distribution lines are placed underground, the CATV utility distribution line shall also be placed underground.

3. A new utility distribution line may be placed overhead when necessary immediately to restore service interrupted by accident or damage by flood, fire, earthquake or weather; provided that the utility distribution line shall be replaced by a utility distribution line conforming to this chapter within 12 months of its placement.

4. A utility distribution line or service connection may be placed on the surface of frozen ground, provided that it is placed underground within 12 months thereafter.

5. New facilities may be added to existing overhead utility distribution facilities located outside target areas.

6. A temporary utility distribution line may be placed overhead in connection with new construction if the utility's tariff approved by the state public utilities commission expressly provides for removal of that line by a date certain, not to exceed 12 months thereafter.

C. Variances

1. The director may grant a variance from subsection A. above when any of the following is found:

a. Placing a utility distribution line underground would cause an excessive adverse environmental impact;

b. Placing a utility distribution line underground would threaten public health and safety, because the placement cannot be shown to meet acceptable technical standards for safety; or

c. Placing a utility distribution line underground in an environmentally sound and safe manner would cost more than three times the cost of placing the line overhead, where the applicant demonstrates the relative cost to the satisfaction of the director.

2. The director may grant a variance from subsection A. above when he or she finds that the utility distribution line is being placed overhead temporarily for one of the reasons listed in this subsection:

a. The line is being placed to provide service when weather conditions do not allow excavation for underground placement;

b. A permanent location for underground placement is not available because of construction in progress; or

c. The line is being placed to provide service to a temporary use or structure.

A variance issued under this subsection C.2. shall expire within two years of its issuance.

D. Relationship to Chapter 21.12, *Nonconformities*

Existing overhead utility distribution lines located where this title requires new or relocated utility distribution lines to be placed underground are nonconforming utility distribution lines and are subject to the provisions of this subsection. A utility distribution line is not a nonconforming structure or use under chapter 21.12, *Nonconformities,* solely because it is a nonconforming overhead line under this section.

E. Nonconforming Overhead Lines in Dedicated Municipal Parks

1. When a utility proposes to underground an existing overhead utility distribution line located in a dedicated municipal park, and the overhead and underground alignment are identical, no fee shall be assessed to the utility for the value of the easement.

2. The public works department director may, upon request by a utility:

a. Grant an administrative variance from subsection E.1. above, up to five feet on either side of the existing overhead easement center line, to adjust the underground alignment.

b. An adjustment exceeding five feet on either side of the existing overhead easement center line shall require a new easement, including assessment of a fee for the value of the easement and administrative costs.

3. The utility shall remain solely responsible for municipal administrative fees and costs associated with the relocation, including but not limited to, a managing department application fee, and document research, review, and preparation.

4. The disposal procedures for interests in municipal land, set out in AMC chapter 25.30, and the variance procedure, set out in subsection C. above, shall not apply to this section.

F. Designation of Target Areas

1. An electric utility that owns poles that support nonconforming utility distribution lines shall prepare or otherwise include as part of its annual capital improvement plan, a five-year undergrounding program consistent with subsection G. below. This five-year program shall be updated on an annual basis. Priorities shall be based on undergrounding in conjunction with the electric utility's essential system improvements and then by target area as set forth below in no particular order of priority. The director shall review and provide comment for consideration by the electric utilities on these five-year programs. When reviewing and commenting on these programs, the director shall consider the following factors in no particular order of priority:

a. Whether undergrounding will avoid or eliminate an unusually heavy concentration of overhead distribution facilities.

b. Whether the street or general area is extensively used by the general public and carries a heavy volume of pedestrian or vehicular traffic.

c. Whether the appearance of grounds and structures adjacent to the roadway is such that the removal of the overhead facilities will substantially improve the general appearance of the area.

d. Whether the street or area affects a public recreation area or an area of scenic interest.

e. Whether there is a significant opportunity to achieve economies due to the anticipated relocation or replacement of overhead lines or the widening or realignment of streets within a given area.

f. Whether the five-year program sufficiently addresses the objectives of subsection G. below.

g. Whether the area under consideration is within a zone where new and relocated distribution lines are required to be placed underground.

h. Whether the installation of underground distribution lines is economically, technically and environmentally feasible, including the effect on the attached utility.

i. Whether undergrounding will avoid or eliminate overhead electric distribution or other attached utility facilities in a residential area with significant risk exposure to wildfire, high winds, or other natural disaster.

2. The director shall confirm annually that the electric utilities have developed project undergrounding implementation plans. The director shall consult with the utilities and public agencies affected by any implementation plan. In reviewing implementation plans, the director shall consider the factors stated in subsection F.1. above.

3. The following shall be target areas:

a. Central Business District: between and including Third Avenue and Tenth Avenue and L Street and Ingra Street.

b. Midtown area: between and including New Seward Highway and Minnesota Drive and International Airport Road and Fireweed Lane.

c. All municipal and state street improvement projects except for those which do not require relocation of utility distribution facilities.

d. The following major traffic corridors:

i. Old Seward Highway.

ii. Ingra and Gambell Streets between and including Ninth Avenue and Fireweed Lane.

iii. Northern Lights Boulevard and Benson Boulevard between and including Glenwood Street and Arlington Drive.

iv. Muldoon Road between and including New Glenn Highway and Patterson Street.

v. Tudor Road between and including Patterson Street and Arctic Boulevard.

vi. Boniface Parkway between and including 30th Avenue and New Glenn Highway.

vii. Spenard Road between and including Hillcrest Drive and International Airport Road.

viii. Arctic Boulevard between 17th Avenue and Tudor Road.

ix. Lake Otis Parkway between Tudor Road and Abbott Loop

e. All park, recreational use, and scenic interest areas.

f. Eagle River Central Business District between and including the New Glenn Highway, North Eagle River Access Road, Aurora Street as extended to the Old Glenn Highway, and the Old Glenn Highway.

g. Any area where utility distribution facilities are provided by more than one utility as a result of mergers and boundary changes approved by the state public utilities commission.

h. School and university areas.

i. Any residential area with significant risk exposure to wildfire, high winds, or other natural disaster.

G. Nonconforming Overhead Lines

1. An electric utility that owns poles that support nonconforming utility distribution lines shall remove the poles and place those lines underground. Any other utility that attaches to such poles shall place its lines underground at the same time that the pole owner places lines underground.

a. The electric utility that owns poles shall, in each fiscal year, expend at least two percent of a three-year average of its annual gross retail revenues derived from utility service connections within the municipality, excluding toll revenues, revenues from sales of natural gas to third parties, and revenues from sales of electric power for resale for purposes of undergrounding nonconforming lines. An electric utility's expenditures, pursuant to AS 42.05.381(h), within the municipality, shall be counted toward satisfaction of the two percent expenditure required by this subsection.

b. A utility with lines attached to a pole that is to be removed under this subsection shall place its lines underground at the same time that the pole owner places its lines underground. To underground nonconforming utility lines, an attached utility shall not be required to expend more than two percent of its annual gross retail revenues derived from utility service connections within the municipality, excluding toll revenues. For the purpose of satisfying subsection 21.07.050G., the utility's expenditures pursuant to AS 42.05.381(h) within the municipality are counted toward this two percent expenditure limit.

c. The electric utility that owns poles may choose which existing lines to underground in order to fulfill the two percent expenditure requirement, in consultation with appropriate public agencies and any other utilities.

d. An electric utility that owns poles that does not expend the amount required in subsection G.1. of this section, or that expends more than that amount, may carry over the under expenditure or over expenditure as an adjustment to the following year's obligation.

2. The electric utility that owns poles shall notify the director, and utilities or entities with lines attached to such poles, of the approximate date that the owner plans to remove the poles. Such notice, where possible, shall be given at least four months in advance of the undergrounding except where an emergency or other unforeseen circumstances preclude such notice, in which case such advance notice as is reasonable under the circumstances shall be provided.

3. A utility shall annually submit a report of its undergrounding projects and expenditures for non-conforming lines to the director within 120 days of the end of the preceding calendar year.

4. All new service connections shall be placed underground in the same manner as required for utility distribution lines under subsections A. and B. above. New service lines may be temporarily installed above ground from October through May, if placed underground prior to the next October.

H. Lines in Municipal Right-of-Way

1. The department of public works shall furnish to a utility owning or operating utility distribution lines all planning documents for municipal road construction that will require the relocation of those utility distribution lines.

2. Once a utility installing a utility distribution line underground in material compliance with a right-of-way permit issued by the department of public works and in accordance with this chapter, the municipality shall reimburse the cost of any subsequent relocation of the utility distribution line required by municipal road construction.

3. If municipal road construction requires the relocation of a nonconforming utility distribution line, the municipality, as part of the road construction project cost, shall reimburse the cost of the relocation. Reimbursable costs under this subsection include engineering and design, inspection, construction, and general overhead costs, but exclude utility plant betterment costs. Plant betterment costs are the costs of providing utility distribution line capacity or quality beyond what current industry standards require for the capacity or level of service existing before the relocation.

I. Conversion of Service Connections

A utility that places a nonconforming utility distribution line underground as required by subsection G. above shall bear the cost of placing underground any related service connections or other utility facilities on a customer's premises, in accordance with the utility's applicable tariff or rules or regulations of operation.

J. Landscaping

A utility shall provide written notice to property owners about planned projects that affect landscaping within utility easements.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13)

21.07.060 TRANSPORTATION AND CONNECTIVITY

A. Purpose

The purpose of this section 21.07.060 is to support the creation of a safe and highly connected transportation system within the municipality in order to provide choices for drivers, bicyclists, and pedestrians; increase effectiveness of municipal service delivery; promote walking and bicycling; connect neighborhoods to each other and to local destinations such as employment, schools, parks, and shopping centers; reduce vehicle miles of travel and travel times; improve air quality; reduce emergency response times; support the pattern of designated land uses; mitigate the traffic impacts of new development; create road and trail connectivity to free up arterial capacity while protecting neighborhood identity and safety; and, in high-volume traffic corridors, maintain an adequate degree of crossings for local circulation and minimize road and traffic impacts on adjacent uses.

B. Applicability

The standards of this section 21.07.060 shall apply to all development in the municipality.

C. Traffic Impact Mitigation

1. Traffic Impact Analysis Required

The transportation system for new development shall be capable of supporting the proposed development in addition to the existing uses in the area. Evaluation of system capacity shall be undertaken through a traffic impact analysis (TIA), which should consider the following factors without limitation: street capacity and level of service; vehicle access and loading; on-street parking impacts; the availability of transit service and connections to transit; impacts on adjacent neighborhoods; and traffic safety including pedestrian

safety. Unless the traffic engineer issues a substantiated written finding, based on location of the project and professional judgment, that there is no need for a TIA, a traffic impact analysis (TIA) shall be required with applications for development review and approval when:

a. Thresholds established in the traffic department's *Policy on Traffic Impact Analyses* are met;

b. A TIA is required by the planning and zoning commission or assembly as a condition of any land use application approved pursuant to the requirements of this title;

c. Any case where the traffic engineer determines that the previous TIA for the property is out of date and no longer accurate—in such case the TIA shall not be less than two years old;

d. Any case where increased land use intensity will result in substantially increased traffic generation or reduction of the existing level of service on affected streets by at least one service level; or

e. Any case in which the traffic engineer determines that a TIA should be required because of other traffic concerns that may be affected by the proposed development.

2. TIA and Development Review Process

a. Prior to the development of a required TIA, there shall be a scoping meeting that includes the traffic department, the applicant, and all other relevant parties.

b. The development and review of a TIA shall be according to the traffic department's *Policy on Traffic Impact Analyses*.

c. When state-owned roads are involved, the applicant shall coordinate with the state department of transportation and public facilities, and the development of a TIA shall follow state regulations as defined in 17 AAC 10.095.

3. Traffic Mitigation Measures

The applicant shall, as part of the traffic impact analysis, recommend measures to minimize and/or mitigate the anticipated impacts and determine the adequacy of the development's planned access points. Mitigation measures shall be acceptable to the traffic engineer and may include, without limitation: an access management plan; transportation demand management measures; a reduction in the intensity or size of the proposed development; street improvements on or off the site; phasing of the proposed development to coincide with, and not outpace, the necessary upgrades to off-site infrastructure; placement of pedestrian, bicycle, or transit facilities on or off the site; or other capital improvement projects such as traffic calming infrastructure or capacity improvements.

D. Streets and On-Site Vehicular Circulation

1. Street Standards

All streets shall meet the standards and requirements set forth in subsections 21.08.030F.2., *Street Grades*, 21.08.030F.4., *Street Alignment,* and 21.08.030F.5. *Street Intersections*.

2. Parking Lots

In addition to complying with the standards in this subsection 21.07.060D., parking lots shall comply with the standards set forth in section 21.07.090, *Off-Street Parking and Loading.*

3. Street Connectivity

a. *Purpose*

Street and block patterns should include a clear hierarchy of well-connected streets that distribute local traffic over multiple streets, providing multiple direct connections for neighborhood residents to and between local destinations, and avoid traffic congestion on principal routes. Within each residential development, the access and circulation system should accommodate the safe, efficient, and convenient movement of vehicles, bicycles, and pedestrians through the development; provide ample opportunities for linking adjacent neighborhoods, properties, and land uses; and be designed in such a way as to limit and discourage cut-through traffic and protect the new development and adjacent development from adverse impacts. This section is not intended to increase speed limits in neighborhoods, create opportunities for cut-through traffic, or encourage freight movement through residential areas.

b. *Internal Street Connectivity*

i. Developments, whether subdivisions or not, shall meet the block length requirements of subsection 21.08.030G.

ii. Whenever cul-de-sac streets are created, at least one 10 foot wide pedestrian access right-of-way or easement shall be provided, to the extent reasonably feasible, between each cul-de-sac head or street turnaround and the closest adjacent street or pedestrian walkway. This requirement shall not apply where it would result in damage to or intrusion into significant natural areas such as stream corridors, wetlands, and steep slope areas, or if the configuration of existing adjacent development prevents such a connection.

c. *External Street Connectivity*

i. The arrangement of streets in a development shall provide for the alignment and continuation of existing streets from the boundaries of the development. The arrangement of streets shall provide connections to adjacent lands that are undeveloped and intended for future development as required in subsection 3.e. below, or that are developed and include opportunities for such connections. This arrangement may be reduced or waived by the decision-making body if the applicant can show how connectivity is provided by a different arrangement of streets. Vehicular and/or pedestrian connections to adjacent municipal parks or municipal lands designated as parks shall be required unless waived by the director of the parks and recreation department.

ii. Street rights-of-way shall be extended to or along adjoining property boundaries such that a roadway connection or street stub shall be provided for development at least every 1,300 feet for each direction (north, south, east, and west) to the maximum extent feasible. The director may waive this requirement where the configuration of existing adjacent development, topography, or the presence of sensitive natural areas makes compliance impractical.

d. *Vehicular Access to Public Streets*

Unless the decision-making body determines otherwise, any development of more than 100 residential units or additions to existing developments such that the total number of units exceeds 100 shall be required to provide vehicular access to at least four public streets to the extent reasonably feasible, due to topography, natural features, or the configuration of existing adjacent developments. These connections (if possible) shall be made to foster and accommodate connectivity

into, out of, and within the new development, regardless of the macro-level access to and connectivity of the general area.

e. ***Connections to Vacant Land***
Where new development is adjacent to land likely to be developed or redeveloped in the future, all streets, sidewalks, pathways, trails, walkways, and access ways in the development's proposed street system shall continue through to the boundary lines of the site of new development, as determined by the director and the traffic engineer, to provide for the orderly subdivision of such adjacent land or the transportation and access needs of the community.

f. ***Neighborhood Protection from Cut-through Traffic***
Street connections should connect neighborhoods to each other and to local destinations such as schools, parks, greenbelt trail systems, and shopping areas, while minimizing neighborhood cut-through vehicle traffic movements that are non-local in nature. Configuration of local and internal streets and traffic calming measures should be used to discourage use of the local street system for cut-through collector or arterial vehicle traffic.

g. ***Pedestrian Connectivity***
Where the director and the traffic engineer have determined a vehicular connection required above is not feasible or appropriate, a pedestrian access way shall be provided as long as:

i. The topography and existing development patterns allow for pedestrian access; and

ii. The land uses allowed on either end of the potential pedestrian connection are such that may generate pedestrian traffic.

E. Standards for Pedestrian Facilities

1. Purpose
The purpose of this section is to provide convenient, safe, and regular pedestrian facilities along streets and within and between developments. Such facilities create a healthful built environment in which individuals have opportunities to incorporate physical activity, such as walking or bicycling, into their daily routine. Injuries and fatalities are reduced when interactions between pedestrians and vehicles are minimized. Adequate pedestrian facilities meet community goals for mobility and access, as well as for providing transportation choices. Safe pedestrian access for students to their schools is also an essential purpose of these standards.

2. Sidewalks
a. All sidewalks shall be designed to comply with the standards of the *Design Criteria Manual* (DCM) and *Municipality of Anchorage Standard Specifications* (MASS).

b. In all class A zoning districts except for industrial districts, sidewalks shall be installed on both sides of all streets (local, collector, arterial, public or private, including loop streets). Where indicated in the comprehensive plan, a pathway may replace a sidewalk on one side. In industrial zoning districts, a sidewalk shall be installed on one side of all local streets, and on both sides of local streets if the new sidewalks would connect to existing sidewalks on both ends and the needed sidewalk length is no greater than one quarter mile.

c. In cul-de-sacs in class A zoning districts, the following shall apply:

i. For cul-de-sacs with fewer than 150 average daily trips and with speeds limited to 25 miles per hour by design, no sidewalks are required on the cul-de-sac stem or bulb.

ii. For cul-de-sacs with 150 to 500 average daily trips, and for those with fewer than 150 average daily trips but a design speed of greater than 25 miles per hour, a sidewalk on one side of the cul-de-sac stem is required.

iii. For cul-de-sacs with more than 500 average daily trips, or for cul-de-sacs that are used to access a school or a park (notwithstanding subsections c.i. and c.ii. above), sidewalks on both sides of the stem are required.

iv. Average daily trips shall be computed by the traffic engineer.

d. In class B zoning districts, sidewalks, walkways, pathways, and trails shall be provided in accordance with the comprehensive plan. In all cases, pedestrian facilities shall be provided on at least one side of collector and arterial streets.

e. The requirements of 2.b. and 2.c. shall not apply in steep-slope areas where sidewalks on one side of the street may be approved by the director to reduce excessive slope disturbance, adverse impacts on natural resources, and potential soil erosion and drainage problems.

f. Development on lots along existing streets in class A zoning districts shall install sidewalks in the following situations:

i. In R-4, R-4A, and commercial districts.

ii. Along streets identified in Appendix A of the *Anchorage Pedestrian Plan* as “missing sidewalk” or “inadequate sidewalk”, with a total point rating of five or higher.

g. Where sidewalks are not specifically called for on both sides of the street by the comprehensive plan, the decision-making body may reduce a requirement to provide sidewalks (or other pedestrian facilities) on both sides of a street after considering the following:

i. Site conditions and the potential for significant negative impacts on the natural environment;

ii. The need to maintain and improve sidewalk continuity;

iii. Evidence that a sidewalk would decrease pedestrian safety;

iv. Extensive public testimony offering rational arguments against sidewalks;

v. Availability of an alternate trail system; and

vi. Vehicular speeds and pedestrian safety.

3. Through-Block Connections

Within new developments, pedestrian walkways, crosswalks, or multi-purpose trails no less than five feet in width shall be constructed near the center and entirely through any block that is 900 feet or more in length. This standard may be waived during a site plan review, if justified by the decision-making body.

4. On-Site Pedestrian Walkways

a. *Continuous Pedestrian Access*

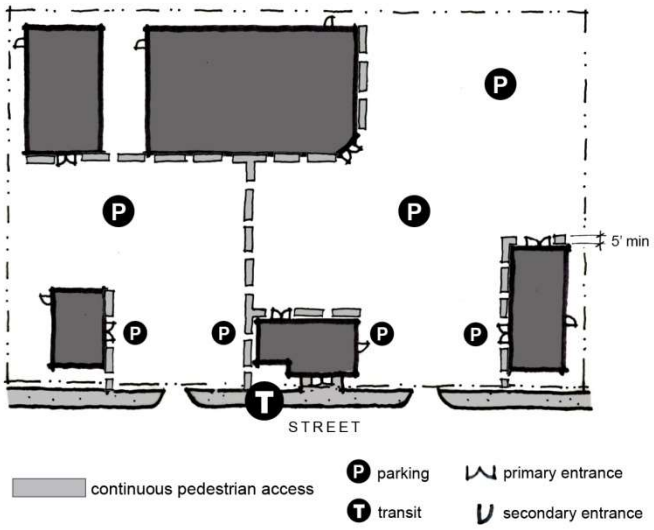
Pedestrian walkways are intended to form a convenient on-site circulation system that minimizes conflict between pedestrians and traffic at all points of pedestrian access to on-site parking and building entrances. This subsection E.4. does not apply to single- and two-family development, or to marijuana cultivation facility, marijuana manufacturing facility, industrial, and utility facility uses in the I-1, I-2, MC, and MI zoning districts.

b. *On-Site Pedestrian Connections*

The following walkways shall be provided. Where one walkway fulfills more than one requirement, only one walkway need be provided. If they can provide a relatively direct route, public pedestrian facilities such as public sidewalks shall satisfy any or all of the requirements below.

i. A walkway shall connect the primary entrance to the abutting primary street frontage, except where a proposed walkway connection to an alternative street frontage is determined by the director to provide equal or better pedestrian access. No walkway need be provided to the primary street frontage if that frontage is a restricted access street or a frontage road, unless there is a pathway or other pedestrian facility to which access can be provided along the restricted access street or frontage road, in which case a walkway shall connect to that pedestrian facility. The walkway route shall be clear and direct, to the extent reasonably feasible.

ii. All primary building entrances on a site shall be connected to the street by a convenient system of walkways. This includes multiple primary entrances into one building, and primary entrances in separate buildings on a site.



iii. A walkway shall connect the primary entrances to any transit stop abutting the site, where on an active transit route with scheduled service. The walkway shall be clear and direct to the extent reasonably feasible.

c. *Walkway Clear Width*

The minimum width of a required pedestrian walkway shall be five feet of unobstructed clear width, excluding vehicular overhang, except where otherwise

stated in this title. A walkway that provides access to no more than four residential dwelling units may provide an unobstructed clear width of three feet.

d. ***Walkways and Parking***

i. Where an on-site pedestrian walkway system or required pedestrian area abuts a parking lot or internal street or driveway, the pedestrian facility shall be clearly marked and physically separated from the parking lot or drive, through the use of an upright curb of six inches in height, bollards spaced a maximum of six feet apart, or other physical buffer approved by the traffic engineer; and a change of paving materials distinguished by color, texture, textured edge, or other edge, or striping.

ii. The vehicle overhang established in table 21.07-7, *Parking Angle, Stall And Aisle Dimensions*, shall not encroach into the minimum required walkway width or area.

iii. Where an on-site pedestrian walkway crosses an internal street or driveway, the crosswalk shall be clearly marked and delineated through a change in paving materials distinguished by color, texture, textured edge, other edge, or striping, and shall meet the requirements of the Americans with Disabilities Act.

iv. Multifamily or townhouse developments may provide a parking courtyard in lieu of required walkways, where specifically allowed in section 21.07.110 and in conformance with subsection 21.07.060F.18.

e. ***Walkways, Landscaping, and Open Space***

Walkways shall be credited toward a required private open space where they are contiguous. A walkway that crosses a required landscaping bed (at or near perpendicular) shall be credited against the required landscaping area and amount of planting material.

5. Trails

All trails shall meet the following requirements in addition to the standards contained in the *Areawide Trails Plan*, *Design Criteria Manual* (DCM), and *Municipality of Anchorage Standard Specifications* (MASS)*:*

a. All trail connections shall be well-signed with destination and directional signing as approved by the traffic engineer or the parks director as appropriate.

b. Trails shall be designed in such a manner that motor vehicle crossings can be eliminated or significantly minimized.

c. Trails that connect to the street system shall do so in a safe and convenient manner as determined by the traffic engineer.

6. Use and Maintenance of Sidewalks, Walkways, Pathways, and Trails

a. ***Restrictions on Use***

Sidewalks, walkways, pathways, and trails are intended to provide pedestrian access. Vehicle parking, snow storage, garbage containers, merchandise storage or display, utility boxes and poles, signs, trees, and other obstructions shall not encroach into the required minimum clear width of any required sidewalk, walkway, pathway, trail, or other pedestrian way. Pedestrian amenities including bollards are exempt from this requirement.

b. ***Maintenance and Snow Removal***

Walkways required by this title shall be maintained in usable condition throughout the year, including snow and ice removal as appropriate. Sidewalks shall be maintained in a usable condition in accordance with AMC title 24.

F. Pedestrian Amenities

1. Purpose

The purpose of this section is to define and provide standards for pedestrian amenities that may be required or included in a menu of choices to meet a requirement, or listed as a special feature that can count toward a bonus incentive anywhere in this title. For example, another section of this title may list a pedestrian amenity as a special feature for which bonus floor area may be granted. The standards contained in this section give predictability for applicants, decision-makers, and the community for the minimum acceptable standards for pedestrian amenities. It also ensures the amenities will improve and enhance the community to the benefit of all, and respond to the northern latitude climate. This title provides flexibility to encourage and allow for creativity and unique situations through the alternative equivalent compliance and minor modifications process.

2. Applicability

Pedestrian amenities shall meet the minimum standards of this section in order to be credited toward a requirement, menu choice, or as a special feature bonus incentive of this title.

3. Walkway

A walkway is a surface that connects two points for pedestrian use, as defined in chapter 21.14. A walkway may be in a publicly dedicated pedestrian easement. Examples include pedestrian connections within one development site, mid-block, between subdivisions, or leading from streets to public amenities, such as schools or parks.

a. A walkway shall have a minimum unobstructed clear width of five feet, except where otherwise stated in this title. A walkway that provides access to no more than four residential dwelling units may have an unobstructed clear width of three feet.

b. Walkways shall be improved in accordance with subsection 21.08.050H.

4. Primary Pedestrian Walkway

A primary pedestrian walkway is intended to provide an unobstructed clear width of at least eight feet for pedestrian movement with additional space incorporating features along the walkway such as storefront sidewalk space, room for residential stoops or building foundation plantings, and peripheral space that accommodates landscaping, furniture, and utilities. As established generally in subsection F.1 and F. 2 above, the standards of this subsection apply only where the specific term "primary pedestrian walkway" is listed as a requirement, menu choice, or special feature that counts toward a bonus. Thus subsection is not a generally applicable requirement for other large walkways.

a. A primary pedestrian walkway shall be developed as a continuous pedestrian route extending for at least 50 feet.

b. A primary pedestrian walkway shall have an unobstructed clear width of at least eight feet. Where adjacent to a ground-floor building elevation it shall also have a sidewalk storefront or building interface zone a minimum of two feet in width for foundation landscaping or three feet in width of sidewalk space for opening doors or seating and transition pedestrian spaces. In addition, a buffer space of at least four feet in width shall be incorporated as part of the walkway when abutting any street or vehicle area, to accommodate street trees, landscaping beds, light poles, utilities, benches, and other objects to be kept clear of the walkway.

c. At least one pedestrian feature as defined by this title shall be provided for every 50 feet of length along a primary pedestrian walkway.

d. A primary pedestrian walkway shall be illuminated with pedestrian scale lighting.

e. A primary pedestrian walkway shall directly connect to surrounding public streets and sidewalks, and be publicly accessible at all times.

5. Ice-Free (Snow Melting) Walkway

An ice-free (snow melting) walkway has a heated surface for the full extent of the walkway clear width. The walkway shall be maintained as ice-free at all times in areas required to be publicly accessible, and otherwise during all hours of operation of an establishment.

6. Plaza or Courtyard

A plaza is an open space which is designed to be used for relaxation, conversation, eating, or other outdoor activities.

a. A plaza shall contain at least one pedestrian feature as defined by this title for each 200 square feet of plaza or courtyard area.

b. A plaza shall be visible and directly accessible from the public sidewalk and at no point be more than five feet above nor more than 12 feet below the curb level of the nearest street.

c. A plaza shall be unobstructed to the sky except for certain permitted obstructions such as canopies or awnings, landscaping, or ornamental features such as fountains and flag poles.

d. A plaza shall be positioned so that at least two-thirds of its area receives access to at least four hours of direct or reflected sunlight on March 21 and September 21. A plaza or courtyard may be credited towards a requirement, menu choice, or bonus as long as it meets this standard. The director may reduce this requirement in cases where topography or vegetation shadow the site. Reductions shall be the minimal action that would address these factors.

e. Plazas shall not be paved with asphalt.

7. Housing Courtyard

A housing courtyard may be created when a multifamily building or buildings are arranged or configured to enclose and frame a common private open space. To receive credit as a housing courtyard, the space shall achieve the following:

a. The residential building(s) shall enclose a clearly defined courtyard open space. The structure(s) surrounding the housing courtyard may, for example, form an O, L, or U shaped enclosure.

b. A courtyard shall comply with the plaza requirement for pedestrian features, and with the common private open space standards of section 21.07.030.

c. All individual dwelling units around the perimeter of a courtyard shall have windows, entrances, and/or transitional spaces such as porches or balconies that face the courtyard.

d. A courtyard shall have a solar orientation as defined by this title in terms of openings in the courtyard and the lower height of surrounding buildings.

8. Transit Stop or Transit Shelter

A transit stop or transit shelter shall meet or exceed the minimum design standards established by the transit facilities design guidelines in the *Design Criteria Manual*.

9. Pedestrian Shelter such as a Canopy, Awning, or Marquee

A pedestrian shelter is a roof-like structure extending out from the building face that provides year round overhead protection from precipitation and wind, and that can provide visual interest and wayfinding orientation to primary entrances, passenger loading areas, or waiting areas. Pedestrian shelter may be composed of awnings, canopies, marquees, cantilevered overhangs, colonnades, or similar overhangs along the pedestrian route.

a. A pedestrian shelter shall have a minimum dimension of six feet measured horizontally from the building wall, or shall extend to a line two feet from the curb line of the street or nearest motor vehicle area, whichever is less.

b. A pedestrian shelter shall have a minimum vertical clearance of eight feet and a maximum vertical clearance of 12 feet, except that a pedestrian shelter that projects out more than eight feet measured horizontally from the building wall shall have a maximum vertical clearance of 16 feet.

c. A pedestrian shelter may be indented as necessary to accommodate street trees, landscaping beds, street lights, bay windows, or similar building accessories. A pedestrian shelter shall not extend out to within three feet of the center of the main trunk of a street tree.

d. A pedestrian shelter shall incorporate architectural design features of the building from which it is supported.

10. Arcade (or Building Recess)

An arcade is a covered passageway created by the overhanging upper portion of the building along a sidewalk or walkway to provide a sheltered area at grade level. An arcade is usually separated from the adjacent street, sidewalk/walkway, or pedestrian space by a line of supporting columns or arches. A ground level building recess without supporting columns may also receive credit if it achieves the following standards:

a. An arcade shall be developed as a continuous covered space extending along a street, plaza, or courtyard or other pedestrian open space. An arcade shall be open for its entire length to the street or pedestrian open space, except for building columns.

b. An arcade shall have a minimum vertical clearance of no less than 12 feet, and on average no greater than 18 feet.

c. An arcade shall have a minimum horizontal walkway clear width of eight feet between the building and any supporting columns, and a maximum covered width of 20 feet.

d. An arcade shall not at any point be above the level of the adjacent sidewalk, walkway, or pedestrian open space (whichever is higher). The width and spacing of the supporting columns shall be such that maximum visibility is maintained.

e. The spacing and rhythm of the supporting columns shall relate to the structural or architectural pattern of the building and shall be consistent along the length of the arcade.

f. No off-street parking spaces, passenger loading zones, driveways, or off-street loading berths are permitted anywhere within an arcade or within 10 feet of any portion thereof, unless the decision-making body determines that such activity will not adversely affect the air quality or functioning of the arcade. In no event shall such vehicular areas be eligible for credit as part of the arcade.

g. An arcade shall be publicly accessible at all times.

11. Atrium, Galleria, or Winter Garden

An atrium, galleria, or winter garden is a publicly accessible sunlit interior space suited for year-round public use, and which takes advantage of windows and sunlight access to provide brightness, orientation, and visual connections to the outdoors.

a. An atrium, galleria, or winter garden shall be developed and maintained as a temperature controlled, publicly accessible space furnished with features and amenities that encourage its use.

b. An atrium, galleria, or winter garden shall contain at least one pedestrian feature as defined by this title for each 200 square feet of floor area.

c. An atrium, galleria, or winter garden shall be co-located with primary entrances and pedestrian activity areas, and either adjoin or directly connect to a publicly accessible sidewalk or open space.

d. The publicly accessible portion of the atrium, galleria, or winter garden shall be at least 400 square feet, with a minimum dimension of 16 feet.

e. At least half of an atrium, galleria, or winter garden's ceiling area and at least a portion of its wall area shall consist of transparent glazing.

f. An atrium, galleria, or winter garden shall have access to direct and/or reflected sunlight for at least four hours daily for eight months of the year.

12. Sun Pocket (or Sun Trap)

A sun pocket or sun trap is a pedestrian space that captures direct and reflected sunlight. A sun pocket shall be a clearly defined open space partly sheltered by building walls, fences, or landscape features, such as a C, L, or U shaped semi-enclosure. The protected space shall contain at least 250 square feet of pedestrian area that is exposed to direct and reflected sunlight access for at least six hours on March 21 and September 21.

13. Reflected Sunlight

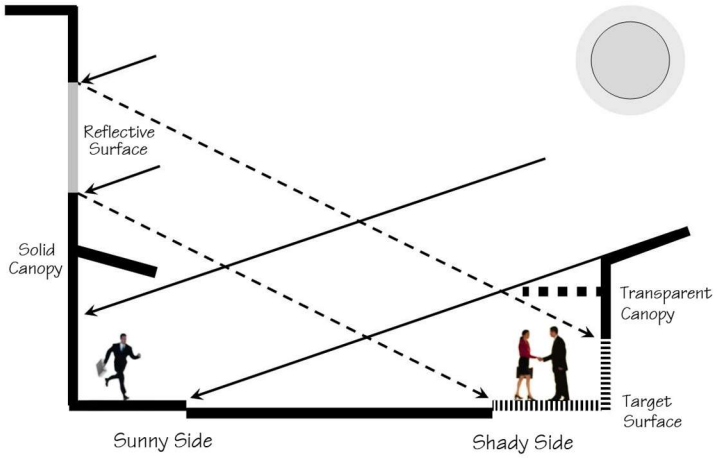
Reflected sunlight as a pedestrian amenity is created by a light-colored, partially reflective, upper-story façade surface that redirects sunlight radiation to pedestrian spaces and walkways to brighten or increase the comfort level in those spaces.

a. The reflective façade surface shall have a solar orientation.

b. The reflective façade surface shall have a reflectance of at least 50 percent and no greater than 75 percent in order to avoid excessive glare.

c. The reflective façade surface shall be an upper floor above ground-level.

d. Reflected sunlight shall fall on at least 400 square feet of a publicly accessible walkway, open space, and/or abutting ground-level wall area for at least four hours on March 21 and September 21.



14. Sheltered Transition Space

A sheltered transition space is an outdoor or glass covered space such as café seating along a building façade that provides a comfortable transition between indoor areas and unsheltered outdoor spaces.

a. A sheltered transition space shall be a minimum of 400 square feet.

b. A sheltered transition space shall comply with the dimensional standards for pedestrian shelter or arcade.

c. A sheltered transition space shall contain a minimum of one pedestrian feature as defined by this title.

d. A sheltered transition space shall not obstruct the minimum clear width of the adjoining walkway or sidewalk.

15. Bicycle Parking Facilities

a. Required bicycle parking or a sign leading thereto shall be located in an area visible from a primary entrance area and no farther from a primary entrance than the closest motor vehicle parking space, not including designated accessible parking, carpool, or vanpool spaces. It may also be located inside the building served, in a location that is easily accessible for bicycles.

b. A required bicycle parking space shall include a securely fixed structure that allows the bicycle wheel and frame to be locked to the facility, and that supports the bicycle frame in a stable position without damage to the bicycle, or shall be in a bicycle locker, lockable bicycle enclosure, or lockable room.

c. A required bicycle parking space shall be a minimum of six feet long and two feet wide.

d. The surfacing of bicycle parking facilities shall be designed and maintained to be clear of mud and snow.

e. Bicycle parking shall not obstruct pedestrian walkways, building access, or use areas.

16. Pedestrian-Interactive Use

A pedestrian-interactive use is intended to provide ground-floor spaces that strongly engage the sidewalk with street-facing windows and entrances, feature activities and

services that support neighborhood residents, and generally contribute to the pedestrian-oriented environment. The standards that follow apply where the term "pedestrian-interactive use" is listed in this title as a requirement, special feature for a bonus, or a menu choice.

a. A pedestrian-interactive use shall be any of the following uses that are permitted in the district: retail and pet services; financial institution providing banking services open to the public with at least one employee on site; food or beverage service; personal service; cultural facility; or the frontage of entryways or stairways through which such uses are principally accessed;

b. Retail sales uses that are permitted in the district shall be considered pedestrian-interactive uses, except for the following types of retail sales uses: fueling station; building materials store.

c. The following uses supporting residential neighborhood and housing development are also considered pedestrian-interactive uses when permitted in the district: residential dwellings with individual front entries along the street; elementary school; middle or high school; health services; child care center.

d. A pedestrian-interactive use shall provide a primary entrance facing the street. Entrances at building corners facing a street may be used to satisfy this requirement.

e. A pedestrian-interactive use shall contain habitable floor area at least 24 feet deep extending along the full length of the ground-floor, street-facing building elevation, allowing for pedestrian and vehicle entrances, entry lobbies or atriums, and stairwells.

f. A pedestrian-interactive use shall comply with subsection 21.06.030C.5., *Maximum Setbacks*, but the exceptions of subsection 21.06.030C.5.d. shall not be available.

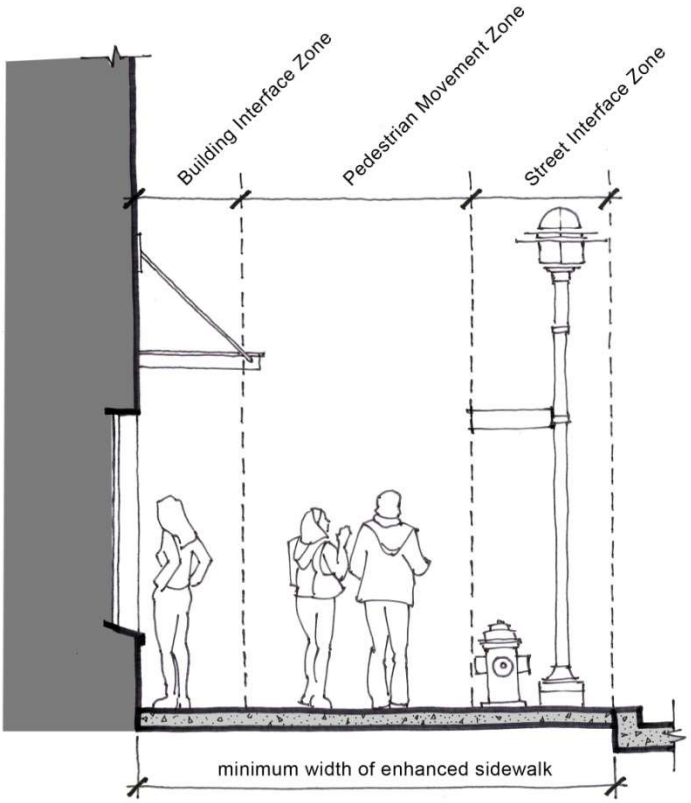
g. Street-facing ground-floor wall areas of a pedestrian-interactive use shall be 67 percent visual access windows, except that such wall areas for dwellings shall be at least 20 percent visual access windows.

h. Where a building has three or more street frontages, these criteria apply along only two of the frontages.

17. Enhanced Sidewalk Option

An enhanced sidewalk promotes sidewalk widening and streetscape enhancements to support higher levels of pedestrian activity and access in mixed-use developments. An enhanced sidewalk environment with "main street" style amenities may be provided in lieu of required site perimeter landscaping where it is logical to support a pedestrian zone as determined through an administrative site plan review, and subject to the following:

a. The sidewalk width shall be at least 12 feet, and include a pedestrian movement zone, building interface zone, and street interface zone. The street interface zone shall be at least four feet wide along major arterials. At least part of the development's frontage along the enhanced sidewalk shall feature a principal building with a 20-foot maximum setback in compliance with subsection 21.06.030C.5.



Enhanced Sidewalk in a Commercial Setting

i. A public use easement shall be recorded for any part of the designated sidewalk to be located within the subject parcel.

ii. Physical obstructions within the sidewalk's building interface zone, such as landscaping, entry stoops, or seating, shall extend no more than two feet into the minimum required 12 foot width, so that at least ten feet remain.

b. The enhanced sidewalk shall provide at least two-thirds the number of trees and shrubs required for site perimeter landscaping.

c. The enhanced sidewalk may be placed wholly or in part within a right-of-way, subject to approval of the traffic engineer and municipal engineer.

i. The enhanced sidewalk shall be subject to the applicable requirements of title 24, including sections 24.30.020., *Permit to use Public Places*, and 24.90, *Encroachment Permit*.

ii. Improvements within the public right-of-way shall be consistent with the DCM and MASS.

iii. Existing improvements that meet the standards of the enhanced sidewalk may be counted towards the requirements of this section, subject to approval by the director.

iv. The owner shall maintain landscaping and amenities for the enhanced sidewalk within the right-of-way, and comply with the provisions for removal of snow and ice in AMC 24.80.090, 100, and 110.

v. Where the right-of-way is not adequate or cannot be configured to accommodate the enhanced sidewalk, then the development shall be set back from the street frontage as necessary to accommodate part of the improvements within the property.

18. Parking Courtyard

A parking courtyard is a pedestrian-oriented parking facility for residential developments that uses the principles of a "Woonerf Street" or "Play Street." It is designed and operated as a shared space to allow all resident users, not only drivers, to use it safely. A parking courtyard that is credited towards a residential pedestrian facility requirement or menu choice of this title shall meet the following standards:

a. An administrative site plan review is performed, unless a higher level of review is already required;

b. The parking courtyard serves no more than eight dwelling units and contains no more than 12 parking spaces (not including garage spaces in individual dwellings);

c. The parking courtyard is a dead end and does not lead or provide access to other dwelling units, parking facilities, or streets;

d. A walkway is provided between the parking courtyard and the street—the common access driveway does not qualify as a pedestrian walkway;

e. A special paving scheme and landscape treatment is applied, as approved through the review;

f. The space is designed for both vehicles and people, with an emphasis on pedestrians and usable, safe, and attractive pedestrian and play space, as approved through the review; and

g. The parking courtyard achieves the intent of this title for pedestrian access, as determined through the review.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2015-82, 7-28-15; AO 2015-100, 10-13-15; AO 2017-55, 4-11-17)

21.07.070 NEIGHBORHOOD PROTECTION STANDARDS

A. Purpose and Relationship to Other Requirements

This section makes available a menu of additional tools to use in discretionary approvals to protect residential neighborhoods from potential adverse impacts of adjacent nonresidential uses, including limitations on hours of operation, noise, and lighting.

B. Discretionary Conditions

A decision-making body through application of this section shall:

1. Make findings regarding the potential adverse impact that is anticipated by the proposed development;

2. Propose conditions that are specifically related and commensurate to the anticipated impacts identified in the findings; and

3. Propose conditions that are the minimum necessary to avoid or mitigate the anticipated impacts identified in the findings.

C. Nonresidential Development Adjacent to Existing Residential Use

As a condition of the approval of any conditional use permit, site plan review, subdivision, or variance of any nonresidential use located within 200 feet of any residential district, the decision-making body shall be authorized to impose conditions that are necessary to reduce or minimize any potential adverse impacts on residential property. Such conditions shall be based on findings which support the imposed condition as required by subsection 21.07.070B., and may include but are not limited to the following:

1. Hours of operation and deliveries;

2. Location on a site of activities that generate potential adverse impacts on adjacent uses, such as noise and glare;

3. Placement of trash receptacles, compactors, or recycling;

4. Location and screening of loading and delivery areas, garages, vehicle fleet parking, or vehicle maintenance areas;

5. Lighting location, intensity, and hours of illumination;

6. Placement and illumination of outdoor vending machines, telephones, or similar outdoor services and activities;

7. Additional landscaping and screening to mitigate adverse impacts;

8. Height restrictions to preserve light and privacy;

9. Ventilation and control of odors and fumes;

10. Paving to control dust; and

11. Location and orientation of changeable type or illuminated signs, to protect residential character and privacy and views from residential units.

D. Residential Development Adjacent To Existing Nonresidential Use

When a residential development is proposed adjacent to an existing commercial, commercial marijuana, or industrial use, the decision-making body may impose neighborhood protection standards, including but not limited to increased landscaping, traffic calming measures, and requiring the residential development to be configured and dwelling units located to minimize potential conflicts with or adverse impacts from the existing nonresidential development. Any required mitigation measures shall be installed and maintained by the residential development, not the existing commercial, commercial marijuana or industrial use.

(AO 2012-124(S), 2-26-13; AO 2017-55, 4-11-17)

21.07.080 LANDSCAPING, SCREENING, AND FENCES

A. Purpose

This section is intended to ensure that new landscaping and the retention of existing vegetation is an integral part of all development. It is also the intent of this section to provide flexible requirements that encourage and allow for creativity in landscape design. More specifically, these provisions are intended to:

1. Visually enhance industrial, commercial, commercial marijuana, community use, and residential development through retention of existing native or ornamental vegetation or through new landscaping improvements.

2. Integrate new or renovated development into the surrounding context of the community including its neighborhoods and street corridors.

3. Separate, screen, and buffer adjacent incompatible land uses through the use of landscape plantings, fencing, and other appropriate landscape architectural features.

4. Reduce and treat runoff of storm water to preserve the quality of local streams and water bodies.

5. Promote the use of existing vegetation and retention of trees, woodlands, habitat, and urban forest.

6. Reduce runoff and erosion, control dust, and preserve air and water quality.

7. Encourage use of native plants or provide landscaping that is compatible with the climate and natural setting of the municipality and can provide desired effects even during harsh urban and winter conditions.

B. Exemption for Temporary Uses

Unless required under section 21.05.080, temporary uses in accordance with section 21.05.080 are exempt from the requirements of this section.

C. Landscape Plan

1. All landscaping and screening required under this section 21.07.080 shall be reflected on a landscape plan for review and approval by the decision-making body.

2. Except for lots where there is a single principal structure containing between one and four dwelling units and any development of a single principal structure where the sum of the required perimeter and parking lot landscaping is less than 1,000 square feet, all development shall have a landscape plan prepared by a licensed landscape architect registered by the state of Alaska consistent with AS 08.48 and 12 AAC 36, for review and approval by the decision-making body. Minimum requirements for the landscape plan are as follows:

a. Plan scale shall be easily readable and not smaller than one inch equals 30 feet.

b. Plans and/or schedules shall call out the common and scientific name for each plant type or ground cover to be used.

c. The plan shall identify plant locations and sizes in accordance with the sizing standards of the American Standard for Nursery Stock (ANSI Z60.1-2004) as published by the American Nursery and Landscape Association.

d. The plan shall identify locations and areas where existing native vegetation is being used to fulfill the requirements of this section.

e. The location of buildings, walkways, vehicular circulation (to include adjacent streets), retaining walls, and fences shall be indicated.

f. Topography, expressed in contours or spot elevations, shall be identified on plans. Additionally, all drainage features to include swales, biofiltration swales, drainage basins, snow storage and disposal areas, and any inlets for storm drains shall be identified on plans. A separate plan, detailing site grading, that includes contours and/or spot elevations is acceptable.

g. The plan shall identify existing and proposed utility elements such as easements, transformers, utility poles, overhead and underground utility lines, street lights, and curb cuts that affect the landscape plan.

h. Planting details shall be provided.

i. North arrow and scale shall be included.

D. Cross-References to Other Requirements

1. Landscaping

Any use that is required to provide landscaping or screening pursuant to the district-specific standards of chapters 21.04, 21.09, and, 21.10; the use-specific standards of chapters 21.05, 21.09, and 21.10; or any applicable standards of other sections of this chapter 21.07, chapter 21.09, or chapter 21.10; shall provide such landscaping or screening. In the event of a conflict between other requirements and the requirements of this section 21.07.080, the more restrictive provisions shall govern.

2. Walkways

Refer to subsection 21.07.060E.4.e.

3. Parking and Loading Facilities and Vehicular Overhangs

Refer to subsections 21.07.090H.3. and H.9.

4. Private Open Space

Refer to subsection 21.07.030D.

5. Snow Storage

Refer to subsection 21.07.040F.

E. Types of Landscaping

Four types of landscaping may be required for a development, depending on the use and zoning district of the property and adjacent properties, and the portion of the property involved. These types of landscaping are: (1) site perimeter landscaping; (2) parking lot landscaping—perimeter and interior; (3) site enhancement landscaping applied in site interiors; and (4) tree requirements for new residential development. Minimum requirements for these landscaping types are set forth in subsections 21.07.080E.1. through E.4. below and in table 21.07-1.

1

TABLE 21.07-1: LANDSCAPING SPECIFICATIONS			
TYPE OF LANDSCAPING	**BED WIDTH OR AREA/LOCATION REQUIRED**	**PLANT MATERIALS REQUIRED**	**OPTIONAL DESIGN STANDARDS**
SITE PERIMETER LANDSCAPING REQUIREMENTS			
Visual Enhancement Landscaping (L1)	Minimum average planting bed width: 8 feet as measured for each leg of the perimeter. Minimum planting bed width: 5 feet. No more than one-half the property line length or 50 feet, whichever is less, may have a planting bed width less than 8 feet in width. The maximum bed width used for the calculation of average bed width may not be greater than 12 feet.	Provide 1 tree and 6 shrubs per 20 linear feet of property line requiring visual enhancement landscaping. All areas within the planting bed shall be covered with living ground cover, turf, or mulch. All trees, shrubs, and ground covers shall be chosen for suitable hardiness and length of season for the specific area to be planted.	Use of raised planters, pedestrian amenities, and pedestrian scale lighting may be used to offset up to 1/3 of trees and 1/3 of shrubs, through an administrative site plan review. Up to 1/2 of total required shrubs may be substituted with perennial plantings at a ratio of three 1-gallon container perennials for every shrub required. Trees may be substituted with an equal number of shrubs at 6-foot minimum planting height in utility easements with overhead lines.
Buffer Landscaping (L2)	Minimum average planting bed width shall be 15 feet, with minimum width at any point not less than 10 feet, except as modified by the Optional Design Standards, in which case the overall minimum planting bed width shall be 10 feet.	Provide 2 trees and 6 shrubs per 20 linear feet of property line requiring buffer landscaping. At minimum, 1/2 of all trees shall be coniferous. Distribute trees and shrubs evenly along the length of the planting bed. All areas within the planting bed shall be covered with living ground cover, turf, or mulch. If relying on existing vegetation to meet these requirements, use of a site-obscuring or screening fence as an optional design standard is not allowed. All trees, shrubs, and ground covers shall be chosen for suitable hardiness and length of season for the specific area to be planted.	A 6-foot high ornamental sight-obscuring or screening fence may be used in lieu of 5 feet of planting bed width on side or rear property lines, but not along streets or street rights-of-way. The fence shall be situated within or on the edge of the planting bed, except where utilities or existing conditions create a conflict. Trees may be substituted with an equal number of shrubs at 6 feet minimum planting height in utility easements with overhead lines.
Screening Landscaping (L3)	Minimum planting bed width of 30 feet, except as allowed by the Optional Design Standards.	Provide 3 trees and 10 shrubs per 20 linear feet of property line requiring screening landscaping. At minimum, 75% of all trees shall be coniferous. Trees and shrubs shall be evenly distributed along the frontage. All areas within the planting bed shall be covered with living ground cover, turf, or mulch. All trees, shrubs, and ground covers shall be chosen for suitable hardiness and length of season for the specific area to be planted.	On side or rear property lines, but not along streets or street rights-of-way, planting bed width may be reduced by 10 feet with provision of an eight-foot high ornamental screening fence.

TABLE 21.07-1: LANDSCAPING SPECIFICATIONS			
TYPE OF LANDSCAPING	**BED WIDTH OR AREA/LOCATION REQUIRED**	**PLANT MATERIALS REQUIRED**	**OPTIONAL DESIGN STANDARDS**
Freeway Landscaping (L4)	Freeway landscaping requirements shall apply to any lot abutting the right-of-way of: 1. Seward Highway between Tudor Road and Potter Valley Road. 2. Glenn Highway between Boniface Parkway and the northern municipal boundary. 3. Minnesota Drive/O'Mally Road between International Airport Road and the Old Seward Highway. Minimum planting bed width of 30 feet, except as allowed by the Optional Design Standards.	Provide 3 trees and 10 shrubs per 20 linear feet of property line requiring freeway landscaping. At minimum, 1/2 of all trees shall be coniferous. Trees and shrubs may be distributed along frontage at owner's discretion. All areas within the planting bed shall be covered with living ground cover, turf, or mulch. All trees, shrubs, and ground covers shall be chosen for suitable hardiness and length of season for the specific area to be planted.	Planting bed width may be reduced by 10 feet with provision of an 8-foot high ornamental screening fence. If this option is chosen, the fence shall be set back 20 feet from the right-of-way, plant material requirements remain the same, and all required plantings shall be on the freeway side of the fence.
PARKING LOT LANDSCAPING REQUIREMENTS			
Parking Lot Perimeter Landscaping	Same as perimeter landscaping bed width requirements for L1 or L2 landscaping, as applicable. Refer to L1 and L2 perimeter landscaping requirements above in this table.	As required for L1 visual enhancement or L2 buffer landscaping (see subsection E.2.b.ii.) When not serving as required site perimeter landscaping, trees and shrubs may be grouped to best serve the design intentions for the site and promote safe use. Sight-lines for entry and egress shall be considered for placement of landscaping.	Where L1 visual enhancement landscaping is required in the same location as site perimeter landscaping, the requirement for parking lot landscaping takes precedence—no use of optional design standards allowed. Where parking lot perimeter landscaping is in the same location as a higher level of site perimeter landscaping, the site perimeter landscaping requirement takes precedence.
Parking Lot Interior Landscaping	Provide total area in accordance with parking lot interior landscaping requirements in subsection E.2.c. Minimum area for individual beds shall be 165 square feet. Minimum bed width: 8 feet.	1 tree and 6 shrubs per 150 square feet of total internal landscaping required. All areas within the planting bed shall be covered with living ground cover, turf, or mulch. Plant materials shall be evenly distributed throughout planting beds in the parking lot.	Individual planting beds that are designed to be used for biofiltration may substitute up to 3/4 of the required trees and 2/3 of the required shrubs with site appropriate herbaceous plant material in planting beds designed as rain gardens according to the municipal Low Impact Development Design Guidance Manual (latest edition), at a ratio of 12 plants per tree and 2 plants per shrub.
SITE ENHANCEMENT LANDSCAPING REQUIREMENTS			
Site Enhancement Landscaping	Provide on all areas of the site not occupied by buildings, structures, driveways, walkways, off-street parking, or other authorized uses or installations, and not otherwise devoted to landscaping required by this title.	Areas subject to site enhancement landscaping shall be covered with living ground cover, turf, or planting beds with trees and shrubs, at the discretion of the property owner. Existing natural vegetation can be applied toward meeting site enhancement landscaping requirements.	

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1. Site Perimeter Landscaping Requirements

a. *Purpose*

Site perimeter landscaping separates land uses of different characteristics or intensities, to minimize the effects of one land use on another. Perimeter landscaping also marks the interface between public streets and individual property. Four basic levels of site perimeter landscaping are provided to accommodate a variety of land uses at a variety of intensities: (1) visual enhancement landscaping; (2) buffer landscaping; (3) screening landscaping; (4) freeway landscaping. Specifications for these landscaping types are found in table 21.07-1.

b. *Applicability*

Site perimeter landscaping shall be provided along the perimeter property line of development sites in accordance with table 21.07-2, except for the following:

i. At approved points of pedestrian or vehicle access;

ii. On individual single-family and two-family lots that are not being developed as part of a subdivision, unless required elsewhere in this title; and

iii. Along alleys.

c. *Exceptions*

i. Development which is eligible to use enhanced “main street” style sidewalk environment standards of subsection 21.07.060F.17. may use those standards that modify the requirements of required visual enhancement or buffer landscaping along public streets.

ii. L4 freeway landscaping may be replaced with L2 buffer landscaping in the following situations:

(A) Any lot whose area, less the 30-foot setback area for the L4 freeway landscaping, is less than the minimum lot area required in the zoning district; or

(B) Any lot whose depth, excluding all setbacks required by this title, is less than 100 feet.

TABLE 21.07-2: MINIMUM SITE PERIMETER LANDSCAPING – BY ABUTTING DISTRICT OR STREET

	Required Level of Site Perimeter Landscaping (Levels 1-4) [1, 2]												
Abutting District or Street / District of Proposed Development	**R-6, R-8, R-9, R-10, TA**	**R-1, R-1A, R-2A, R-2D, R-5, R-7**	**R-2M**	**R-3**	**R-4, R-4A**	**PLI**	**B-1A, B-1B, B-3, RO**	**I-1, I-2, MC, MI**	**PR**	**Freeway**	**Arterial, Expressway**	**Collector**	**Local Street**
R-6, R-8, R-9, R-10, TA		L2	L2	L2	L2	L2	L2	L2		L4	L2		
R-1, R-1A, R-2A, R-2D, R-5, R-7	L2		L2	L2	L2	L2	L2	L2		L4	L2	L1	
R-2M	L2	L2			L2	L2	L2	L2		L4	L2	L1	
R-3	L2	L2				L2	L2	L2		L4	L2	L1	L1
R-4, R-4A	L2	L2	L2			L2	L1	L2		L4	L1	L1	L1
PLI	L2	L2	L2	L2	L2		L1	L1	L1	L4	L1	L1	L1
B-1A, B-1B, B-3, RO	L2	L2	L2	L1	L1	L1		L1	L2	L4	L1	L1	L1
I-1, I-2, MC, MI, AF	L2	L2	L2	L2	L2	L1	L1		L2	L4	L1	L1	L1
PR						L1	L2	L2		L4	L1	L1	L1

NOTES:

[1] This table lists minimum site perimeter landscaping standards. Other chapters or sections of title 21 may have stricter site perimeter landscaping standards which would be used instead of the standards listed in this table.

[2] L3 screening landscaping is not included in this table as it only occurs as a use-specific standard for certain industrial uses, or through development-specific application in processes such as conditional use approvals.

1

d. ***Visual Enhancement Landscaping***

Visual enhancement landscaping is intended to integrate new or renovated development into the surrounding community and is required along property perimeters that abut another zoning district or a public right-of-way. Landscaping improvements shall be placed within the area identified as the perimeter landscaping area and may be organized to the best advantage of property development.

e. ***Buffer Landscaping***

Buffer landscaping is intended to help separate one land use from another land use that may be incompatible for reasons such as the intensity of use or the visual character.

f. ***Screening Landscaping***

Screening landscaping provides the highest level of buffering between land uses, and is mostly applied by use-specific standards in chapter 21.05 between residential land uses and abutting industrial uses.

g. ***Freeway Landscaping***

Freeway landscaping is intended to enhance the appearance of the municipality along portions of the Seward Highway, the Glenn Highway, and Minnesota Drive/O'Malley Road. Landscaping improvements in these designated areas may be used to screen adjacent uses, such as residential uses impacted by the adjacent roadways, and to enhance the appearance of major visual and scenic corridors and entrance gateways of the community. Freeway landscaping is limited to specific areas along major highways in Anchorage as identified in table 21.07-1.

2. Parking Lot landscaping Requirements

a. ***Purpose***

Parking lot landscaping softens the view and breaks up the visual impact of extensive paved surfaces associated with multifamily residential and nonresidential development. It also contributes to storm water management, provides orientation to entrances, increases outdoor comfort levels, and mitigates wind and dust in large parking lots. Parking lot landscaping consists of parking lot perimeter landscaping and parking lot interior landscaping.

b. ***Parking Lot Perimeter Landscaping***

i. Parking lot perimeter landscaping is required for all parking lots with 10 or more parking spaces that are associated with any multifamily or nonresidential use, and for parking lots that are a principal use on a site.

ii. Parking lot perimeter landscaping shall be placed on all perimeters of a parking lot, which includes appurtenant driveways, where the parking lot abuts a property line. L2 buffer landscaping shall be used where a nonresidential district abuts a residential district, or is adjacent to a residential district across an alley, and where a multifamily district abuts a single-family residential district. All other sides of the parking lot perimeter shall have L1 visual enhancement landscaping.

iii. Exceptions include:

(A) At approved points of pedestrian and vehicle access; and

(B) Adjacent to lots being developed under a common development plan, where the director waives the requirement.

c. ***Parking Lot Interior Landscaping***

Parking lot interior landscaping is intended to visually enhance and break up the area of larger parking lots. Parking lot interior landscaping is required for any parking lot with 40 or more parking spaces. The area of the parking lot shall be determined by the total paved area including parking, circulation aisles, and appurtenant driveways.

i. Parking lot interior landscaping requirements are as follows:

(A) 40 to 100 parking spaces: An area equal to at least five percent of the parking lot shall be devoted to landscaping.

(B) 101 to 200 parking spaces: An area equal to at least eight percent of the parking lot shall be devoted to landscaping.

(C) More than 200 parking spaces: An area equal to at least ten percent of the parking lot shall be devoted to landscaping.

ii. Areas eligible to be counted as parking lot interior landscaping in subsection c.i. above shall be surrounded by parking area and/or driveway on at least three sides, except that up to 50 percent of the total parking lot interior landscaping, up to a maximum of 800 square feet, may include landscaping areas with parking area and/or driveway on only two sides (such as corner areas of parking lots).

iii. For parking lots with more than 200 spaces, a linear landscaping break with a minimum width of 8 feet shall be provided parallel to every third drive aisle. This area may count toward the total interior parking lot landscaping requirement.

iv. Parking lots with more than 200 spaces and exceeding the parking requirements by 25 percent or more shall increase the parking lot interior landscaping area by the amount provided in subsection 21.07.090E.4.d.

v. Fifty percent of the area required for parking lot interior landscaping may be accommodated by biofiltration swales. The use of biofiltration swales to partially fulfill some portion of the need for parking lot interior landscaping requires that swales be a minimum of ten feet in width and designed to promote biofiltration.

3. Site Enhancement Landscaping

a. ***Purpose***

Site enhancement landscaping provides plant materials to open areas of a site to enhance the appearance and function of the building and site, to help prevent erosion and dust by covering bare disturbed areas, and to help reduce and clean storm water runoff.

b. ***Applicability and Requirements***

Development sites shall provide site enhancement landscaping, except that single-family or mobile home dwellings on individual lots are exempt. Site enhancement landscaping requirements, including required area and planting materials, are provided in table 21.07-1.

4. Trees for Residential Development

a. ***Purpose***

This section establishes a minimum requirement for trees in new residential development. It encourages the retention of existing trees and in general promotes

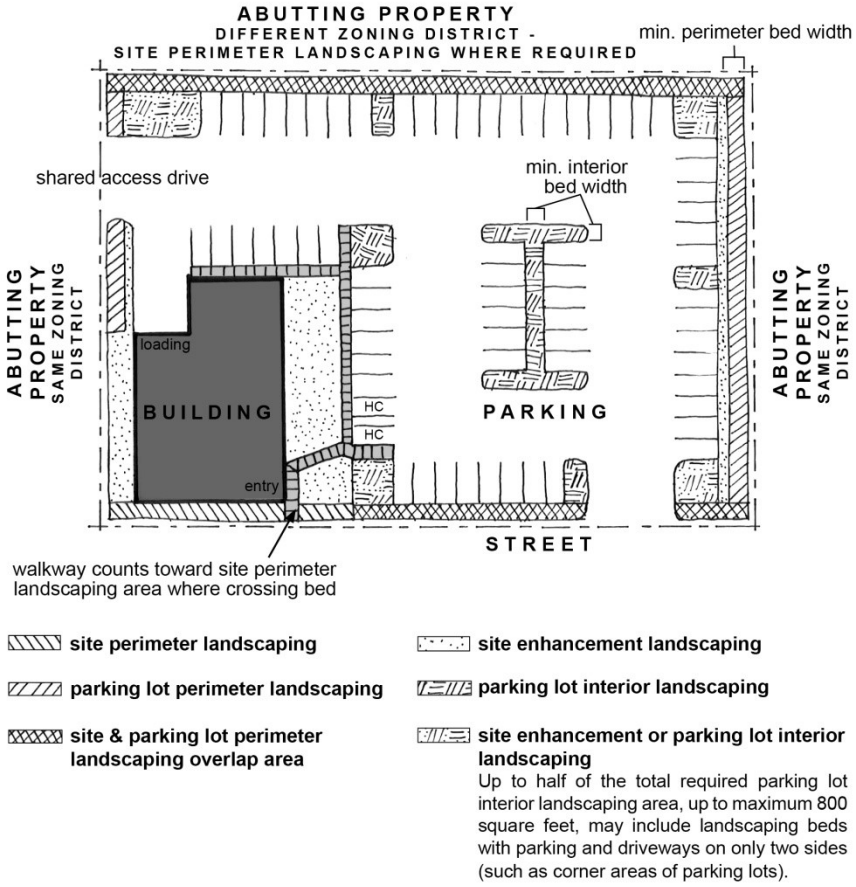
a sustained presence of trees and woodlands for their benefits to property values, community character, wildlife habitat, and the natural environment in urban areas of the municipality.

b. ***Applicability***

This section applies to new residential development, except for single-family and two-family lots that were platted before January 1, 2014.

c. ***Requirements***

All individual lots in a subdivision shall have a minimum of one tree prior to the issuance of a certificate of zoning compliance for the original structure. A minimum of 20 trees per acre is required in new residential developments. Deciduous tree plantings shall be two-inch caliper or greater, and coniferous tree plantings shall be six feet in height or greater. This section may be fulfilled by the preservation of existing trees as provided in subsection F.1.b. below.



Type of Landscaping Areas (Site Plan Example)

F. General Landscaping Requirements and Standards

1. Plant Materials

Anchorage lies generally within the USDA climatic zone 3. This categorization is intended to help identify plants with suitable hardiness to survive in our climate. There are known microclimates within Anchorage that are less severe in some areas and more severe in others. It is not the intent of this title to dictate the use of individual species; however property owners are encouraged to understand the local climate and to use plant species known to be hardy. It is the property owner's responsibility to replace plant materials which

are provided in response to the requirements of this title, but perish due to poor maintenance, lack of hardiness, mechanical damage, or some other reason. In all cases, the plant materials shall be living and free of defects and of normal health, height, and spread as defined by the American Standard for Nursery Stock, ANSI Z60.1, latest available edition, American Nursery and Landscape Association. Plants may be nursery grown or native transplants, provided they meet the requirements of ANSI Z60.1.

a. ***Minimum Size of Planting Materials***

i. *Trees*

(A) Deciduous trees: 2 inch caliper

(B) Coniferous trees: 6 feet in height

ii. *Shrubs*

(A) Deciduous shrubs: 18 inches in height

(B) Evergreen shrubs: 18 inches in height

(C) Creeping evergreen shrubs: 18 inch spread

b. ***Preservation of Existing Plant Material***

This title acknowledges the great benefit of preserving existing mature plant material over the replacement of such material with new immature landscape plantings. The mature landscaping may consist of a mass of native plant materials that include a complete community of trees, shrubs, and ground covers, or it may consist of mature individual tree specimens.

c. ***Native Plant Material Mass***

A mass of existing native plant material preserved on site may be utilized to fulfill a portion of the landscaping requirements identified in this title. To fulfill this requirement, existing plant materials shall include trees, shrubs, and groundcovers. The quantity of trees within the stand of native plant materials shall be at least equal to the quantity of trees required for the types of landscaping identified above. Cottonwood trees (Populus balsamifera and Populus trichocarpa) may be kept, but shall not be included in the count of trees to meet these requirements. Provided that the stand(s) of existing vegetation meet the requirement for the quantity of trees, the area of the stand of existing vegetation shall be equal to at least 50 percent of the total square foot area for which the existing vegetation is fulfilling the landscaping requirement. Use of existing vegetation may be mixed with planted landscaping improvements to fulfill total requirements.

d. ***Individual Tree Specimens***

Existing individual tree specimens that are preserved on-site may be used towards meeting the landscaping requirements for visual enhancement, buffer, screening, or freeway landscaping, as identified above, if these trees are located in the applicable site perimeter or parking lot landscaping areas. Retained existing trees that meet the above requirements shall be credited as follows:

i. Coniferous trees 10 feet or more in height are equivalent to three new trees.

ii. Deciduous trees 6 inches or greater caliper are equivalent to three new trees.

Cottonwood trees (Populus balsamifera and Populus trichocarpa) may not be used to meet this requirement.

2. Planting Location

a. *Utility Easements*

i. Required landscaping areas may overlap with utility easements.

ii. The developer shall coordinate landscape projects within utility easements with the respective utilities and ensure that the landscaping is compatible with the utility's need to safely and reliably operate and maintain its facilities. The utility shall provide written notice to property owners about planned projects that affect landscaping within utility easements.

b. *Visibility Clearance Areas*

All landscaping and screening materials shall comply with the clear vision area requirements of the traffic engineer. The decision-making body may approve alternate plant locations to accommodate the sight distance triangle requirements.

3. Planting Bed and Vegetation Areas

a. *Protection of Landscaping*

All required landscaped areas shall be protected from potential damage by adjacent uses, such as parking and storage areas. Concrete barrier curbs or an alternate barrier capable of maintaining separation between vehicles and plantings and at least six inches in height shall be provided between vehicular use areas and landscaped areas. Landscaped areas shall be protected from impacts resulting from snow removal operations.

b. *Existing Plant Materials*

Where existing plant materials are used to meet the requirements of this section, plant materials shall be protected from construction activities in accordance with the following:

i. *Construction Fence*

A construction fence shall be placed around each tree or group of trees and shrubs to be retained at or beyond the edge of the tree protection zone. Construction fencing shall be placed prior to the commencement of construction work and shall be maintained for the duration of the construction period. Construction fencing in high-traffic areas of the construction site shall consist of a durable material, such as chain link or wood. Plastic fencing that is properly anchored and not on movable posts is acceptable for low-traffic areas of the construction site. Plastic tape is not an acceptable alternate.

ii. *Plant Material Replacement*

In the event that existing plant materials die as a result of construction activity or for any other reason, the owner is responsible for replacement with other landscaping materials in accordance with the requirements of this section.

c. *Ground Covers and Mulches*

i. Planting beds containing trees and shrubs shall use mulches which consist of shredded bark, wood chips, or stone aggregate or other mineral mulches that are ¼ inch or more and do not become compacted.

ii. For areas of the site outside of planting beds and subject to site enhancement landscaping, ground cover plants such as lawn grasses or native perennial ground covers and wildflowers shall be planted to provide continuous ground coverage within three years.

4. Installation of Landscaping

a. ***Timing***

All required landscaping and screening shall be installed by the developer. All landscaping shall be installed before a certificate of zoning compliance is issued. If a certificate of zoning compliance is requested between September and May, then the certificate shall be conditioned upon the landscaping being installed before the following August 31.

b. ***Guarantee of Landscaping Survival***

i. The owner shall be responsible for landscaping installed to fulfill the requirements of this title and the approved site landscape plan. In order to ensure the preservation or replacement of required and installed landscaping, the owner shall provide to the municipality a warranty guarantee such as a letter of credit, escrow, performance bond, or other surety as approved by the director. Single-family and two-family homes on individual lots, and lots less than 10,000 sf in area are exempt from providing this guarantee. The warranty guarantee shall be in an amount equal to the following schedule, and shall remain in effect for two years, starting on the date the municipality witnesses the installation per the approved landscape plan.

TABLE 21.07-3: WARRANTY GUARANTEE SCHEDULE

Lot Area	Value of Surety
10,000-15,000 sf	$1,200
15,001-20,000 sf	$1,750
20,001-30,000 sf	$5,000
30,001-40,000 sf	$7,500
40,001-50,000 sf	$10,000
50,001-75,000 sf	$12,500
75,001-100,000 sf	$15,000
100,001 sf and greater	$20,000

ii. At warranty end and prior to the municipality authorizing release of the guarantee, a licensed landscape architect or a certified arborist shall inspect the landscaping. When landscaping is found to be complete and healthy as intended, the inspector shall provide affidavit of the same to the director. At the direction of the above inspector, the owner shall replace failed or failing landscaping with healthy material per the approved landscape plan and to the satisfaction of the inspector. The municipality shall release the guarantee within 30 days of receiving the affidavit of the inspector that all the landscaping is found to be complete and healthy as intended.

5. Maintenance and Replacement

a. Trees, shrubs, other vegetation, irrigation systems, fences, and other landscaping, screening, and fencing elements shall be considered as elements of a development in the same manner as other requirements of this title.

b. The property owner shall be responsible for regularly maintaining all landscaping elements in good condition. All landscaping shall, to the extent reasonably feasible, be maintained free from disease, weeds, and litter.

c. Any landscaping element that dies, is removed, or is seriously damaged shall be replaced with the same type and size landscaping element that is shown on the approved landscape plan for the site.

d. All landscaping, screening, and fencing materials and structures shall be repaired and replaced as necessary to maintain them in a structurally sound condition.

G. Screening

1. Purpose

Screening consists of landscaping, the retention of natural vegetation, or the use of physical structures to block views of specific activities or specific parts of a property or structure.

2. Refuse Collection

In order to improve the appearance of the municipality's streets and neighborhoods, refuse collection receptacles shall be screened and set back from abutting streets in a location where they can be conveniently and safely accessed by the intended users and by refuse collection vehicles, as provided in this section.

a. ***Applicability***

The standards of this subsection 21.07.080G.2. shall apply to all outdoor refuse collection receptacles, including dumpsters, compactors, garbage cans, debris piles, and grease containers, except for the following:

i. Receptacles that receive refuse collection service only from an alley.

ii. Public trash receptacles for pedestrians.

iii. Public drop-off recycling receptacles, which are subject to the recycling drop-off use-specific standards of subsection 21.05.060E.7.

iv. Waste receptacles for temporary uses such as construction sites.

v. Refuse collection receptacles that are stored indoors and brought outdoors on garbage pickup days.

b. ***Service Provider Standards***

Approval under this title does not by itself guarantee that a service provider will service the receptacle. Property in the municipal solid waste service area shall also abide by AMC 26.70.050 which requires approval of enclosure plans by solid waste services prior to construction. Other service providers may have similar requirements.

c. ***Residential Dwellings***

i. In class A districts, single-family, two-family, townhouse, and three-unit multifamily dwellings on lots less than 40,000 square feet shall not have dumpsters, except where serviced from an alley.

ii. In class B districts, dumpsters are permitted and shall be screened in accordance with the standards below.

iii. Where dumpsters are not provided, multifamily developments shall provide covered storage for trash receptacles. Such storage shall not be located between any building and the primary adjacent street frontage.

d. ***Site Plans***

Site plans for applicable development shall include the proposed location and type of refuse receptacle screening that will be used and the access provisions for

service trucks. If a screening enclosure is necessary pursuant to G.2.f. below, the site plan shall include the construction details of the enclosure to ensure the dimensions comply with the service provider's standards. Site plans with refuse receptacles in alleys shall identify the location of the refuse receptacle and the methods with which the receptacle shall be contained in its identified location.

e. ***Location***

Outdoor refuse collection receptacles shall not be located in any required front setback. Outdoor refuse collection receptacles shall be set back from the front plane of the principal structure to the extent reasonably feasible and depending on the size, location, and configuration of the site, and need for access by refuse collection vehicles. Refuse collection receptacles shall not be located within any area used to meet the minimum landscaping or parking requirements and loading berth requirements of this chapter, or be located in a manner that obstructs or interferes with any designated vehicular or pedestrian circulation routes onsite. Refuse collection vehicle access and circulation shall be considered and shown on the site plan, in conformance with the requirements for commercial trucks in subsection 21.07.090H.8.b., *Vehicle Access and Circulation*.

f. ***Screening***

Each refuse collection receptacle shall be screened from view from streets and rights-of-way abutting the property, if the receptacle is to be stored within 300 feet of the street or right-of-way. The screening may be achieved by buildings and structures, fences, landscaping, topography, or a refuse collection receptacle screening enclosure.

i. If a screening enclosure is necessary to meet the standards of this subsection, the screening enclosure shall consist of a durable, three-sided screening structure. Screening enclosure construction and dimensions shall comply with service provider industry standards and AMC 26.70.050.

ii. If the refuse collection receptacle is visible through the open side of the required screening structure from the abutting street or right-of-way, the opening shall be screened with a sight-obscuring gate. The enclosure and any gate shall be maintained in working order to function as a screening structure. The gate shall remain closed except on refuse collection days and the prior evening.

g. ***Amortization of Nonconforming Refuse Collection Receptacles***

Existing dumpsters that are located at residential uses indicated in subsection 21.07.080G.2.c.i. shall be removed within 18 months from January 1, 2014. Sites with refuse collection receptacles that are subject to the location and screening requirements of this subsection 21.07.080G.2. shall meet the requirements of this section within seven years from January 1, 2014, except where an administrative variance is granted in accordance with subsection 2.h. below.

h. ***Administrative Variance for Refuse Receptacle Location and Screening***

The municipality recognizes that full compliance with the refuse receptacle location and screening standards will not be reasonably feasible for some existing developments approved prior to January 1, 2014. The intent of this subsection is to provide for partial or complete exemption in such cases, through a documented administrative process. The variance should be the minimum action necessary to provide relief, with the intent to encourage existing development to move in the direction of conformity.

i. If a site was developed prior to January 1, 2014, the property owner may apply for an administrative variance from the location and/or screening

standards of this section, using the administrative variance procedure of subsection 21.03.240J., subject to the following approval criteria:

(A) Compliance would conflict with other requirements of this title, or other laws, ordinances, or regulations;

(B) Compliance would not be compatible with standards for access and safety of refuse collection operations, as documented in the title 21 user's guide;

(C) A proposed alternative achieves the intent of this section to the same or better degree; or

(D) The applicant demonstrates that compliance would be incompatible with the existing layout, function, or appeal of the development for its users, such as interference with or proximity to primary pedestrian access, required landscaping, side or rear setbacks and minimum separation from buildings, outdoor activity spaces, snow storage areas, proximity to windows to living spaces, or vehicle access and parking.

3. Service and Off-Street Loading Areas

a. ***Applicability***

This standard is intended to mitigate visual and noise impacts of service and off-street loading areas on abutting residential uses and neighborhoods, and streets. The standards shall apply to all service and off-street loading areas serving nonresidential uses that are visible from a street or a nonindustrial zoning district.

b. ***Standard***

Applicable non-enclosed service and off-street loading areas shall be screened as follows:

i. A wall or fence at least eight feet high shall be located along at least one exposed edge of the service or loading area that is parallel to vehicles/trailers parked in the service or loading area. The wall or fence shall extend the length of the longest vehicle/trailer anticipated to be parked in the service or loading area.

ii. Additional landscaping shall be provided along the site perimeter at the location of the service or loading area to visually obscure the area from the abutting street or property.

iii. An alternate screening plan may be approved by the director if the proposed plan effectively screens the service or loading area from abutting streets and nonindustrial districts.

4. Mechanical and Electrical Equipment

a. ***Applicability***

This section applies when it is referenced as a requirement in another section of this title.

b. ***General Requirement***

Mechanical and electrical equipment serving a single building shall be screened from view as provided below. This requirement applies to heating, ventilation, and cooling equipment; pumps; generators; and groups of four or more utility meters. The screening requirement does not apply to telecommunications equipment, chimneys, minor vent pipes, wall vents that are flush/near-flush with the building

wall, or solar collectors and reflectors. Screening shall comply with AMC title 23 and the access and safety requirements of utilities.

c. ***Rooftop Mechanical and Electrical Equipment***
Rooftop mechanical and electrical equipment shall be screened from view of abutting streets and the ground level of residentially zoned lots using the menu choices provided in subsection 4.d. below. If menu choice d.iii. is the only choice selected, then the roof mounted equipment shall also be set back from the roof edge (where the roof meets the façade wall) at least three feet for each foot of height of the equipment.

d. ***Mechanical and Electrical Equipment – Other***
All other mechanical and electrical equipment shall be screened from view from abutting streets, except where located more than 40 feet from the street or right-of-way, using one of the following choices, as long as the choices do not conflict with the requirements and standards of the utility companies:

i. Sight-obscuring landscaping consisting of shrubs, trees, berms, and/or hardscape materials. Other landscaping required by this title, such as perimeter landscaping, may be used if it meets this standard.

ii. A sight-obscuring fence, wall, or structure that is adequate in height to screen the equipment.

iii. Wall-mounted utility meter bases and CT cabinets finished in a color that is consistent with other areas of the building façade, unless an alternative color or design is approved by the director.

iv. Equipment that is disguised, camouflaged, or hidden so that its function as mechanical or electrical equipment is imperceptible to an uneducated eye.

H. Fences

1. Applicability
The provisions of this subsection 21.07.080H. shall apply to all construction, substantial reconstruction, or replacement of fences, retaining walls not required for support of a principal or accessory structure, or any other linear barrier intended to delineate different portions of a lot or to separate lots from each other. The provisions of this subsection do not apply to temporary fencing for construction, emergencies, or special public events or performance areas.

2. Location
A fence may be constructed within property boundaries, or at the lot line, subject to the limitations in this section. No fence shall be installed so as to block or divert a natural drainage flow onto or off of any other property.

3. Maximum Height
Unless specifically required elsewhere in this title for screening fences, fences shall not exceed the maximum heights set forth below. Such maximum heights shall be measured as provided in subsection 21.06.030D.3.b. Unless specifically allowed by this title, no fence shall exceed eight feet in height.

a. In the R-1, R-1A, R-2A, R-2D, R-2M, R-3, R-4, R-4A, R-5, and R-7 districts:

i. Fences in front setbacks shall not exceed four feet in height.

ii. Fences in secondary front setbacks that abut a street of arterial or greater classification may be up to eight feet in height.

iii. The director may approve a fence in a secondary front setback to be up to six feet in height where the property owner shows that such fence is necessary to block headlights of in-street traffic, the sight distance triangle is preserved, and no direct vehicular access to the street is provided.

iv. Fences in side or rear setbacks shall not exceed six feet in height, except where across an alley from or abutting a nonresidential district, in which case the fence may be up to eight feet in height.

b. In the R-6, R-8, R-9, and R-10 districts, fences in front setbacks shall not exceed six feet in height if the fence is a screening or sight-obscuring fence.

c. In the B-1A, B-1B, B-3, and R-O districts, fences in front setbacks shall not exceed four feet in height.

d. In the MC district, fences in front setbacks shall not exceed six feet in height.

e. Fences in front setbacks in nonresidential districts shall be located interior to any required landscaping.

f. Enclosures provided as a part of a permitted tennis court, ball field, or other recreational facility shall be exempt from the height restrictions of this section.

4. Finished Appearance Outward
Fences along front or secondary front setbacks shall be installed so that the more finished side (i.e., the side with fewer or no visible structural framing or bracing elements) faces outward from the lot on which it is installed.

5. Prohibited Materials
Fences made of debris, junk, or waste materials are prohibited, unless such materials have been recycled and reprocessed into building materials marketed to the general public and resembling new building materials, or unless approved by the director.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2015-82, 7-28-15; AO 2017-55, 4-11-17; 2017-160, 12-19-17)

21.07.090 OFF-STREET PARKING AND LOADING

A. Purpose

This section establishes off-street parking and loading requirements as a necessary part of the development and use of land, to ensure the safe and adequate flow of traffic in the public street system, and to ensure that parking lots are designed to perform in a safe, efficient manner. It is also the intent of this section to attenuate the adverse visual, environmental, and economic impacts of parking lots, and to achieve a compact and efficient land use pattern. Specific purposes include to:

1. Ensure that off-street parking, loading, and access demands will be met without adversely affecting other nearby land uses and neighborhoods;

2. Provide for safe and orderly circulation and parking in parking and loading facilities, and minimize conflicts between pedestrians and vehicles;

3. Encourage the efficient use of land and avoid the encumbrance of more space than is necessary for parking;

4. Improve the visual appearance of public street corridors by encouraging buildings and other attractive site features to become more prominent relative to parking lots;

5. Provide for better pedestrian movement and encourage alternative modes of transportation by reducing the expanses of parking that must be traversed between destinations;

6. Support a balanced transportation system that is consistent with cleaner air and water, greater transportation choices, and efficient infill and redevelopment; and

7. Allow flexibility in addressing vehicle parking, loading, and access, including providing for reductions and alternatives to minimum parking requirements.

B. Applicability

1. Generally

a. The off-street parking and loading standards of this section 21.07.090 shall apply to all development in the municipality, including changes of use.

b. Except for the off-street loading requirements of subsection 21.07.090G., all other requirements of this section shall apply to Girdwood unless specifically preempted in chapter 21.09.

c. Except when specifically exempted, the requirements of this section shall apply to all temporary parking lots and parking lots that are a principal use on a site.

2. Expansions, Relocations, and Enlargements

A site to which a building is relocated shall provide the required parking and loading spaces. An expansion or enlargement that is an increase in the floor area or other measure of off-street parking and loading requirements shall provide spaces as required for the increase.

3. Use of Required Parking Spaces

Required parking spaces shall be available for the parking of passenger automobiles by residents, occupants, customers, visitors, or employees of the use. Required parking spaces may not be assigned, leased, or rented in any way to a use on another site, or to anyone who is not a resident, occupant, customer, guest, or employee, except for shared parking situations. See subsection 21.07.090F.16. Also, required parking spaces shall not be used for the parking of equipment or for storage of goods or inoperable vehicles.

4. Regulation of Parking Space Use

The providers of required off-street parking spaces may reasonably control the users thereof by means that may include, but are not limited to, restricting all parking to the users of the facility; parking lot attendants; control gates; tow-away areas; areas for exclusive use by employees, tenants or staff; areas restricted for use by customers or visitors; and imposing time limitations on users. Fees may be charged for the use of required parking, subject to approval of the traffic engineer. Prior to approval of the permit the traffic engineer may review all methods of control and may disapprove of any restriction such as fees that adversely affects the purpose of this section. The municipality may enforce any approved parking plan or restrictions through any of the code enforcement provisions set forth in chapter 21.13, *Enforcement.*

5. Parking Nonconformities

When a site is out of compliance as to the number of required or allowed parking spaces, section 21.12.060, *Characteristics of Use*, applies.

C. Computation of Parking and Loading Requirements

1. Fractions

When measurements of the number of required or allowed parking spaces result in a fractional number after subtracting for parking reductions or alternatives, the fraction shall be rounded as provided in section 21.14.020O., *Fractions*.

2. Multiple Uses

The number of parking spaces is computed based on the uses on the site. When there are two or more uses on a site, the required or allowed parking for the site is the sum of the required or allowed parking for the individual uses. For shared parking, see subsection 21.07.090F.16. below.

3. Area Measurements

Unless otherwise specified in table 21.07-4, all square footage-based parking and loading standards shall be computed on the basis of gross floor area of the use in question. For the purposes of this section, all gross floor area shall be counted in such measurement, except for floor area dedicated for parking spaces; driveways; circulation aisles; loading areas; or enclosed and isolated floor area exclusively for HVAC mechanical equipment serving the building, provided such area is located in a mechanical penthouse or topmost floor of a multistory building. The traffic engineer may also waive the floor area for HVAC mechanical equipment occupying another story in the building, provided the majority of such story (including the mechanical equipment) is non-habitable floor area.

4. Occupancy Load Factors

Where parking requirements for assembly rooms or other uses are based on maximum capacity under provisions of AMC title 23, the occupancy load factors of AMC title 23 shall not be adjusted.

5. Additional Computation Standards

a. ***Off-Street Loading Space***

Required off-street loading space shall not be included as off-street parking spaces in computation of required or allowed number of off-street parking spaces, unless approved by the traffic engineer.

b. ***Fleet Vehicle Parking***

For the purpose of calculating parking requirements, fleet vehicle parking shall not count against either the minimum or maximum requirements.

c. ***Areas that Count Toward Minimum but Not Maximum Parking Requirements***

For the purpose of calculating parking requirements, the following types of parking spaces shall not count against the maximum parking requirement, but shall count toward the minimum requirement:

i. Accessible parking spaces;

ii. Passenger loading zones spaces including taxi cab stands, provided that such spaces are not required by the traffic engineer pursuant to subsection 21.07.090I.;

iii. Vanpool and carpool parking spaces;

iv. Parking spaces provided as the required parking for a use on another parcel through a municipally approved shared parking or off-site parking agreement; and

v. Parking structures, underground parking, and parking within, above, or beneath the building(s) it serves.

D. Parking Lot Layout and Design Plan

1. Applicability

For all commercial, commercial marijuana, mixed-use, industrial, community, multifamily, and townhouse residential developments, the applicant shall submit a parking facility layout, circulation, and design plan for review and approval by the traffic engineer. The

plan shall contain sufficient detail to enable the traffic engineer and the director to verify compliance with this section 21.07.090. Subject to approval of the traffic engineer, the parking layout and design plan may be combined with other plans required under this title, such as the landscaping plan required in 21.07.080, *Landscaping, Screening, and Fences*.

2. Minimum Plan Requirements

a. The parking facility layout, circulation, and design plan shall be prepared by a design professional and stamped by a professional registered with the Alaska State Board of Registration for Architects, Engineers, and Land Surveyors, except that parking lots with fewer than 20 parking spaces shall be exempt.

b. The director and traffic engineer shall establish the minimum submittal requirements for such plans that will enable staff to adequately review and ensure compliance with the standards and requirements of this section 21.07.090. Such submittal requirements, to be included in the user's guide, shall include but not be limited to elements such as placement and dimensions of spaces, landscaping, pedestrian and vehicle circulation, snow storage, lighting, loading and trash collection areas, and drainage.

c. The traffic engineer shall ensure that provisions have been made for minimum interference with street traffic flow and safe interior vehicular and pedestrian circulation, transit, and parking.

E. Off-Street Parking Requirements

1. Minimum Number of Spaces Required

Unless otherwise expressly stated in this title, off-street parking spaces shall be provided in accordance with table 21.07-4, *Off-Street Parking Spaces Required* and subsection E.2. below. Reductions, exemptions, and alternatives to the required minimum number of parking spaces are provided in subsection 21.07.090F. below.

2. Minimum of Three Parking Spaces

Where a use is required to provide off-street parking and the amount specified in table 21.07-4 would result in fewer than three spaces being required for the use, the use shall provide at least three parking spaces including one van-accessible parking space pursuant to subsection 21.07.090J. Where there are multiple uses located on a site, the uses may share the accessible space as long as the requirements of subsection 21.07.090J.1. are met. Parking reductions in subsection 21.07.090F. shall also comply with this subsection E.2. The minimum of three parking spaces shall not apply to residential household living uses, community gardens, parks and open space, utility substations, or fueling stations and food and beverage kiosks that are exclusively for drive-through customers.

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED
("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)

Use Category	Use Type	Minimum Spaces Required	See Loading Subsection 21.07.090G.
RESIDENTIAL USES			
Household Living	Dwelling, mixed-use, multifamily, single-family attached, two-family, and townhouse	1 per studio or efficiency or one bedroom du Add 0.5 spaces for each additional bedroom Add 0.25 guest parking spaces for each multifamily du with single-family or two-family style construction Add 0.15 guest parking spaces for each multifamily du with townhouse style construction Add 0.10 guest parking spaces for each multifamily du, with a minimum of 1 guest space Add 0.10 guest parking spaces for each mixed-use du, with a minimum of 1 guest space	**X**
	Dwelling, single-family detached	2 per du up to 2,400 square feet; 3 per du over 2,400 square feet, including any unfinished area which may be converted to living area	
	Accessory dwelling unit (ADU)	See subsection 21.05.070D.	
	All other household living uses	2 per du	
Group Living	Assisted living facility (9+ client capacity)	1 per 4 beds plus 1 per 350 sf of office area plus requirement for dwelling, if located in a dwelling	**X**
	Correctional community residential center	1 per 2,000 sf gfa	**X**
	Habilitative care facility	1 per 400 sf gfa, and 1 passenger loading space, reserved for pickup and delivery of adults, per 800 sf gfa	**X**
	Roominghouse	0.6 per guestroom	**X**
	Transitional living facility	1 per 2 beds plus 1 per 4 persons in principal assembly area based on maximum occupancy provisions of AMC title 23	**X**
COMMUNITY USES			
Adult Care	Adult care facility, 3-8 persons	1 per 400 sf gfa, and 1 passenger loading space, reserved for pickup and delivery of adults, per 2,000 sf gfa (plus requirement for principal use, if approved as accessory use)	
	Adult care facility, 9+ persons	1 per 400 sf gfa, and 1 passenger loading space, reserved for pickup and delivery of adults, per 2,000 sf gfa	**X**
Child Care	Child care home	No additional requirements beyond those required for the dwelling unit If the establishment is for fewer than 9 children and is not located in a dwelling, then the requirement is as provided in subsection 21.07.090E.2.	
	Child care center, 9-15 children	1 space in addition to what is required for the dwelling	

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED
("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)

Use Category	Use Type	Minimum Spaces Required	See Loading Subsection 21.07.090G.
	Child care center, more than 15 children	1 per 400 sf gfa, and 1 passenger loading space, reserved for pickup and delivery of children, per 800 sf gfa	
Community Service	Cemetery or mausoleum	See subsection 21.07.090E.3.	
	Community center or religious assembly	1 per 5 persons in principal assembly area based on maximum occupancy provisions of AMC title 23	X
	Crematorium	1 per 4 persons in the main chapel based on maximum occupancy provisions of AMC title 23	
	Family self-sufficiency service	1 per 300 sf gfa	
	Government administration and civic buildings	1 per 300 sf gfa	X
	Homeless and transient shelter	1 per 300 sf administrative area, and 1 per 20 pillows	
	Neighborhood recreation center	See subsection 21.07.090E.3.	
	Social service facility	1 per 300 sf gfa	
Cultural Facility	Aquarium	1 per 500 sf gfa	X
	Botanical gardens	See subsection 21.07.090E.3.	X
	Library	1 per 400 sf gfa	X
	Museum or cultural center	1 per 400 sf gfa	X
	Zoo	1 per 5,000 sf of site area	X
	All other uses	1 per 400 sf gfa or 1 per 10,000 sf of site area for outdoor uses	X
Educational Facility	Boarding school	See subsection 21.07.090E.3.	X
	College and university	See subsection 21.07.090E.3.	X
	Computer-aided learning center	1 per 300 sf of enclosed floor space	X
	Elementary school and middle school	1 per 6 students, based on State of Alaska EED capacity provisions	X
	High school	6 per classroom Where the traffic engineer has reason to believe that, based on similar or comparable schools, parking study data, or other information, that parking demand for the proposed high school development is likely to exceed the requirement, the traffic engineer may require up to 1 parking space per 3 students, based on State of Alaska EED capacity provisions.	X

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED ("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)			
Use Category	**Use Type**	**Minimum Spaces Required**	**See Loading Subsection 21.07.090G.**
	Instructional services	6 per classroom, plus 1 per 300 square feet of dance or other training area	**X**
	Vocational or trade school	1 per 2 students based on maximum occupancy provisions of AMC title 23	**X**
Health Care Facility	Health services, including outpatient medical and dental offices, co-located with a hospital/ hospital campus Other health services, including outpatient medical and dental offices	1 per 250 sf gfa 1 per 300 sf gfa	**X**
	Hospital/ health care facility	1 per 2 beds, based on maximum capacity, plus 1 per 350 sf of office and administrative area	**X**
	Nursing facility	1 per 4 beds, based upon maximum capacity.	**X**
Park and Open Area	Community garden	1 per 5,000 sf of lot area	
	Park, public or private	See subsection 21.07.090E.3. Playfields (soccer, baseball, etc.) shall have minimum of 25 spaces per field, unless otherwise approved by the traffic engineer, for up to four fields. Facilities with more than four fields shall be subject to the determination of the traffic engineer.	
Public Safety Facility	All uses	See subsection 21.07.090E.3.	
Transportation Facility	All uses	See subsection 21.07.090E.3.	**X**
Utility Facility	Utility facility	1 per 1,000 sf gfa	**X**
	Utility substation, wind energy conversion system	See subsection 21.07.090E.3.	
Communica-tion Structures	All uses	None	
COMMERCIAL USES			
Agricultural Uses	Commercial horticulture	See subsection 21.07.090E.3.	**X**
Animal Sales, Service & Care	Animal boarding	1 per 800 sf gfa	
	Animal shelter	1 per 400 sf gfa	

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED
("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)

Use Category	Use Type	Minimum Spaces Required	See Loading Subsection 21.07.090G.
	Large domestic animal facility, principal use	1 per 4 seats or 1 per stall, whichever is greater	
	Retail and pet services	1 per 350 sf gfa	X
	Veterinary clinic	1 per 600 sf gfa	X
Assembly	Civic/convention center	1 per 4 persons in assembly areas based on maximum occupancy provisions of AMC title 23	X
	Club/lodge/meeting hall	1 per 4 persons in assembly areas based on maximum occupancy provisions of AMC title 23.	X
Entertainment and Recreation	Amusement establishment Bowling alley Bingo parlor Indoor shooting range	Indoor entertainment facility: 1 per 300 sf gfa 4 per bowling lane 1 per 4 persons in assembly areas based on maximum occupancy provisions of AMC title 23. 1 per target area, or 1 per 5 seats, whichever is greater	
	Entertainment facility, major	See subsection 21.07.090E.3.	X
	Fitness and recreational sports center	1 per 300 sf gfa	X
	General outdoor recreation, commercial	See subsection 21.07.090E.3.	
	Golf course	4 per green	
	Golf driving range	0.5 per tee	
	Motorized sports facility	1 per 2 spectator seats in a structure such as a grandstand, stadium; or 1 per 2,000 sf of site area; whichever is greater	X
	Movie theater	1 per 4 persons based on maximum occupancy provisions of AMC title 23	X
	Nightclub	1 per 3 persons based on maximum capacity under provisions of AMC title 23	X
	Shooting range, outdoor	1 per target area, or 1 per 5 seats, whichever is greater	
	Skiing facility, alpine	See subsection 21.07.090E.3.	
	Theater company or dinner theater	1 per 4 persons based on maximum capacity under provisions of AMC title 23	X
Food and Beverage Service	Bar	1 per 100 sf gfa	X
	Food and beverage kiosk	0 per establishment, plus vehicle queuing spaces	
	Restaurant	1 per 100 sf gfa and outdoor seating area 1 per 125 sf gfa for drive-through restaurants (plus vehicle queuing spaces)	X

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED ("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)			
Use Category	**Use Type**	**Minimum Spaces Required**	**See Loading Subsection 21.07.090G.**
Office	Broadcasting facility	1 per 350 sf gfa	
	Financial institution	1 per 350 sf gfa (plus vehicle queuing spaces if drive-through is provided)	X
	Office, business or professional	1 per 350 sf gfa	X
Personal Service, Repair, and Rental	Business service establishment	1 per 500 sf gfa	X
	Funeral services	1 per 4 persons in main assembly areas based on maximum occupancy provisions of AMC title 23	X
	General personal services	1 per 400 sf gfa	X
	Small equipment rental	1 per 400 sf gfa	X
Retail Sales	Auction house	1 per 300 sf gfa	X
	Building materials store	1 per 600 sf gfa and outdoor display area	X
	Convenience store	1 per 350 sf gfa	X
	Farmers market	See subsection 21.07.090E.3.	
	Fueling station	1 per attendant for stand-alone fueling stations; also refer to subsection 21.07.090H. for queuing requirement	
	Furniture and home appliance store	1 per 800 sf gfa	X
	General retail	1 per 350 sf gfa	X
	Grocery or food store	1 per 250 sf gfa	X
	Liquor store	1 per 400 sf gfa	X
	Pawnshop	1 per 350 sf gfa	X
Vehicles and Equipment	Aircraft and marine vessel sales	1 per 7,000 sf outdoor display/sales area; 1 per 400 sf indoor floor area	X
	Vehicle parts and supplies	1 per 400 sf gfa; 1 per 7,000 sf outdoor display/sales area	X
	Vehicle – large and small, sales Vehicle – large and small, rental	1 per 7,000 sf outdoor display/sales area; 1 per 400 sf indoor floor area 1 per 400 sf of indoor floor area	X
	Vehicle service and repair, major and minor	0.5 per car wash bay; 4 per other service bay (provided that all vehicles in custody of operator of business for purpose of service, repair or storage shall be stored on premises or on a separate off-street parking lot or building)	

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED ("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)			
Use Category	**Use Type**	**Minimum Spaces Required**	**See Loading Subsection 21.07.090G.**
Visitor Accom-modations	Camper park	1 space per 10 recreational vehicle or tent camping spaces	
	Extended-stay lodgings	1 per guestroom or one bedroom unit; 1.25 per two bedroom unit; 1.5 per three bedroom or more unit; plus 1 per 4 persons in meeting rooms based on maximum occupancy provisions of AMC title 23.	X
	Hostel	1 per 600 sf gfa	
	Hotel, motel and inn	0.9 per guestroom, plus 1 per 4 persons in meeting rooms based on maximum occupancy provisions of AMC title 23.	X
	Recreational and vacation camp	See subsection 21.07.090E.3.	
MARIJUANA USES			
Marijuana Uses	Marijuana cultivation facility	1 per 1,000 sf gfa	X
	Marijuana manufacturing facility	1 per 400 sf gfa	X
	Marijuana testing facility	1 per 350 sf gfa	
	Marijuana retail sales establishment	1 per 350 sf gfa	X
INDUSTRIAL USES[11]			
Industrial Service[11]	Data processing facility	1 per 1,000 sf gfa	X
	Dry cleaning establishment	1 per 750 sf dry cleaning plant area plus 1 per 600 sf of customer service area	X
	General industrial service, contractor and special trades, light	1,000-3,000 sf gfa: 1 per 750 sf gfa; Add 1 space per each 1,000 sf gfa above 3,000 sf gfa, up to 5,000 sf gfa; Add 1 space per each 1,500 sf gfa above 5,000 sf gfa, up to 50,000 sf gfa; Add 1 space per each 2,000 sf gfa above 50,000 sf gfa	X
	Governmental service	1 per 600 sf gfa	X
	Heavy equipment, sales and rental	1 per 400 sf indoor floor area	X
	Research laboratory	1 per 350 sf gfa	X
Manufacturing and Production[11]	Commercial food production	1 per 400 sf gfa for catering; 1 per 800 sf gfa for food processing	X
	Cottage Crafts	1 per 600 sf gfa	

TABLE 21.07-4: OFF-STREET PARKING SPACES REQUIRED ("du" = dwelling unit; "sf" = square feet; "gfa" = gross floor area)			
Use Category	**Use Type**	**Minimum Spaces Required**	**See Loading Subsection 21.07.090G.**
	Manufacturing (general, heavy, and light)	1,000-3,000 sf gfa: 1 per 750 sf gfa; Add 1 space per each 1,000 sf gfa above 3,000 sf gfa, up to 5,000 sf gfa; Add 1 space per each 1,500 sf gfa above 5,000 sf gfa,	**X**
	Natural resource extraction	See subsection 21.07.090E.3.	
Marine Facility[11]	Aquaculture	See subsection 21.07.090E.3.	
	Facility for combined marine and general construction	See subsection 21.07.090E.3.	
	Marine operations	See subsection 21.07.090E.3.	
	Marine wholesaling	1 per 800 sf gfa	**X**
Warehouse and Freight Movement[11]	Bulk storage of hazardous materials	See subsection 21.07.090E.3.	
	Impound yard	1 per 500 sf gfa, plus 1 per 5,000 sf of outdoor storage area	
	Motor freight terminal	see Warehouse or wholesale establishment	**X**
	Self-storage facility	1 per 75 self-storage units, plus vehicle queuing spaces for security gate. Aisles suitable for temporary loading and unloading may be counted as required parking spaces in accordance with table 21.07-4 as determined by the traffic engineer. 1 per 75 vehicle/boat storage spaces	**X**
	Storage yard	1 per 2,000 sf of outdoor storage area	
	Warehouse or wholesale establishment, general or light	1,000-10,000 sf gfa: 1 per 1,000 sf gfa; Add 1 space per each 1,250 sf gfa above 10,000 sf gfa, up to 50,000 sf gfa; Add 1 space per each 1,500 sf gfa above 50,000 sf gfa,	**X**
Waste and Salvage	All uses	See subsection 21.07.090E.3.	

NOTES:

[11] The off-street parking requirements for industrial uses in this schedule A shall not include space devoted to office or other non-industrial related use. Where a warehousing or industrial facility contains office or other non-industrial related use, off-street parking for such spaces shall be computed using the requirements set forth in this table.

3. Uses Not Listed or that Have No Specific Requirement

In the case of a use or category of uses not listed in table 21.07-4, or that is listed without a specific parking requirement, the requirements for off-street parking facilities shall be determined by the director and the traffic engineer. Such determination shall be based upon the requirements for the use specified in table 21.07-4 that is most nearly comparable to the unspecified use, traffic engineering principles, and/or parking studies. Any parking

study prepared by the applicant shall include estimates of parking demand based on recommendations of the Institute of Transportation Engineers (ITE), or other acceptable estimates as approved by the traffic engineer, and shall include other reliable data collected from uses or combinations of uses that are the same as or comparable with the proposed use. Comparability shall be determined by density, scale, bulk, area, type of activity, and location. The study shall document the source of data used to develop the recommendations.

4. Maximum Number of Spaces Permitted

a. ***Purpose***

The purpose of this subsection is to establish an upper limit on the number of parking spaces allowed in order to promote efficient use of land, enhanced urban design, a safe and walkable pedestrian environment, alternative modes of transportation, and to protect air and water quality. Exceptions and flexibility procedures are provided where the required limit on the number of parking spaces is problematic for a certain use.

b. ***Applicability***

For any use categorized as a community or commercial use in table 21.05-1, *Table of Allowed Uses*, the maximum number of off-street vehicle parking spaces shall be as provided below. Temporary parking, the uses "parking lot, principal use" and "parking structure, principal use", and uses in the Educational Facility, Parks and Open Areas, Transportation Facility, and Utility Facility use categories are exempt.

c. ***Maximum Number of Spaces***

Developments may provide a maximum of one parking space per 250 square feet of gross floor area, or 125 percent of the minimum number of parking spaces required in table 21.07-4, whichever is greater.

d. ***Increased Landscaping in Large Parking Lots***

Development sites with more than 200 parking spaces required in table 21.07-4 and that are proposed by the applicant to have at least 25 percent more than the minimum number of parking spaces required in table 21.07-4 shall increase the overall amount of area devoted to parking lot interior landscaping area to an area equal to at least 12 percent of the parking lot, including parking, internal circulation, and appurtenant driveways. This shall apply to uses which utilize the exceptions offered in subsection 4.e. below.

e. ***Exceptions***

i. Restaurants without a drive-through, dinner theaters, and bars may provide up to 200 percent of the minimum number of parking spaces required in table 21.07-4.

ii. If application of the maximum parking standard would result in fewer than six parking spaces, the development shall be allowed six parking spaces.

iii. Exceptions to the maximum parking requirement may be allowed by the traffic engineer and the director in situations that meet all of the following criteria:

(A) The applicant provides a parking demand study of similar sites in the municipality that demonstrates that parking demand cannot be accommodated within the maximum number of parking spaces allowed or through any of the available parking reductions and alternatives such as on-street parking, shared parking with nearby uses, or incentives for alternatives to single-occupancy vehicle use; and

(B) The request is the minimum necessary variation from the standards.

5. Parking Location

Except as provided in subsection 21.07.090F., all required parking shall be on the same lot as the use served. However, required parking may be on an abutting or adjacent lot provided the zoning district in which the lot is located allows for off-street parking as a permitted principal use, site plan review use, or conditional use; in which case there shall be a parking agreement which meets the requirements of subsection F.1. below.

F. Parking Reductions and Alternatives

The traffic engineer and director may approve reductions and alternatives to providing the number of off-street parking spaces required by table 21.07-4, and/or to the circulation and dimensional standards of subsections H.8. and H.9., in accordance with the following standards.

1. Parking Agreements

A parking reduction or alternative shall require a written parking agreement between the property owner(s) and the municipality, except where expressly stated otherwise.

a. ***Recordation***

The municipality shall record the parking agreement at the district recorder's office as a covenant that runs with the land and is binding on the owner and all successors and assigns for as long as the required number of off-street parking spaces is not provided as a result of the parking reduction or alternative. All parties involved in the parking reduction or alternative shall participate in the parking agreement. Recordation of the agreement shall take place before issuance of an entitlement requiring a parking reduction or alternative.

b. ***Content***

The form and content of the parking agreement shall be approved by the director. It shall guarantee installation and maintenance of any required improvements by the owner, and/or the owner's continued participation in any parking management strategy required for a parking reduction. The parking agreement shall assure future implementation of a contingency plan by the owner if so ordered by the traffic engineer. The contingency plan may include strategies such as installation of parking, payment to the municipality for the full cost of providing the required parking, transportation demand management programs, or other parking management strategies identified in the parking reductions or alternatives of this section.

c. ***Termination***

If for any reason the parking agreement terminates, owners and all successors and assigns who are parties to the parking agreement shall comply with all provisions of this title governing the required number of off-street parking spaces.

2. Calculation of Parking Reductions

a. ***Multiple Reductions***

A development may be eligible for multiple reductions from the required number of parking spaces. The total impact of parking reductions shall be calculated as being multiplicative and not additive where a development is eligible for more than one. For example, if one reduction is 20 percent, and a second reduction is an additional 15 percent, their combined reduction shall be calculated as 80 percent times 85 percent equals 68 percent, or a 32 percentage point total reduction, rather than adding 20 percent plus 15 percent equals 35 percent. This is because the 15 percent reduction applies to a base that is already reduced 20 percent.

b. ***Minimum Reduction Credit of One Space***
If the total approved reduction from the required number of parking spaces for a development is calculated to be a reduction of less than one parking space, it shall be credited as a reduction of one parking space.

3. Qualifying Site Development
Uses shall provide the following enhancements to be eligible for any reduction in the number of required parking spaces, except where stated otherwise. The qualifying site criteria shall not be required for the following parking reductions and alternatives in this subsection 21.07.090F.: downtown Anchorage parking exemption, land banking, stacked and tandem parking, or smaller parking spaces for low-turnover uses. Industrial uses, public safety facilities, transportation facilities, and utility facilities are exempt from the qualifying site development criteria.

a. ***Street Oriented Building***
For buildings constructed after January 1, 2014, primary entrances and/or windows providing visual access shall comprise at least 15 percent of the area of any street facing building elevation. For nonresidential uses, windows providing visual access and/or primary entrances shall comprise at least 50 percent of the length and 25 percent of the ground-floor wall area of any street facing building elevation.

b. ***Walkway to the Street***
A walkway meeting the requirements of section 21.07.060 shall connect at least one primary entrance to a street. The director and the traffic engineer may waive this requirement in situations with existing structures where it is demonstrated that the addition of a walkway will cause a reduction in parking and/or landscaping below required levels, or where the work required to add a walkway is out of proportion with the work being done to effect a change of use.

c. ***Parking Facility Location***
For buildings constructed after January 1, 2014, parking facilities including driveways shall comprise no more than 50 percent of the area between the street property line and the street facing building elevation, and garage doors shall comprise no more than 50 percent of the length of the street facing building elevation. These requirements apply to no more than two street frontages.

d. ***Private Open Space***
For residential developments that are required to provide private open space, an additional 40 square feet of private open space that meets the requirements of section 21.07.030 shall be provided for each reduction of one parking space in developments built after January 1, 2014. This shall be common private open space in the case of multifamily and mixed-use dwellings.

e. ***Cross-Access to Adjacent Properties***
The director and the traffic engineer may determine there is potential for driveway or walkway cross-access to abutting properties and may require a cross-access facility and/or easement within the subject property to the site boundary. Vehicular cross-access may only be required in commercial districts.

4. Downtown
Uses located in DT-1, DT-2, and DT-3 districts are exempt from providing off-street parking spaces. However, if parking is provided, all other standards of this section shall apply in the DT districts. Parking agreements and qualifying site criteria shall not be required for this exemption.

5. Residences in Walking Distance to Downtown

Residential household uses located north of 15th Avenue, west of Orca Street, east of L Street, and south of Ship Creek are eligible for a reduction of up to 25 percent of the minimum number of required parking spaces.

6. Districts That Promote a Mix of Uses

a. Uses located in the R-4A district are eligible for a reduction of up to 10 percent of the minimum number of required parking spaces.

b. Uses located in the B-1A district are eligible for a reduction of up to 10 percent of the minimum number of required parking spaces, if the B-1A district abuts residential districts on the majority of its perimeter, and has a contiguous area of no more than one acre, excluding rights-of-way. In addition, certain developments in the B-1A district are eligible for a separate parking reduction as specified in the mixed-use development or overlay district standards of chapter 21.04. Such reductions shall be reviewed and administered under this section 21.07.090F.

c. Certain developments in the B-1B and B-3 districts are eligible for a reduction of the minimum number of required parking spaces, as specified in the mixed-use development standards or overlay district standards of chapter 21.04. Such reductions shall be reviewed and administered under this section 21.07.090F.

7. Residences in Center City Neighborhoods

a. Residential household uses located in center city neighborhoods are eligible for a reduction of up to 10 percent of the minimum number of required parking spaces.

b. For the purposes of this provision, the center city area is bounded to the north by Joint Base Elmendorf-Richardson, to the south by Tudor Road, to the east by Ingra Street and the Seward Highway, and to the west by Minnesota Drive. Any part of Fairview, South Addition, Government Hill, or Mountain View community council is also in the eligible area.

c. This reduction recognizes proximity to employment centers, characteristics such as traditional street grids and development patterns, household characteristics, emphasis on walkable northern city environments, and lower parking demand in these areas.

8. Uses Adjacent to Transit Service

A use is eligible for a reduction of up to five percent of the minimum number of required parking spaces if it is located within 800 feet of the street right-of-way centerline of any municipal public transit route, subject to approval by the traffic engineer and the director. The public transportation department may require a public use easement or transit stop and/or transit shelter improvements if the subject property abuts an existing or planned transit stop. If the public transportation department requires such an easement or improvements, then the use is eligible for an additional reduction of two percent or one more parking space, whichever is greater.

9. Rideshare Programs

A nonresidential use is eligible to substitute participation in municipal rideshare programs for up to a maximum of five percent of the minimum number of required parking spaces. The land area that would otherwise be needed in order to provide the required number of parking spaces shall be set aside on the site to provide for the future construction of a parking lot in conformance with subsection 21.07.090F.12., *Land Banking*.

a. ***Carpool***

Every designated carpool space may count as 1.8 spaces toward meeting the minimum number of required spaces. The carpool spaces shall be those closest to the primary entrance or elevator, but not closer than accessible spaces or those

signed for exclusive customer/visitor use. Signs shall be posted indicating these spaces are reserved for carpool use. The traffic engineer shall consult with the public transportation department in providing carpool spaces and the location of carpool parking.

b. ***Vanpool***
For every vanpool purchased or leased by the applicant for employee use operated through the municipal rideshare program, the number of required parking spaces shall be reduced by up to six spaces. The traffic engineer may require a safe and convenient designated vanpool passenger loading zone.

10. Transit Pass Benefits
A use in which the owner or employer offers transit passes cost-free to all employees or residents is eligible for a parking reduction of up to 10 percent of the minimum number of required parking spaces. The use shall be located within 800 feet of the street right-of-way centerline of any municipal transit route. The public transportation department may require a public use easement or transit stop and/or transit shelter improvements if the subject property abuts an existing or planned transit stop. If the public transportation department requires such an easement or improvements, then the use is eligible for an additional reduction of two percent or one more parking space, whichever is greater.

11. Parking Cash-Outs
A use is eligible for a reduction of up to 10 percent of the minimum number of required parking spaces if it implements a parking cash-out program by which commuters are provided the option to choose between free parking and its equivalent cash value for using an alternative mode of travel.

12. Land Banking
Subject to approval by the traffic engineer and the director, the land area that would otherwise be needed in order to provide up to 25 percent of the minimum number of required parking spaces may be set aside on the site to provide for the future construction of a parking facility. The applicant shall submit a parking demand study prepared in a form and manner prescribed by the traffic engineer that indicates the reduced parking lot will accommodate expected parking needs, and an alternate site plan to be approved by the traffic engineer that accommodates the parking that would be required without the land banked parking reduction. The area set aside shall be landscaped with site enhancement landscaping and/or pedestrian amenities approved by the director. The parking agreement shall guarantee that, if the director and the traffic engineer determine at some point in the future that additional parking spaces are needed, the owner shall construct parking on the land banked area in conformance with the alternate site plan.

13. Affordable Housing
Affordable housing units that are deed-restricted for households having an income at the time of initial occupancy of 30 percent or less of median family income are eligible for a reduction of up to 30 percent of the minimum number of required parking spaces. Affordable housing units for low income households having an income at the time of initial occupancy of 60 percent or less of median family income are eligible for a reduction of up to 15 percent of the minimum number of required parking spaces. The affordable housing units shall be consistent with the standards of subsection 21.07.110H., *Standards for Affordable Housing*.

14. Senior Housing
Dwelling units that meet the definition of senior housing are eligible for a reduction of up to 15 percent of the minimum number of required parking spaces. Dwelling units that meet the definition of senior housing that is intended for, and solely occupied by, persons 62 years of age or older are eligible for a reduction of up to 25 percent of the minimum number of required parking spaces.

15. Housing Density

Residential household uses are eligible for a reduction of one percent of the minimum number of required parking spaces for every four dwellings per acre above a net density of 40 dwellings per acre on the site, up to a maximum reduction of 20 percent of the minimum number of required parking spaces.

16. Shared Parking

Shared use of required parking spaces may occur where two or more uses on the same or separate sites are able to share the same parking spaces because their peak parking demands occur at different times. The traffic engineer and director may approve shared parking facilities for uses with different peak business periods if the shared parking complies with all of the following standards:

a. ***Shared Parking Study***

The applicant shall submit a shared parking study to the director that demonstrates the feasibility of shared parking. The study shall be provided in a form established by the traffic engineer and shall be made available to the public. The study shall demonstrate that any parking reduction requested will not result in the spillover of parking onto other properties or public streets, by, at a minimum, addressing the following: the size and type of the proposed development, location of required parking, the composition of tenants, the anticipated rate of parking turnover, and the anticipated peak parking and traffic loads for all uses that will be sharing off-street parking spaces.

b. ***Calculation of Parking Spaces Required***

The shared parking study shall follow one of the following procedures:

i. The method under subsection 16.c.;

ii. The most current published procedures of the Urban Land Institute or the Institute of Transportation Engineers; or

iii. Other procedures as specifically approved by the traffic engineer.

c. ***Alternative Calculation Method***

For each use sharing the parking facility, calculate the number of off-street parking spaces required for that use in table 21.07-4. Multiply that number across the row for its land use in table 21.07-5, *Shared Parking Credit*, to determine the typical parking required for that use during the eight time periods. For each time period, add the resulting products for each of the uses sharing the parking. The column total that generates the highest number of parking spaces then becomes the shared parking requirement. This represents the time period with the highest total parking demand.

TABLE 21.07-5: SHARED PARKING CREDIT								
Land Uses[12]	**Weekday Time Periods**				**Weekend Time Periods**			
	7 am to 6 pm	6 pm to 1 am	1 am to 3 am	3 am to 7 am	7 am to 6 pm	6 pm to 1 am	1 am to 3 am	3 am to 7 am
Residential	65%	100%	100%	100%	75%	90%	10%	100%
Religious assembly	25%	50%	0%	0%	100%	50%	0%	0%
Health services	100%	30%	5%	5%	100%	0%	0%	0%
Assembly	100%	50%	5%	5%	100%	50%	5%	5%
Fitness center	90%	100%	60%	60%	100%	100%	80%	80%
Movie theater	60%	100%	0%	0%	80%	100%	0%	0%
Bar or nightclub	40%	100%	90%	0%	50%	100%	90%	0%
Restaurant	80%	100%	50%	50%	85%	100%	25%	25%
Restaurant – drive-through	100%	90%	15%	15%	100%	80%	15%	15%
Office or financial	100%	10%	0%	5%	15%	0%	0%	0%
Retail sales / services	100%	80%	0%	0%	100%	60%	0%	0%
Visitor accommodations	75%	100%	100%	100%	75%	100%	100%	100%
NOTES: [12] If one or more of the land uses proposed to make use of shared parking facilities do not conform to the land use classifications in this table, as determined by the director, then the applicant shall submit sufficient data to indicate the periods of peak parking demand for the uses. Based on this information, the traffic engineer shall determine the appropriate shared parking requirement.								

d. ***Distance to Parking Spaces***
Shared parking spaces for residential units shall be located within 500 feet of the dwelling unit entrance they serve. Shared spaces for other uses shall be within 800 feet of a primary entrance of the uses served. The traffic engineer and the director may approve a portion of shared parking spaces at a greater distance based on factors such as the pedestrian environment, availability of attendant parking, weather protection, and the type of use served.

e. ***Pedestrian Connection***
Clear and safe pedestrian walkways shall connect the shared parking facility and the primary entrances of the uses it serves. The traffic engineer may require pedestrian street crossing improvements.

f. ***Separation by Streets***
Separation of a use and its shared parking facility by a local street is allowed. Shared parking spaces shall not be separated from the served use by a collector or greater classification street, unless approved by the traffic engineer with consideration of the ease and safety of pedestrian access, or as specifically allowed by a comprehensive plan element specific to an area or district.

g. ***Residential Neighborhoods***
A nonresidential use shall not participate in a shared parking facility that is located in a residential district, if the use itself is not permitted in the residential district.

h. ***Instructional Signs***
The shared parking facility shall provide instructional signs on the premises indicating the availability of the facility for patrons of the uses it serves.

i. ***Shared Parking Plan***
A shared parking plan shall be submitted for review and approval by the traffic engineer and the director. The shared parking plan may be combined with other parking plans required by this title.

j. ***Changes in Use or Shared Parking Facility***
Any subsequent change to the shared parking facility or in use type shall require a review by the department and the traffic engineer for compliance with this section, including proof that sufficient parking will be available. Any change shall be approved prior to being implemented.

k. ***Expiration***
Notwithstanding F.1.a. above, a shared parking agreement may be recorded for a time certain period, not to be less than ten years. At the end of the life of the agreement, property owners who are parties to the agreement shall comply with all provisions of this code governing the required number of off-street parking spaces.

17. Off-Site Parking
The traffic engineer and the director may approve the location of required parking spaces on a separate lot from the principal use if the off-site parking complies with all of the following standards:

a. ***Accessible Parking Spaces***
Required accessible parking spaces shall not be located off-site.

b. ***Location***
The maximum distance between off-site parking spaces and the use(s) served shall be the same as provided in subsection 21.07.090F.16.d. for sharing parking spaces (measured along the shortest legal pedestrian route). Separation of a use and its off-site parking spaces by a street shall be subject to subsection 21.07.090F.16.f.

c. ***Pedestrian Connection***
Clear and safe pedestrian walkways shall connect the off-site parking facility and the primary entrance(s) of the uses served. The traffic engineer may require sidewalk or pedestrian crossing improvements to enhance pedestrian safety or mobility to and from the off-site parking.

d. ***Instructional Signs***
Instructional signs shall be posted on the principal site providing notice of the availability and location of additional parking. The off-site parking facility shall provide instructional signs indicating the availability of the facility for patrons of the uses it serves.

e. ***Residential Neighborhoods***
A nonresidential use shall not participate in an off-site parking facility that is located in a residential district, if the use itself is not permitted in the residential district.

18. District Parking
The traffic engineer may reduce the minimum number of required off-street parking spaces for uses within the boundaries of a municipally recognized public parking district that provides off-site parking facilities to serve an area. To determine eligibility for this reduction or the size of the reduction to be allowed, the traffic engineer shall consider factors such as:

a. Peak hours of use and turnover rate;

b. The ability of the use to meet the parking requirement through other means;

c. The availability of spaces in the nearby district parking facility;

d. The relative distance to the use from the district parking facility; and

e. Measures provided by the applicant to ensure employee and patron use of the district parking facility, and ease and safety of pedestrian access.

19. On-Street Parking

If approved by the traffic engineer, on-street parking spaces in the street or right-of-way abutting the frontage of the site may be counted toward the minimum required number of off-street parking spaces, including guest parking spaces. In addition, as determined by the traffic engineer, a portion of the remaining on-street parking spaces located within the maximum distance provided in subsection 21.07.090F.16.d. for shared parking spaces may be counted toward the minimum required off-street parking spaces, in an amount consistent with a fair apportionment of on-street parking spaces among the properties on the street. Upon approval, each on-street space may be substituted for one required off-street space. The provisions apply only to street frontages where on-street parking is allowed. Determination of the location and dimensions of on-street parking spaces to be counted toward the parking requirement shall be the authority of the traffic engineer based on a review of the situation. The street curb next to on-street parking spaces shall be a vertical curb (not a rolled curb), and a sidewalk shall extend the full length of the subject property.

20. Stacked and Tandem Parking

a. ***Nonresidential Uses***

Stacked and tandem parking spaces for nonresidential uses are allowed to count toward the minimum number of required spaces if the owner ensures through the parking agreement that attendant parking is provided for such spaces. An accessible passenger loading zone shall be provided with attendant parking services at or near a primary entrance. Availability of this service shall be conspicuously posted inside and outside the primary entrance. The traffic engineer may waive the parking attendant requirement for automated parking structures.

b. ***Residential Uses***

Two required parking spaces for any residential dwelling may be arranged in tandem or stacked one above the other using a car stacker, so long as parking required for the dwelling unit is arranged independently from parking serving any other dwelling unit, with unobstructed vehicle access for at least one of the spaces required for each dwelling unit, and the owner assigns the two spaces toward the same dwelling and enforces their assigned use.

21. Smaller Parking Spaces for Parking Structures and Low-Turnover Uses

If approved by the traffic engineer, up to 20 percent of the total number of required parking spaces located in a parking structure and/or designated for employee or resident parking only may be eight feet six inches wide, subject to the requirements of table 21.07-7, *Parking Space and Aisle Dimensions*. Such spaces shall be signed for employee or resident parking only.

22. Bicycle Parking

A use is eligible to permanently or seasonally substitute bicycle parking spaces for required automobile parking spaces. Each automobile parking space shall be replaced by a minimum of six bicycle parking spaces not required by this title. Bicycle parking spaces shall comply with the standards of subsection 21.07.060F.15. and be separated from motor vehicle areas by bollards or other physical buffer approved by the traffic engineer.

23. Other Eligible Reductions or Alternatives

The traffic engineer and the director may approve any parking reduction or other alternative in addition to the choices above, or that increases the percentage reduction in any of the choices above, if the applicant demonstrates to the satisfaction of the traffic engineer and the director that the proposed parking management strategy will protect surrounding neighborhoods, and maintain traffic circulation patterns at least the same extent as would strict compliance with otherwise applicable off-street parking standards. Additional parking management strategies may include, for example, transportation demand programs, car sharing, unbundled parking, or a combination of strategies. The applicant shall provide a parking demand study prepared in a form and manner prescribed by the traffic engineer that demonstrates a reduction is appropriate based on the expected parking needs of the development, availability of transit, and similar factors. It shall be determined that:

a. The use will be adequately served by the proposed parking due to project location, transportation characteristics of the persons residing, working, or visiting the site, or because the applicant has undertaken a program or strategy that will reduce parking demand at the site; and

b. Parking demand generated by the project will not exceed the capacity of or have a detrimental impact on the supply of on-street parking in the surrounding area.

G. Off-Street Loading Requirements

No building or structure used for any use specified in the loading column of table 21.07-4 shall be erected, nor shall any such existing building or structure be altered so as to increase its gross floor area by 25 percent or more, without prior provision for an off-street loading berth in conformance with the following minimum requirements:

1. Types of Loading Berths

Required off-street loading shall be provided in berths that conform to the following minimum specifications:

a. Type A berths shall be at least 60 feet long by 10 feet wide by 14 feet six inches high, inside dimensions.

b. Type B berths shall be at least 30 feet long by 10 feet wide by 14 feet six inches high, inside dimensions.

c. Type C berths shall be located in the rear of a lot and utilize part of an adjacent alley. The building setback shall be a minimum of five feet from the property line along the alley for the entire width of the lot.

2. Number of Spaces

The following numbers and types of berths shall be provided for the specified uses in table 21.07-6, *Off-Street Loading Berths*; provided, however, that, in any DT district, or in any mixed-use development where an alley is available that is not shared with any adjacent R-1, R-1A, R-2A, R-2D, R-2M, or R-3 zoned residential lot, one type C berth may be substituted for one type B berth. The uses specified in this subsection shall include all structures designed, intended, or arranged for such use.

TABLE 21.07-6: OFF-STREET LOADING BERTHS

Use	Aggregate Gross Floor Area (square feet) or Number of Dwelling Units	Berths Required	Type
Residential Uses			
Multifamily and mixed-use dwellings	50-149 dwelling units in a structure	1	B

TABLE 21.07-6: OFF-STREET LOADING BERTHS			
Use	**Aggregate Gross Floor Area (square feet) or Number of Dwelling Units**	**Berths Required**	**Type**
	150-249 dwelling units in a structure	2	B
	Each additional 100 dwelling units or portion thereof	1 additional	B
Group housing	Same as for health care facilities		
Community Uses			
Community center or religious facility	Same as for assembly uses		
Government administration and civic facilities	Same as for office commercial uses		
Cultural facilities	24,000--50,000	1	B
	50,001--100,000	2	B
	Over 100,000, each additional 50,000 or fraction thereof	1 additional	B
Educational facilities	Over 25,000	1	B
Health care facilities	25,000--100,000	1	B
	Over 100,000	2	B
Railroad freight terminals and other transportation facilities, utility facility	12,000--36,000	1	A
	36,001--60,000	2	A
	60,001--100,000	3	A
	Each additional 50,000 or fraction thereof	1 additional	A
Commercial Uses			
Assembly uses, entertainment and recreation uses	25,000--150,000	1	B
	150,001--400,000	2	B
	Each additional 250,000 or fraction thereof	1 additional	B
All commercial establishments not otherwise specified	10,000 --24,000	1	B
	24,001--50,000	2	B
	50,001--100,000	3	B
	Over 100,000, each additional 50,000 or fraction thereof	1 additional	B
Visitor accommodations, animal sales and service, office, personal services, repair and rental uses	25,000--40,000	1	B
	40,001--100,000	2	B
	Each additional 100,000 or fraction thereof	1 additional	B
Marijuana Uses			
Marijuana cultivation facility	12,000 – 60,000	1	B
	Each additional 60,000 or fraction thereof	1 additional	B
Marijuana manufacturing facility	Same as for marijuana cultivation facility		

TABLE 21.07-6: OFF-STREET LOADING BERTHS			
Use	**Aggregate Gross Floor Area (square feet) or Number of Dwelling Units**	**Berths Required**	**Type**
Marijuana retail facility	Same as for general commercial establishments		
Industrial Uses			
Light contractor and special trades, dry cleaning establishment	Same as for general commercial establishments		
Data processing facility, research laboratory	Same as for office and personal service uses		
All industrial uses not otherwise specified	12,000--36,000	1	A
	36,001--60,000	2	A
	60,001--100,000	3	A
	Each additional 50,000 or fraction thereof	1 additional	A

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3. Uses Not Specifically Mentioned
In the case of a use not specifically mentioned in this section, the requirements for off-street loading berths shall be the same as the use mentioned in this section which, in the opinion of the director, is most similar to the use not specifically mentioned.

4. Concurrent Different Uses
When any proposed structure will be used concurrently for different purposes, the loading requirements shall be the total requirements for each use based upon its aggregate gross floor area, unless otherwise approved by the traffic engineer and the director.

5. Location of Off-Street Loading Facilities
Off-street loading facilities required under this title shall be in all cases on the same lot or parcel of land as the structure they are intended to serve, except as provided in subsection 21.07.090G.1.c. for type C loading berths. Where parking facilities are not allowed between a building and a street, loading berths are also not allowed.

6. Manner of Using Loading Areas
No loading berth shall be so located that a parked vehicle or tractor-trailer using such loading berth projects into any street or across a required pedestrian facility or sidewalk. Loading berths shall be provided with access to an alley, or, if no alley abuts the lot, with access to a street. Any required front, side, or rear setback may be used for loading unless otherwise prohibited by this title. Design and location of entrances and exits for required off-street loading berths shall be subject to the approval of the traffic engineer.

7. Signs
The owners of the property shall provide, locate, and maintain loading signs as specified by the traffic engineer. Such signs shall not be counted against allowed advertising sign area or number.

8. Modifications
The traffic engineer may approve a modification to the loading requirements as they apply to any individual case if documentation demonstrates to the satisfaction of the traffic engineer that the change is appropriate, will not interfere with pedestrian or vehicle traffic circulation or safety, and is consistent with the intent of the requirements. The traffic engineer shall set conditions on approval of modifications as necessary to ensure that loading operations conform to the intent of this title.

H. Parking and Loading Facility Design Standards

1. Purpose

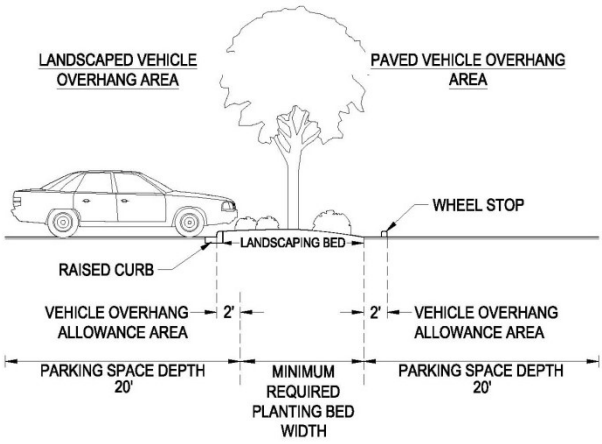
The parking and loading facility design standards promote vehicle areas which are safe, efficient, convenient, and attractive for motorists and pedestrians. Parking facility locations within a site are encouraged to be located elsewhere than the front area between the building and its street frontage, in order to enhance the function, character, and walkability of the area. These design standards also enhance the compatibility of parking and loading facilities with their surroundings.

2. Applicability

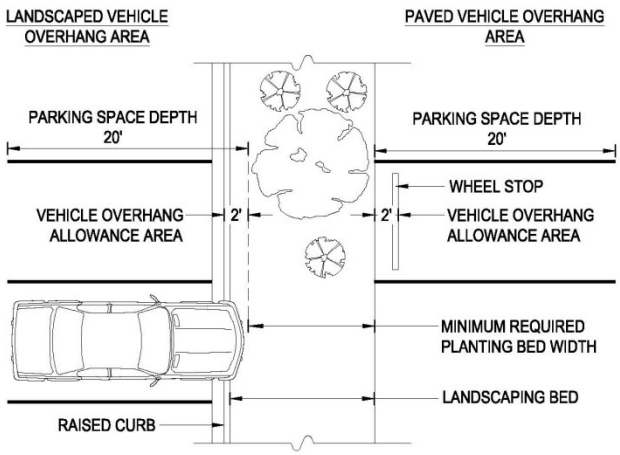
These standards apply to any parking facility or loading facility including all parking spaces in a development, except where stated otherwise. A temporary parking lot shall comply with all applicable development requirements of this title for surface parking lots and parking lot landscaping, except when associated with another temporary use permitted pursuant to section 21.05.080.

3. Landscaping and Screening

Parking and loading facilities shall comply with the landscaping and screening provisions of section 21.07.080. If the loading facilities are adjacent to the lot line, a maximum of 35 percent of one side of the loading area perimeter landscaping and the site perimeter landscaping may be replaced by a screening fence of a minimum height of six feet. That area for the proposed screening fencing shall only be located where adjacent to a loading area and/or dumpster screening area, and shall not be located adjacent to a residentially zoned parcel or a street. Provisions for location and screening of refuse containers and other elements are in section 21.07.080. No automobile or bicycle parking facility or loading facility shall be permitted in any required landscaping area. No vehicle overhang allowance area, as measured in table 21.07-7, may extend into the minimum required planting bed width of required landscaping. See figures that follow.



VEHICLE OVERHANG AND REQUIRED LANDSCAPING
SECTION VIEW (90° ANGLE PARKING SPACE)



VEHICLE OVERHANG AND REQUIRED LANDSCAPING
PLAN VIEW (90° ANGLE PARKING SPACE)

4. Drainage and Storm Water Management

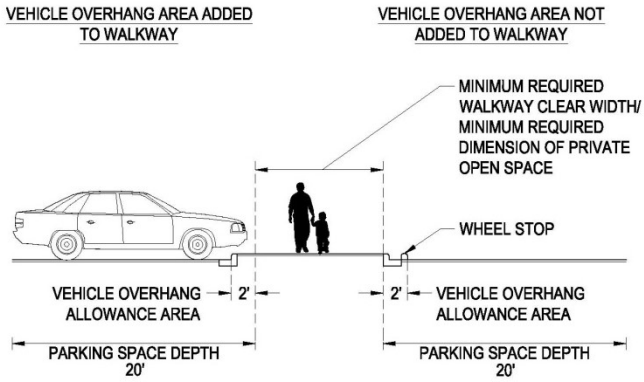
Parking and loading facilities shall comply with the parking and loading related provisions of section 21.07.040, *Drainage, Storm Water Treatment, Erosion Control, and Prohibited Discharges*.

5. Exterior Lighting

Parking and loading areas shall comply with the exterior lighting provisions of section 21.07.100.

6. Pedestrian Access and Circulation

Parking and loading facilities shall comply with the provisions of subsection 21.07.060E., *Pedestrian Facilities*. No vehicle overhang allowance area, as measured in table 21.07-7, may extend into the minimum required dimension of required walkways, pedestrian areas, or private open space. See figure that follows.



VEHICLE OVERHANG AND REQUIRED PEDESTRIAN FACILITIES

7. Relationship to Buildings

a. *Nonresidential Buildings*

Parking spaces and parking aisles shall be separated from any nonresidential building by a walkway or site enhancement landscaping planting area, or both, of at least four feet in width. Other motor vehicle areas shall also be subject to this requirement only where the traffic engineer determines it necessary for a safe pedestrian walkway route between a building entrance or parking lots. Otherwise,

loading berths, rear service areas, motor vehicle entrance and service bays, queuing lanes, and drive-throughs are exempt.

8. Vehicular Access and Circulation

Parking lots and structures shall be designed for a safe and orderly flow of traffic throughout the site, as provided in the subsections that follow.

a. ***Key Elements***

The parking facility layout, circulation, and design plan shall address the following elements as they relate to parking lots, including but not limited to: fire lanes, emergency access, drive-throughs, queuing spaces, passenger loading zones, pedestrian circulation, and loading berths.

b. ***Circulation Patterns***

Internal circulation patterns and the location and traffic direction of all circulation aisles, driveways, and queuing lanes shall be designed and maintained in accordance with the municipal driveway standards currently established by the traffic engineer, and with accepted principles of traffic engineering and safety, per the traffic engineer's review based on the current manuals of the Institute of Transportation Engineers and the Urban Land Institute, and the *Manual of Uniform Traffic Control Devices* or the successor documents. Circulation patterns within parking facilities shall be well defined with pavement marking and signage, curbs, landscaping, landscaped islands, and/or other similar features. In order to define circulation and provide better sight distance, curbed end islands shall be required at the end of each row of parking spaces. Where loading facilities or on-site refuse collection are provided, commercial truck circulation shall be considered, and truck turning radii shall be shown on the parking facility layout, circulation, and design plan when required by the traffic engineer.

c. ***Parking Spaces Along Major Site Entrance Drives***

The provision, location, design, and dimensions of parking spaces on a major access driveway that serves as an entry or exit for a large establishment with multiple lots, tracts, or businesses, shall conform to municipal standards for on-street parking and be subject to review and approval by the traffic engineer.

d. ***Parking Lot Entries/Driveways***

Entries and driveways providing access to parking lots shall conform to the municipal driveway standards currently established by the traffic engineer. Access to streets owned by the state of Alaska requires compliance with state driveway standards, department of transportation and public facilities approval, and a current valid state of Alaska driveway permit. Ingress and egress to parking facilities shall be designed to maintain adequate sight distance and safety and as prescribed in the municipal driveway standards.

i. *Residential Uses*

Residential driveway entrances shall comply with subsection 21.07.110G.3., *Driveway Width*.

ii. *Nonresidential Uses*

The total width of driveway entrances to a nonresidential lot from a street shall not exceed 40 percent of the frontage of the lot, or 33 percent of the frontage if the platting authority or traffic engineer finds that conditions warrant it, unless the applicant provides for snow storage in a manner approved by the decision-making body.

e. ***Parking and Maneuvering***

All circulation aisles, driveways, and vehicle maneuvering areas required by this section shall be located entirely off-street and on the property unless specifically provided otherwise by this section.

i. *Access to Parking Spaces*

To ensure safe and efficient vehicular access to parking spaces, each off-street parking space shall open directly on a parking aisle or driveway of such width and design as provided in table 21.07-7 and the illustrations that follow the table. Adequate ingress and egress to each parking space shall be provided without backing more than 25 feet.

ii. *Maneuvering Area*

Off-street parking facilities shall be designed with sufficient maneuvering room so that all maneuvers associated with the parking shall occur in the off-street parking facility, and that all vehicles enter the abutting street in a forward motion.

iii. *Some Dwellings Exempted*

Single-family, two-family, townhouse, and mobile home dwellings on individual lots shall be exempted from this subsection. Multifamily dwellings with up to four units shall be exempted from this subsection in appropriate circumstances if approved by the traffic engineer. Appropriate circumstances may include lots with alley access, lots located on low-volume streets, and lots located on dead-end streets or cul-de-sacs.

iv. *Loading Berth Maneuvering*

Vehicle maneuvering for loading berths shall be subject to the requirements of subsection 21.07.090G.6., *Manner of Using Loading Areas*.

f. ***Dead-End Parking Aisles***

Dead-end parking aisles may be allowed only with the approval of the traffic engineer.

g. ***Alleys***

Subject to safety approval by the traffic engineer, the usable portion of an alley may be credited as circulation and/or parking aisle space.

h. ***Cross Access and Joint Access with Adjacent Sites***

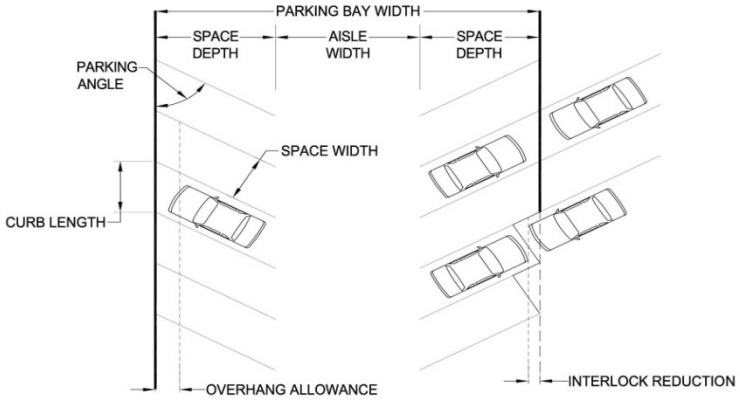
The plan shall show existing parking and circulation patterns on adjacent properties and potential connections. Required parking lots serving a site, whether located on that same lot or on an adjacent lot, may be connected by means of a common access driveway within or between the interior of such lots. Applicants are encouraged to provide shared vehicle and pedestrian access to adjacent properties for convenience, safety, and efficient circulation. An access easement shall be provided on the plat, or a shared access agreement running with the land shall be recorded by the municipality, as approved and executed by the director, guaranteeing the continued availability of the shared access between the properties.

9. Dimensions of Parking Spaces and Aisles

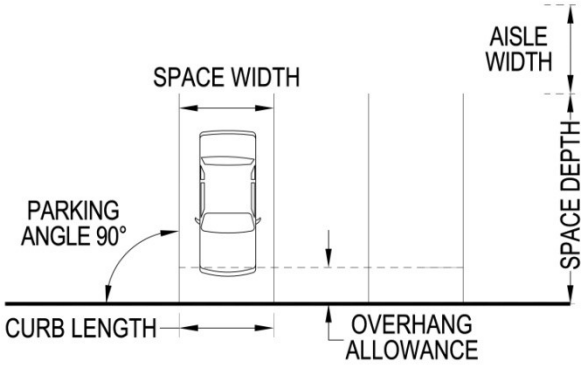
The minimum dimensions for parking spaces and parking aisles shall be as provided in table 21.07-7, and calculated as depicted in the figures that follow the table. The minimum parking space width shall be 9’0” except as provided elsewhere in this section. The parking configuration stated in the following table and figures shall apply to all off-street parking, except as stated elsewhere in this section.

TABLE 21.07-7 PARKING ANGLE, STALL, AND AISLE DIMENSIONS

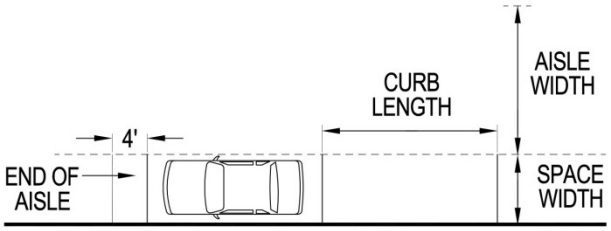
Parking Angle	Space Width	Curb Length (Width Projection)	Space Depth (Vehicle Projection)	Aisle Width 1-way	Aisle Width 2-way	Typical Parking Bay Width (Module)	Interlock Reduction	Overhang Allowance
0 (parallel)	8' 6"	23' 0"	8' 6"	12' 6"	24'	41' 0"	0' 0"	0' 0"
	9' 0"	23' 0"	9' 0"	12' 0"	24'	42' 0"	0' 0"	
	9' 6"	23' 0"	9' 6"	12' 0"	24'	43' 0"	0' 0"	
	10' 0"	23' 0"	10' 0"	12' 0"	24'	44' 0"	0' 0"	
45	8' 6"	12' 0"	18' 9"	12' 6"	24'	61' 6"	3' 0"	1' 5"
	9' 0"	12' 9"	20' 6"	12' 0"	24'	65' 0"	3' 2"	
	9' 6"	13' 5"	20' 10"	12' 0"	24'	65' 9"	3' 4"	
	10' 0"	14' 2"	21' 3"	12' 0"	24'	66' 5"	3' 6"	
60	8' 6"	9' 10"	19' 10"	18' 6"	24'	63' 8"	2' 2"	1' 8"
	9' 0"	10' 5"	21' 10"	18' 0"	24'	67' 8"	2' 3"	
	9' 6"	10' 12"	22' 1"	18' 0"	24'	68' 2"	2' 5"	
	10' 0"	11' 7"	22' 4"	18' 0"	24'	68' 8"	2' 6"	
75	8' 6"	8' 10"	19' 7"	19' 6"	24'	63' 2"	1' 1"	1' 11"
	9' 0"	9' 4"	21' 8"	19' 0"	24'	67' 4"	1' 2"	
	9' 6"	9' 10"	21' 9"	18' 6"	24'	67' 7"	1' 3"	
	10' 0"	10' 4"	21' 11"	18' 0"	24'	67' 10"	1' 5"	
90	8' 6"	8' 6"	18' 0"	23' 6"	24'	60' 0"	0' 0"	2' 0"
	9' 0"	9' 0"	20' 0"	23' 0"	24'	64' 0"	0' 0"	
	9' 6"	9' 6"	20' 0"	22' 0"	24'	64' 0"	0' 0"	
	10' 0"	10' 0"	20' 0"	22' 0"	24'	64' 0"	0' 0"	



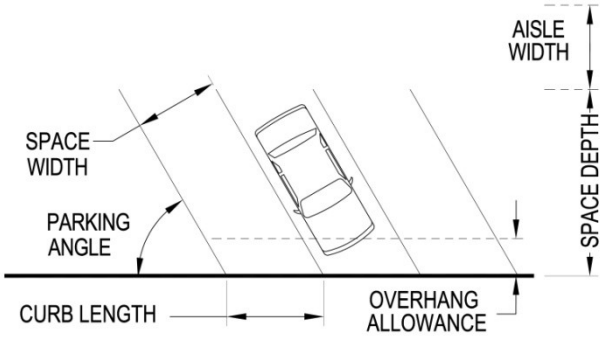
PARKING DIMENSIONS



90° PARKING SPACES



PARALLEL PARKING SPACES



ANGLE PARKING SPACES (45°, 60° or 75°)

a. ***Parking Angle***

Parking angles between zero and 45 degrees and between 75 and 90 degrees are not permitted, except as approved by the traffic engineer. Angles between 45 and 75 degrees are permitted. The dimensions for such angles shall be calculated by the applicant using a method prescribed by the traffic engineer. The angle parking spaces diagram above, including the elements of a parking space that it depicts relative to the required space dimensions in table 21.07-7, are equally applicable to either front-in or back-in angle parking spaces.

b. ***Parking Aisle Width***

Where the parking angle differs across a one-way parking aisle, the greater required parking aisle width shall be provided. In the case of on-street parking, the parking aisle width is replaced by the street's travel lane, and municipal street standards for street land widths apply.

c. ***Reduction in Parking Space Depth Due to Interlock***
Parking space depth (vehicle projection) may be reduced through the use of interlock between angled parking bays as shown in the parking dimensions figure. The amount of reduction in the parking space depth shall be as provided in the interlock reduction column of table 21.07-7. The parking angle of the abutting parking bays shall be equal in order to use the interlock reduction.

d. ***Overhang Allowance with a Parking Space***
The maximum overhang allowance shall be as shown in table 21.07-7 and the figures that follow it. The distance between the end of the parking space and the face of any raised curb or wheel stop used in the parking space shall be equal to (no greater or less than) the overhang allowance provided in table 21.07-7. The relationship between the overhang allowance and adjacent required landscaping and pedestrian facilities is established in subsections 21.07.090H.3. and H.6. Surfacing options for the overhang allowance area of the parking space are provided in subsection 21.07.090H.12b.6., *Paving Alternatives*.

e. ***Parking Spaces Abutting a Wall, Fence, or Other Obstruction***
Minimum required parking space dimensions shall be clear of all obstructions, other than wheel and curb stops and structural columns that meet the requirements of subsection 9.f. below. When the length of a parking space abuts a wall, fence, or other obstruction, the required width of the parking space shall be increased by one foot for each side with an obstruction. The parking space angle and dimension requirements shall apply to the inside dimension of a parking space abutting an obstruction.

f. ***Structural Columns***
A structural column may encroach into the width of a parking space by up to one foot if the column is located within four feet of either end of the parking space. Such column shall not be located within one foot of the drive aisle.

g. ***Minimum Vertical Clearance***
A minimum height of 14 feet shall be maintained clear of obstructions from any parking lot surface to any structure or landscape feature above that may interfere with the safe passage of vehicles. The minimum vertical clearance for a structured parking facility, carport, or garage shall be seven feet four inches, except as follows:

i. The minimum vertical clearance for van accessible parking spaces, access aisles serving them, and vehicle routes to the van accessible spaces shall be eight feet two inches.

ii. The minimum vertical clearance for passenger loading zones including vehicular pull-up spaces, access aisles serving them, and a vehicular route between an entrance and exit and the passenger loading zone shall be nine feet six inches.

h. ***Smaller Parking Spaces for Low Turnover Uses***
Reduced parking space dimensions may be approved by the traffic engineer pursuant to subsection F.21. above.

i. ***Recreational Vehicle Spaces***
Parking spaces for recreational vehicles, if provided and delineated, shall be a minimum of 10 feet wide by 40 feet long.

j. ***Stacked, Automated, or Tandem Spaces***
The traffic engineer may approve reduced parking space dimensions for stacked parking spaces, and/or tandem spaces in an attendant parking facility.

10. Parking Facility Maintenance

a. Paved surface parking lots with 20 or more spaces shall be cleaned annually, or as otherwise required by the current MS4 permit, including once following spring melt prior to June 1 or as snowmelt conditions permit, in a manner that meets air quality and water quality standards.

b. On-site storm water detention and runoff facilities serving parking facility runoff shall be cleaned and maintained in a functional manner, or as otherwise required by the current MS4 permit.

c. Grit or oil and water separator devices shall be cleaned and maintained in a functional manner, or as otherwise required by the current MS4 permit.

11. Maximum Grade of Surface Parking Lots

The maximum grade for any parking space or circulation aisle shall be five percent, except that for accessible spaces the maximum grade shall be two percent, as required by the Americans with Disabilities Act. Circulation aisles that are covered or heated may have an increased maximum grade with the approval of the traffic engineer.

12. Paving

a. ***Material***

Except as provided below, all parking spaces, loading berths, driveways, and other motor vehicle driving surfaces shall be paved and maintained with dustless, all-weather, hard materials appropriate for the municipality's sub-arctic environment, and equal in strength to two inches municipal Type E asphaltic concrete and a base material suitable for the intended traffic, to standards prescribed by the municipal engineer or as otherwise approved by the traffic engineer.

b. ***Paving Exceptions and Alternatives***

The traffic engineer may approve the following exceptions and alternatives to the paving requirement, provided that the first 50 feet of a driveway, as measured from the edge of the street travelled way, shall be paved if connecting to a paved public street. This length is reduced to 15 feet for single-family and two-family uses. Where a driveway throat is less than 50 feet, the traffic engineer may approve an alternative driveway surface that effectively reduces or eliminates the tracking of sediment onto paved public streets.

i. *Use-Specific Exceptions*

Certain uses may use gravel in lieu of paving, as specified in chapter 21.05.

ii. *Exceptions for Small Parking Lots in Class B Districts*

Parking lots of 10 spaces or fewer in class B districts may instead be surfaced with a layer of crushed rock of no more than one inch in diameter, to a minimum depth of three inches.

iii. *Exceptions for Some Vehicle Storage Areas*

The following areas need not be paved: outdoor vehicle storage areas associated with a self-storage facility use; storage, sales, or rental of heavy equipment; seasonal large vehicle storage; and tractor trailer storage areas not used for loading berths, loading berth maneuvering, access to bay doors, site access, or parking. Such areas are still subject to the drainage requirements of subsection 21.07.040.

iv. *Exceptions for Parks and Open Spaces*
Subject to review and approval by the traffic engineer, some required parking spaces for parks facilities that are demonstrated to have a highly variable seasonal demand need not be paved.

v. *Paving Alternatives*
Pervious alternatives to the specified surface may be used, subject to approval by the traffic engineer. All surfacing shall control dust, treat storm water to municipal standards, and be such that rock and other debris is not tracked off-site. If, after construction, the traffic engineer determines that the alternative is not adhering to these requirements, the surface shall be replaced.

vi. *Landscaping in Lieu of Paving*
The vehicle overhang allowance portion of the parking space depth as measured in table 21.07-7 and illustrated in the figures following the table, may be landscaped with a low-growth, hardy plant material in lieu of paving, allowing a bumper overhang while maintaining the required parking dimensions. Landscaped overhang allowance areas may be contiguous with required landscaping but shall not be counted toward the minimum required planting bed width.

vii. *Exception for Temporary Parking Lots*
Temporary parking lots associated with another temporary use pursuant to section 21.05.080, need not be paved, unless required by the traffic engineer.

I. Passenger Loading Zones

All institutional, entertainment, and commercial uses such as schools/daycare, stadiums, and theaters that have high-volume peak traffic volumes shall provide an area for drop-offs and pick-ups that meets the following requirements:

1. Passenger Loading Zone

In addition to the required minimum number of parking spaces established in subsection 21.07.090E., the traffic engineer may require one or more passenger loading zone spaces, depending on the type, intensity, and traffic patterns of the proposed use. The passenger loading zone for large commercial establishments or other intensive uses may be required by the traffic engineer to include one or more spaces dedicated to taxi cabs and/or other specialized high occupancy vehicles.

2. Passenger Loading Zone Dimensions

Any passenger loading zone that is provided for a development shall consist of one or more passenger drop-off/pick-up spaces parallel to the driveway or circulation aisle adjacent to the building. Each space shall be a minimum of 20 feet in length and eight or more feet in width, with an access aisle at least five feet wide abutting the full length of the space. As an alternative, subject to approval of the traffic engineer, a passenger loading zone may consist of one or more parking spaces that meets the accessible parking space dimensional standards of subsection 21.07.090J.7. However, designated passenger loading zone spaces shall not count towards the accessible parking space requirement.

3. Plan

The parking facility layout, circulation, and design plan shall show the location and design of proposed passenger loading zones. For certain intensive uses, the traffic engineer may require the plan to include a traffic control plan addressing projected usage, hours of operation, peak loading/unloading time, plans for directing traffic, safety measures, and other information deemed necessary by the traffic engineer to designing a safe and well-functioning drop-off area.

4. Accessible Route

An accessible pedestrian route to the building or facility entrance shall be provided pursuant to subsection 21.07.090J.9., *Accessible Routes*.

5. Schools

Passenger loading zones shall be required for schools (public or private). Length, location, and design of the passenger loading zones shall be approved by the traffic engineer.

J. Accessible Parking Spaces

1. Required Number of Accessible Parking Spaces

A portion of the total number of parking spaces provided in each parking facility for commercial, industrial, community, multifamily, and mixed-use residential uses shall be accessible parking spaces. However, buildings in multifamily or mixed-use developments that are single-family, two-family, or townhouse style structures are not subject to the accessible parking space requirement. The number of accessible parking spaces shall be determined based on the total number of parking spaces provided, in accordance with table 21.07-8, *Accessible Parking Spaces*, except where otherwise stated in this section.

TABLE 21.07-8: ACCESSIBLE PARKING SPACES

Total Parking Spaces Provided	Total Accessible Spaces Required	Number of Accessible Spaces that shall be Van-Accessible
1 to 25	1	1
26 to 50	2	1
51 to 75	3	1
76 to 100	4	1
101 to 150	5	1
151 to 200	6	1
201 to 300	7	2
301 to 400	8	2
401 to 500	9	2
501 to 1000	2 percent of total	1 for every 6 accessible spaces
1001 and over	20 plus 1 for each 100 over 1000	1 for every 6 accessible spaces

2. Passenger Loading Zones Attendant Parking

If passenger loading zones are provided, then at least one passenger loading zone shall be an accessible passenger loading zone. The requirements of table 21.07-8 do not apply to attendant parking spaces.

3. Multifamily and Mixed-Use Residential

Two percent, but not less than one space, of the parking spaces provided for a multifamily or mixed-use residential development with type A and type B dwelling units as defined in AMC title 23 shall be accessible.

4. Medical Facilities

At least 10 percent of patient and visitor parking spaces provided to serve hospital outpatient facilities shall be accessible. At least 20 percent of patient and visitor parking spaces provided to serve rehabilitation facilities and outpatient physical therapy facilities shall be accessible.

5. Location

Accessible parking spaces shall be located on the shortest accessible route of travel from adjacent parking to an accessible primary entrance. The accessible route of travel shall not pass behind parking spaces. In parking facilities that do not serve a particular building, accessible parking spaces shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility. In buildings with multiple accessible primary entrances with adjacent parking, accessible parking spaces shall be dispersed and located closest to the accessible entrances.

6. Location—Exceptions

In multilevel parking structures, van accessible parking spaces are permitted to be located on one level. Accessible parking spaces shall be permitted to be located in different parking facilities if it is demonstrated to the traffic engineer that substantially equivalent or greater accessibility is provided in terms of distance from an accessible entrance(s), parking fee, and user convenience.

7. Dimensions

Car accessible spaces shall be at least eight feet wide with an access aisle at least five feet wide abutting the space. Van accessible spaces shall be at least eight feet wide with an abutting access aisle at least eight feet in width. Two accessible parking spaces may share a common access aisle.

8. Maximum Grade

Accessible parking spaces and access aisles shall have surface slopes not exceeding two percent in all directions.

9. Accessible Routes

a. ***Location***

At least one accessible route to the building or facility entrance shall be provided from accessible parking and passenger loading zones.

b. ***Surface Textures***

Ground surfaces along accessible routes shall be stable, firm, and slip-resistant.

c. ***Changes in Levels***

Changes in level up to one-fourth inch may be vertical and without edge treatment. Changes in level between one-fourth inch and one-half inch shall be beveled with a slope no greater than one to two. Changes in level greater than one-half inch shall be accomplished by means of a ramp.

d. ***Gratings***

If gratings are located in walking surfaces on an accessible route, then they shall have spaces no greater than one-half inch wide in one direction. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

e. ***Ramps***

ADA ramps cannot protrude into the ADA access aisle. Ramp details shall be included on the plans.

10. Signs and Striping

Each accessible parking space shall be designated as reserved by pavement markings and a sign showing the symbol of accessibility. Van-accessible spaces shall have an additional sign reading "Van-Accessible" mounted below the symbol of accessibility.

a. Signs shall be located so that they do not obstruct the ramps or other pedestrian access.

b. An accessible parking sign detail shall be included in the plan submittal per M.A.S.S.

c. All accessible spaces and aisles shall be striped with blue paint to color specifications prescribed by the *Manual of Uniform Traffic Control Devices*, including the total length of the curb encompassing the accessible parking space and accessible aisle.

11. Implementation of ADA
Regulations may be promulgated under section 21.03.210, *Title 21–Text Amendments,* to implement the requirements of Americans with Disabilities Act of 1991 as it may be amended or interpreted by federal regulation.

12. Standards for Parking as Principal Use
Where a parking structure or lot is a permitted principal or conditional use and is not providing required parking for another principal use, accessible parking spaces in accordance with this section shall be provided.

K. Bicycle Parking Spaces

All nonresidential, multifamily, and mixed-use dwelling developments with more than 40 parking spaces required in table 21.07-4 shall provide at least four bicycle parking spaces, or a number of bicycle parking spaces equal to three percent of the number of required automobile parking spaces, whichever is greater. This requirement shall not apply to buildings in multifamily or mixed-use developments that are single-family, two-family, or townhouse style structures. Bicycle parking spaces shall meet the standards of subsection 21.07.060F.15.

L. Vehicle Queuing Spaces

The vehicle queuing space requirements of this section shall apply unless otherwise expressly approved by the traffic engineer in accordance with L.7. below:

1. General
Uses of land and structures requiring vehicles and customers waiting in vehicles for service at drive-through facilities, pump stations, auto service bays, or similar uses, shall provide sufficient queuing spaces within the site to avoid impeding traffic movement in the public right-of-way. Such uses shall demonstrate to the traffic engineer that sufficient in-line waiting spaces are provided on-site as part of the parking plan to ensure the queue does not extend into the adjacent street, and that queuing minimizes interference with parking facility circulation aisles.

2. Minimum Number of Queuing Spaces Leading to Service Window
In addition to the minimum number of required off-street parking spaces, any use listed in table 21.07-9, *Vehicle Queuing Spaces*, shall provide the number of on-site queuing spaces indicated in the table for each service window. The required number of queuing spaces does not include the vehicle space to be provided at the pick-up window, teller machine, or other station where the service occurs.

TABLE 21.07-9: VEHICLE QUEUING SPACES

Activity Type	Minimum Queuing Spaces
Financial institution teller lane	4 before teller or window
Automated teller machine drive-through	3 before teller machine
Restaurant drive-through	With no ordering board/window, 4 before pick-up window; with ordering board/window, 4 before ordering board plus 4 between ordering board or window and pick-up window

TABLE 21.07-9: VEHICLE QUEUING SPACES	
Activity Type	**Minimum Queuing Spaces**
Car wash bay, automatic	5 before entrance to car wash bay
Car wash bay or stall, self-service	2 before entrance to car wash bay or stall
Food and beverage kiosk	3 before pick-up window
Fueling station pump island	2 at each end of pump island lane
Security gate entrance for self storage or vehicle storage facility	The queuing lane before the security gate shall measure a minimum of 50 feet in length and 24 feet in width. The width of the self-storage security gate is excluded.
Parking garage or structure	See subsection 21.07.090M., *Structured Parking*
School	See subsection 21.07.090I., *Passenger Loading Zones*
Other use with lane of vehicle queuing spaces	Determined by traffic engineer.

3. Queuing Lanes Leaving the Use

Queuing lanes shall be integrated with the on-site circulation and shall merge with the circulation aisle instead of exiting directly into a public right-of-way, except where the traffic engineer approves otherwise. The queuing lane may merge directly into a driveway, subject to approval by the traffic engineer. A minimum of 30 feet of queuing lane shall be required between the service window, bay, or station, and the point of vehicle egress to the adjacent parking facility circulation aisle, street, or right-of-way, however the traffic engineer may require more. The length and design of the queuing lane leaving a car wash bay or stall shall ensure the water and ice from vehicles do not adversely affect adjacent streets, storm drainage systems, or the safe circulation of vehicles and pedestrians.

4. Queuing Dimensions

Queuing lanes shall have a minimum width of 10 feet along straight portions and 12 feet along curved segments. Queuing spaces shall have a minimum length of 20 feet.

5. Traffic Circulation Conflicts

Queuing spaces shall not interfere with on- or off-site traffic movements or movements into or out of off-street parking and loading areas.

6. Delineation

Queuing spaces shall be delineated from other queuing lanes, driveways, internal circulation and parking aisles, loading areas, and refuse collection areas by striping, curbing, landscaping, alternative paving materials, or raised medians. Walk-in customer crosswalks across queuing lanes shall be avoided to the extent reasonably feasible and permitted upon approval by the traffic engineer. If approved, such crosswalks shall provide mitigation such as warning signage aimed at both the pedestrian and vehicle.

7. Exceptions

The traffic engineer may approve a reduction in the number of required queuing spaces or other departure from the queuing space requirements if documentation prepared by a traffic engineering professional demonstrates to the satisfaction of the traffic engineer that the change is appropriate and consistent with the intent of the requirements. The applicant shall enter into an agreement with the municipality which is recorded, runs with the use of the land, and ensures continuation of the alternative strategy and the future implementation of contingency measures if ordered by the traffic engineer.

M. Structured Parking

1. Purpose

Parking structures and structured parking within buildings shall comply with the provisions of this subsection, in order to be compatible with the architectural character and quality of adjacent buildings; avoid adverse impacts to abutting sidewalks or residential properties; use color, massing, and other architectural features to reduce apparent bulk; and screen potential visual impacts from garage lighting or parked vehicles. It is also the intent of this section to ensure safe and convenient vehicle access and parking, and to avoid impeding traffic on adjacent streets and pedestrian facilities.

2. Applicability

This subsection M. applies to all parking structures and structured parking within buildings, with the following exceptions:

a. The requirements do not apply to garages for individual dwellings.

b. Where at-grade parking is provided under or partially under a building, the ground floor level of any side of the building that abuts surface parking on the same site (i.e., the surface parking extends or continues under the building) is exempt from this subsection.

3. Ground Floor Use

In the B-3, R-4, and R-4A districts along streets that have been specifically designated in the comprehensive plan as a main street, transit street, mixed-use street, or with a similar street typology, ground-floor structured parking shall be enclosed along that street frontage by a first-story habitable space that:

a. Has a minimum depth of 25 feet;

b. Extends the full length of the building elevation facing the designated street, excluding pedestrian and vehicle entrances and exits, stairwells, elevators, and centralized payment booths;

c. Is designed and used for residential, community, office, retail, or other commercial use; and

d. Includes ground floor windows providing visual access and/or primary entrances that comprise at least 25 percent of the ground level wall area.

4. Façade Treatment

The street-facing façade of a parking structure shall have a repeating pattern that includes no less than three instances of either (1) color change, (2) texture change, (3) material module change, or (4) expression of an architectural or structural bay through a change in plane no less than 12 inches in width, such as an offset, reveal, or projecting rib. At least one of these elements shall repeat at an interval of not more than 30 feet. The director may approve an alternative design to this standard if, through the alternative equivalent compliance process, the applicant can demonstrate an alternative building design that significantly articulates a wall plane.

5. Screening

Ground floor structured parking within a building shall be screened by a wall or façade or other architectural treatment consistent with the rest of the building in terms of style, detail, and materials. The perimeter of each parking structure floor above the ground floor shall have an opaque screen or other screening mechanism to shield vehicle headlights from public view. The screen shall be at least three and one half feet high measured from the finished floor elevation. An architectural treatment, such as a finished fascia, shall be provided to shield any unfinished structural elements such as electrical elements, exposed

metal beams, and mechanical appurtenances. Lights visible from the exterior of the structure shall be covered or screened with a diffusing lens and oriented to minimize the visual impact on adjacent streets and properties.

6. Landscaping

The perimeter of a parking structure shall be planted with L1 visual enhancement landscaping in any commercial district, except at points of vehicular and pedestrian entrance and exit, where the structure abuts an alley right-of-way, where the structure directly abuts another building, or where there is a ground floor use that meets the standards of subsection M.3. above.

7. Ingress and Egress

a. Non-automated parking structures designed to provide more than 500 parking spaces shall have at least two vehicle entrance driveways and two vehicle exit driveways.

b. Vehicle entrance driveways shall provide a minimum of one queuing space in addition to the vehicle space at the ticket dispenser or access reader, unless a traffic analysis indicates more queuing is needed. Such queuing space(s) shall meet the standards of subsection 21.07.090L., *Queuing Spaces*.

c. Vehicle exit driveways shall provide a minimum of 30 feet of on-site vehicle queuing that does not interfere with any parking spaces, rights-of-way, access easements, pedestrian facilities, or private streets.

8. Maximum Gradients

The maximum gradient of parking aisles shall be six percent. The grade of non-parking ramps shall be no greater than 12 percent, and shall comply with the requirements of Americans with Disabilities Act of 1991 as it may be amended or interpreted by federal regulation. Where special circumstances warrant, the traffic engineer may approve steeper grades according to accepted engineering practices, subject to special conditions of approval such as an ice-free (snow melting) ramp surface.

9. Layout and Internal Circulation

The configuration of parking and dimensions within a non-automated parking structure shall be subject to the requirements of table 21.07-7, except that a modified layout and internal circulation pattern may be approved by the traffic engineer when it can be shown that a structure meets the design guidelines of the latest Urban Land Institute, Parking Institute, or Institute of Transportation Engineers manuals.

10. Automated Parking Structures

a. Automated parking structures shall require a traffic analysis and be subject to review and approval by the traffic engineer.

b. Automated parking structures are exempt from the parking space and aisle dimensions and vertical clearance requirements of this section.

c. Automated parking structures shall be located wholly within an enclosed building and shall not be visible from outside the building or facility.

d. Automated parking structures shall be operated as attendant parking.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2014-58, 5-20-14; AO 2015-82, 7-28-15; AO 2015-100, 10-13-15; AO 2015-131, 1-12-16; AO 2016-3(S), 2-23-16; AO 2017-55, 4-11-17)

21.07.100 EXTERIOR LIGHTING

Nonresidential Uses and Districts

All parking facilities in nonresidential zoning districts and parking facilities which serve nonresidential uses shall have lighting which meets the level of illumination, uniformity ratios, and minimum lumen intensities specified in the illumination guidelines set by the Illuminating Engineering Society of North America. The lighting system shall be designed to prevent glare to motorists on public streets and light trespass onto adjoining property.

(AO 2012-124(S), 2-26-13; 2015-131, 1-12-16)

21.07.110 RESIDENTIAL DESIGN STANDARDS

A. Purpose

The standards of this section 21.07.110 are intended to promote high-quality residential development and construction; protect property values; encourage visual variety and architectural compatibility; and promote an integrated character for the municipality's neighborhoods. Specifically, the standards:

1. Promote new residential developments that are distinctive, have character, and relate and connect to established neighborhoods.

2. Avoid monotony in structure design and site layout by providing variety and visual interest in the exterior design of residential buildings.

3. Enhance the residential streetscape, walkability, and the pedestrian environment by diminishing the prominence of garages and parking lots.

4. Enhance public safety by promoting lines of sight to residential entries, clearly defining transitions from public to more private residential outdoor spaces, and designing entrances to be prominent.

5. Locate active living spaces, entrances, and windows to improve the physical and visual connection from residences to the street, and foster opportunities for casual surveillance of the street and outwardly expressed proprietorship of the neighborhood.

6. Improve the compatibility of residential development with the residential character of surrounding neighborhoods and protect property values of both the subject property and surrounding development.

7. Provide flexible standards that allow for creativity and innovation, site-specific responses, and investment in new housing opportunities.

B. Alternatives and Flexibility

1. Alternative Equivalent Compliance
The alternative equivalent compliance procedure set forth in subsection 21.07.010D. may be used to propose alternative means of complying with the intent of this section. Structures over eight units may apply directly to the urban design commission for alternative compliance with plans at least 15 percent complete, that include exterior elevations and dimensions, floor plans, landscaping, and parking plans.

2. Minor Modifications
Minor modifications may be applied, pursuant to section 21.03.120, *Minor Modifications*.

3. Design Innovation Credit
The decision-making body may approve design innovations not covered by the menu choices, to be used as credit for design features from the menus of this section. The

applicant shall demonstrate a specific feature that realizes the intent of the subsection and that:

a. Achieves an equal or better design solution for the development than would result from application of the basic menu choices; and

b. Does not adversely affect adjacent properties or streets.

4. Topography

Where a standard or menu choice applies to a building elevation facing a street, and the average grade plane of the street-facing side of the building is at least eight feet lower than the average grade plane of the abutting sidewalk (or edge of street pavement where there is no sidewalk), the standard or menu choice shall only apply to the portion of the elevation that is above the average grade plane of the abutting sidewalk (or street edge).

C. Standards for Multifamily and Townhouse Residential

1. Purpose

The purpose of these standards is to improve the appearance, livability, compatibility, and functionality of multifamily and townhouse development, recognizing the importance of these elements to supporting the economic success of neighborhoods, more compact and efficient land use and infill housing, and adequate protection of the surrounding area. These standards are intended to encourage multifamily neighborhood environments which are safe and inviting for walking and cycling, outdoor activity, and transit access, and so reducing vehicle and traffic impacts on denser areas. Specific objectives include:

a. Promote architectural elements that reduce the perceived mass of larger buildings, avoid blank walls along visible facades, and provide visual variety and human scale elements at/near the ground floor.

b. Promote sensitive design and site planning for denser compact housing, with respect to surrounding properties, adjacent outdoor activities, and neighborhood scale and context.

c. Promote building placement and orientation that interfaces with the neighborhood street and engages the pedestrian, to contribute to public safety, attractive street frontages, pedestrian access, and a sense of neighborhood and community.

d. Promote project design and site planning that considers Alaska's northern climate in terms of weather protection, daylighting, outdoor activity, and access to sunlight.

e. Provide pedestrian access to building entries that is clearly defined, safe, and inviting for people of all abilities.

f. Provide relief, including landscaped breaks, from expanses of paved parking, rows of garage doors and townhouse driveways, and unsightly project elements.

g. Promote a safe living environment through "eyes on the street" design elements, such as placement of windows, and transition spaces between the public realm and the more private areas of the development.

h. Ensure flexibility of building and site design standards to facilitate multifamily development and redevelopment in urban and suburban areas responding to site specific characteristics, street typologies, neighborhood context, and the comprehensive plan.

2. Applicability

These standards apply to:

a. Any multifamily structure (three or more units);

b. The residential portion of a mixed-use structure;

c. Any townhouse development;

d. Any townhouse-style structure, including any attached single-family or two-family use that is constructed in townhouse-style.

This section does not apply in Girdwood.

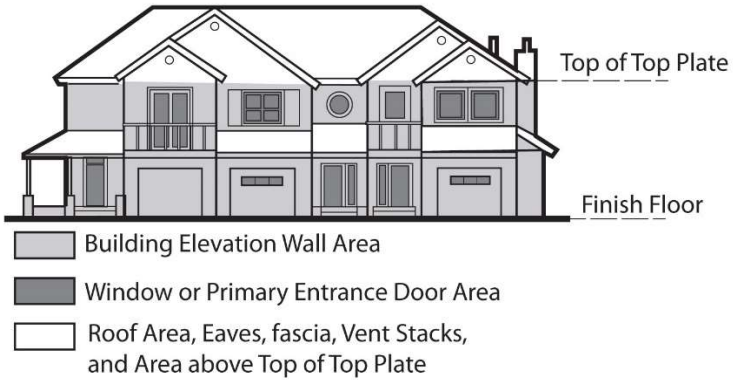
3. Windows Facing the Street

a. ***Windows***

Windows or primary entrance doors shall be provided on each building elevation facing a street or that has primary entrances to dwellings (up to a maximum of two elevations). At least 10 percent of the wall area of the building elevation shall be windows or primary entrance doors. The director may eliminate or reduce the requirement on one elevation (in instance where up to two apply) based on site specific circumstances (such as infill projects where an entry faces an adjacent property rather than the street).

b. ***Wall Area Calculation***

The area of vertical wall surface measured from finished floor of each level, including garages to top of top plate. In the case of a basement wall, calculate the area of vertical wall surface measured from finished grade to the top of the finished floor above or top of top plate, whichever is applicable. any wall area above the top plate shall not apply, including any gable ends. The façade wall area of stories below grade plane, such as below grade parking, are exempt from the measurement of wall area. The roof, including eaves, fascia, and vent stacks, is also exempt, as illustrated below.



c. ***Energy Efficiency Exception***

A reduction in required window area is permitted if demonstrated by calculation by an energy rater certified by the state of Alaska that installing the required window area will reduce the energy rating below a 5-star energy rating.

d. ***Additions and Renovations***

Only the wall area affected by either an addition or a renovation shall be required to comply with the opening requirements. Unaffected wall areas need not comply. Garage additions are exempt from opening requirements. The director may eliminate or reduce the requirement for window openings on additions/renovations

based on project specific circumstances (such as the nature of the spaces being added, building orientation, or structural requirements).

4. Building Spacing

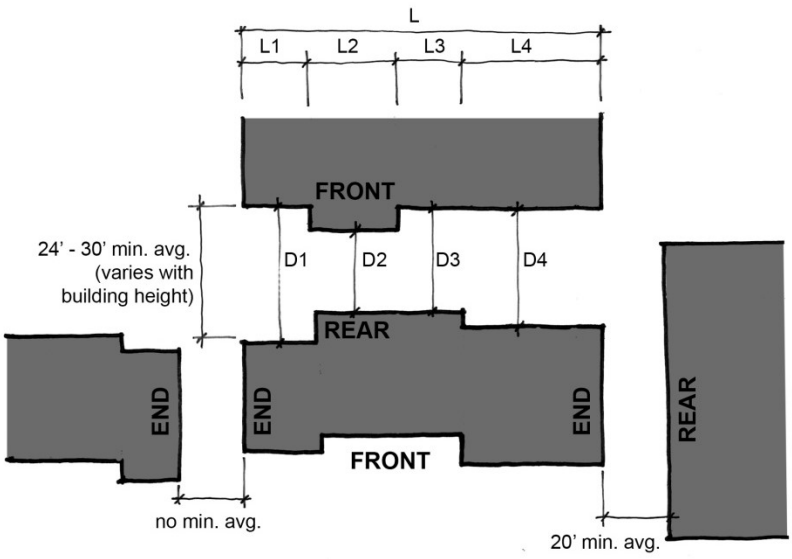
a. When the front wall or rear wall of a row of dwelling units faces the front wall or rear wall of another row of dwelling units on the development site, the average distance between shall be a minimum of 24 feet, plus one foot of distance for each foot of building height above 24 feet, up to a maximum requirement of 30 feet.

b. When the end wall of a row of dwelling units faces the front wall or rear wall of another row of dwelling units on the development site, the average distance between shall be a minimum of 20 feet.

c. End walls facing end walls are not subject to the building spacing requirement of this section.

d. Building projections allowed under subsection 21.06.030C.2. are permitted to project into the required space between buildings.

e. For the purposes of this subsection 21.07.110C.4., front walls and rear walls are defined as those walls that are generally perpendicular to party walls between dwelling units. End walls are generally parallel to party walls separating dwelling units, and are located at the end of a row of units. Front and rear walls in a building are typically the primary location of openings for light and air for the dwelling units, while end walls are not.



for articulated facades: [(L1xD1)+(L2xD2)+(L3xD3)+(L4xD4)...] / L = ≥ min. avg.

5. Pedestrian Access

Walkway connections from primary front entrances to the street are required in accordance with subsection 21.07.060E.4., except that developments may provide one of the following alternatives instead:

a. Primary front entrances for individual dwellings may connect to the street by the dwelling unit's individual driveway if such is provided;

b. A parking courtyard may be provided in conformance with subsection 21.07.060F.18., or

c. Other methods, as approved by the director, that provide safe, convenient, and adequate pedestrian access.

6. Building and Site Orientation Menu

Buildings shall be oriented to surrounding streets, sidewalks, common private open spaces, and the neighborhood public realm through at least three of the following menu choices. The director may reduce the requirement to two menu choices if he or she determines that the primary objective of the menu option is achieved or that the specific site limits availability of a majority of the options.

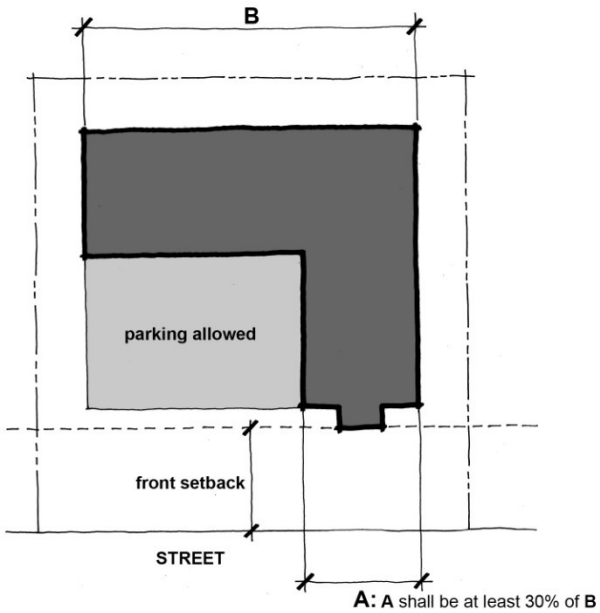
a. ***Courtyard Housing***
Arrange or configure the building(s) to enclose and frame a housing courtyard as described in subsection 21.07.060F.7.

b. ***Orientation of Living Spaces and Windows—Ground Floor***
Provide windows and/or entrances to habitable living spaces comprising, at least 10 percent of the ground-floor wall area of up to two building elevations facing a street or having a primary front entrance. Windows in a garage door do not count towards the minimum area in this section.

c. ***Orientation of Living Spaces and Windows—Overall Development***
Provide windows and/or entrances to habitable living spaces, comprising at least 10 percent of the total wall area of up to two building elevations facing a street or having a primary front entrance. Windows in a garage door do not count towards the minimum area of this section.

d. ***Orientation of Living Spaces and Windows—Additional Transparency***
Increase the percentage of the wall area comprised of windows and/or pedestrian entrances to 20 percent in subsections 6.b. and/or 6.c. above.

e. ***Street Frontage – Parking Beside or Behind the Building***
No more than 70 percent of a street-facing building elevation shall have parking facilities (including garages) between it and the street.

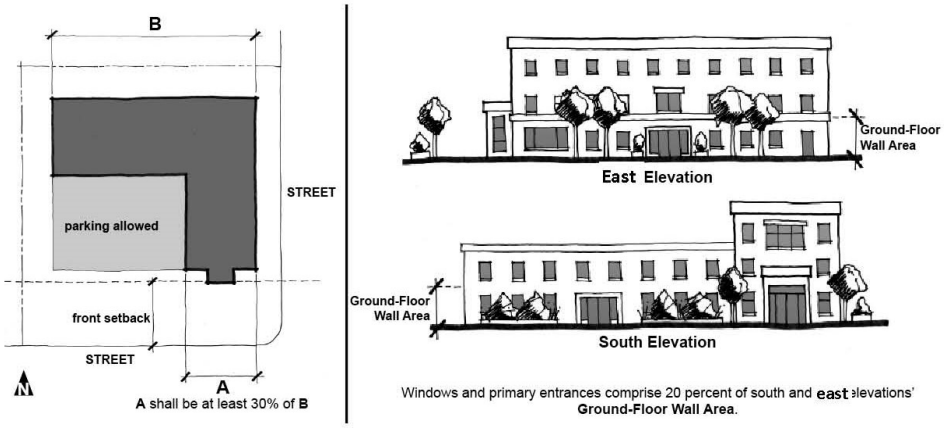


f. ***Street Frontage – Limited Parking Width***

As an alternative to 6.e. above, limit driveways and parking facilities to no more than 50 percent of the total site area between the building and a street, and garages to no more than 50 percent of the street facing building elevation.

g. ***Street Corner Building***

On a corner lot, provide choices 6.e. and 6.f. on both street frontages, such that the building (including its habitable floor area with windows) is placed nearest the corner, and any parking facilities are located beside or behind the building away from the street corner. Compliance with this feature counts for meeting two.



h. ***Limited Front-Facing Garage Width for Townhouses***

Where garages for individual townhouse-style dwelling units face the street or are on the same building elevation as the primary front entry to the dwellings, limit the garage door width to no more than 50 percent of the width of each dwelling, or up to 67 percent provided the building façade achieves one more feature than required in subsection C.7., *Building Articulation Menu*.

i. ***Enhanced Sidewalk***

Provide an enhanced sidewalk conforming to subsection 21.07.060F.17. on at least one street frontage that is not less than 100 linear feet.

j. ***Separated Walkway to the Street***

Connect all primary entrances to the street by a clear and direct walkway separated from and not routed through a parking facility.

k. ***Visible Front Entries***

i. Place the primary front entrance(s) (at least one shared primary front entrance for a multifamily structure or at least 50 percent of individual unit entrances) on a street-facing building elevation, or facing a common private open space that is visible from and has direct access to the street.

ii. As an alternative, place the primary front entrance(s) on a façade at an angle of up to 90 degrees from the street, where there is an unobstructed line of sight from the street or sidewalk edge (abutting the site) to the entry door, and a sheltering roof structure no more than 12 feet above the floor of the entry as a permanent architectural feature projecting from the façade.

l. ***Enhanced Front Yard Landscaping***

Provide one level higher of site or parking lot perimeter landscaping along the street frontages (up to a maximum of two frontages) than otherwise required by this title. For example, if L1 landscaping is required, provide L2 landscaping.

m. ***Site Entry Feature***
Highlight and define a pedestrian and/or vehicle entrance to a development site using three or more of the following elements:

i. Landscape treatment with seasonal color and trees, which clearly distinguishes and highlights the site entry.

ii. Plaza or courtyard as described in subsection 21.07.060F6. or 7.

iii. Identifying building primary entrance form including a covered entry, when the primary entrance is within 40 feet of the site entrance.

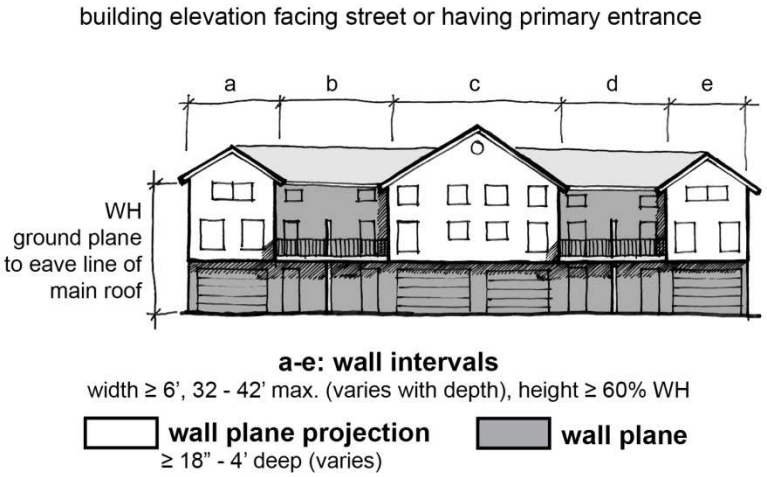
iv. Special paving, pedestrian scale lighting, and/or bollards.

v. Ornamental gate and/or fence.

n. ***Director Approval***
Other methods, as approved by the director, that provide appropriate building and site layouts relative to the surrounding neighborhood and streets.

7. Building Articulation Menu
Any building elevation facing a street or having a primary front entrance shall provide at least four features from the menu below, except that the end walls of rows of dwelling units may provide as few as three features. This section shall apply to no more than two building elevations, with priority to at least one elevation facing a street. Each building elevation may use different menu choices.

a. ***Wall Articulation***
Articulate the building using wall plane projections or recesses, with changes in plane of at least 18 inches in depth. Space at intervals that relate to the location and size of individual dwelling units or living spaces, or to the number of units across the façade, or that are no more than 30 feet on average (spacing may vary). Provide such articulation for the majority of the building wall height.



b. ***Overall Building Modulation***

Provide wall plane projections or recesses having a depth equal to at least 10 percent of the length of the building elevation or 4 feet (whichever is less), and whose combined wall area comprises at least 25 percent of the building elevation wall area. This menu choice counts as two features if the change in plane is double the minimum width.

c. ***Upper Story Cantilever or Step-Back***
Cantilever or step-back an upper story for the majority of the building elevation length, with a change of wall plane of at least 18 inches.

d. ***Variation of Exterior Finishes***
Use two or more primary wall siding materials, or a change of color only if the color change is to a different primary or secondary color family and is delineated with trim or a change in wall plane, not including concrete or block foundation.

e. ***Ornamental Features and Detail Elements***
Use two or more façade detail features at intervals, such as medallions, shutters, columns, pilasters, wall modulations that don't meet subsections 7.a. or 7.b. above, balconies that don't meet 7.f. below, trim that is three and one half inch wide or wider, or other similar features approved by the director.

f. ***Balconies***
Incorporate balconies with a depth of at least four feet and repeated at intervals across the building length (spaced as stated in menu choice 7.a. above).

g. ***Bay Windows***
Incorporate bay windows extending at least 18 inches from the abutting wall plane, and repeated at intervals across the building length (spaced as stated in menu choice 7.a. above).

h. ***Additional Window Area***
Provide windows and/or primary entrance doors comprising at least 20 percent of the wall area of the building elevation. Windows in a garage door do not count towards the minimum area in this section.

i. ***Entry Articulation***
Enhance the articulation of the primary front entrance (or at least 50 percent entries when not every entry faces the street) with a sheltering roof structure, projecting vestibule, or wall projections/recesses, having a depth of at least four feet for the width of the entry space.

j. ***Building Elevations Free of Garage Doors***
Provide the building elevation without garage bay doors.

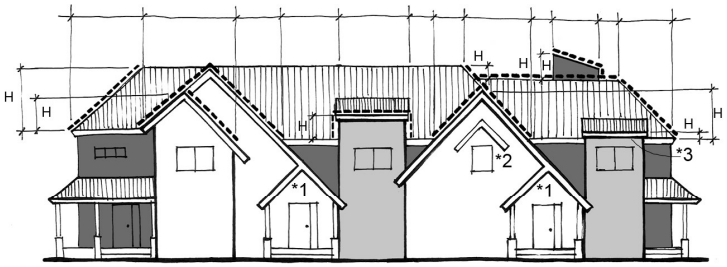
k. ***Additional Foundation Landscaping***
Provide a foundation planting bed along at least two-thirds of the foundation wall with a planting bed at least eight feet in depth, and planted with at least two trees and six shrubs per 20 linear feet of building length.

l. ***Roofline Modulation***
Provide variations in roof form, orientation, or height using features such as a terracing parapet, multiple peaks, jogged ridge lines, projecting roof forms and dormers, provided at intervals above the main eave line (spaced as stated in menu

choice 7.a. above). The vertical dimension of the roofline variation shall be at least the greater of two feet or 10 percent of the wall height.

building elevation

roofline modulation intervals



-- = roofline modulations

*** = feature that does not qualify as roofline modulation**

1 - does not break above wall eave height
2 - is a detail feature rather than a roof over building space
3 - has a height (H) above the eave line that is < 2' or
< 10% of wall height

m. ***Variation in Building Form or Scale***

Provide a minimum of two kinds of variation in architectural form or scale, such as between individual dwellings in a building, or from one building to the next in the development. Variations may include reversed building elevations, a different pattern or arrangement of building modulation or articulation features, a different dwelling unit layout or design that is evident on the exterior, or a change in scale such as varying the number of stories, the number of units from one building to the next, or the width of abutting units.

n. ***Director Approval***

Other methods, as approved by the director, that reduce the scale of multifamily buildings or add visual interest.

8. Northern Climate Weather Protection and Sunlight Menu

Building and site design shall respond to Alaska's northern climate, including the effects of snow, ice, low temperatures, wind exposure, and low and seasonal sunlight conditions, which impacts the pedestrian environment and livability of denser compact housing areas, by providing at least four features from the following menu on buildings comprised of eight or more units. Menu choices 8.f., *Year-Round Access to Sunlight*; 8.g., *Sunlight Access for Neighbors*; 8.i., *Sun Trap*; 8.j., *Atrium*; and 8.l., *Sunlit and Wind Protected Courtyards,* shall each count as two features. The director has the ability to reduce the number of required features in circumstances where site conditions or scale of buildings do not support the features provided in the menu options.

a. ***Weather Protected Entrance***

Provide outdoor shelter as a permanent architectural feature, that covers at least 24 square feet of outdoor entryway space for each primary front entrance.

b. ***Covered Transition Spaces***

Provide outdoor shelter as a permanent architectural feature that covers at least 40 square feet of outdoor space for each dwelling unit—for front porches, rear patios, balconies, or similar indoor-outdoor transition spaces. Spaces may be provided for each dwelling unit or aggregated for a common space. Spaces that achieve this and menu choice 8.a. above shall receive credit for both.

c. ***Sheltered Passenger Loading Zone, Bicycle Parking, or Transit Stop***
Provide pedestrian shelter over a passenger loading zone, accessible parking aisle or route, bicycle parking, or a transit shelter.

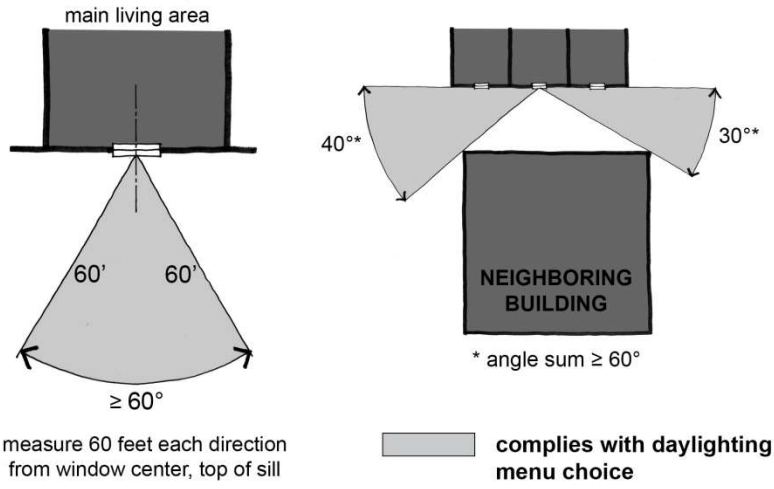
d. ***Ice-Free Walkway***
Provide an ice-free (snow melting) walkway for a required walkway connection to a primary entrance.

e. ***Orientation for Sunlight Access***
Provide windows and/or primary entrances for at least 20 percent of the wall area with a solar orientation and demonstrate each is likely to receive at least six hours of sunlight access on March/September 21. Natural features existing at the time of development, such as trees, shall not be considered as blocking sunlight access, but newly installed evergreen trees shall be planted so as to minimize blocking of sunlight access.

f. ***Year-Round Access to Sunlight***
Ensure that one or more windows of every dwelling in the development will receive sunlight access for at least one hour on December 21. Natural features existing at the time of development, such as trees, shall not be considered as blocking sunlight access, but newly installed evergreen trees shall be planted so as to minimize blocking of sunlight access.

g. ***Sunlight Access for Neighbors***
Preserve sunlight access at least six hours daily on March/September 21 to any adjacent lot zoned PR, any sidewalk across the street, and neighboring residentially zoned property, through building placement, massing, and height.

h. ***Daylighting***
Provide for apartment daylighting and building spacing as follows: Locate at least one window in the main living area of each dwelling such that an imaginary daylight plane extending from the window and formed by an angle of 60 degrees that is unobstructed for a horizontal distance of 60 feet. The plane angle shall be measured horizontally from the center of the bottom of the window. As an alternative, two angles with a sum of 60 degrees may be used.



i. ***Sun Trap***
Incorporate a sun trap or "pocket" meeting the requirements of subsection 21.07.060F.12, *Sun Pocket,* as part of a common private open space.

j. ***Atrium***
Provide an atrium interior sunlit common private open space or primary entrance area, meeting the requirements of subsection 21.07.060F.11., *Atrium, Galleria, or Winter Garden*.

k. ***Stepped or Terraced Building Forms***
Provide a stepped or terraced building form above the second story that adheres to a daylight plane with a step-back angle no steeper than one foot of rise per one foot of run, to reduce the potential shadowing and wind turbulence effects of a tall building.

l. ***Sunlit and Wind Protected Courtyards***
Provide a housing courtyard as described in subsection 21.07.060F.7.

m. ***Wind Study***
If subsection 21.07.120C.1. applies, then credit for this feature shall be given.

n. ***Director Approval***
Other methods not listed in this menu may be approved by the director following a finding that the proposed alternative methods effectively address northern climate considerations.

9. Entryway Treatment
Primary front entrances shall be given emphasis and physical access as follows. A porch, landing, patio, or other semi-private outdoor entryway space with a minimum dimension of four feet shall be provided that is distinguished from adjacent areas and vehicular parking by a vertical separation or change in surface material. Examples of features that meet the intent of the section include the following:

a. Outdoor sheltering roof structure such as an overhang, recess, portico, or other permanent architectural feature covering at least 12 square feet.

b. Façade variation through wall modulation (changes in wall plane) or changes in exterior finishes (color or materials) that relate to and emphasize the entry.

c. Entry detail elements such as double doors, entry side light or transom windows, or planter boxes.

d. Front steps creating a vertical separation, and/or vertical vegetation or low front fencing, to define the transition from public to more private outdoor entryway space.

e. Landscaping and pedestrian features, not otherwise required by this title, such as integrated planters, pedestrian-scale lighting or accent lighting, or special paving treatments.

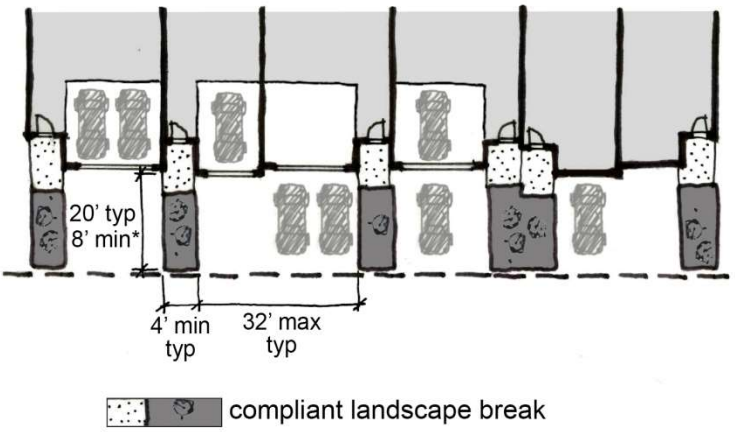
f. Other methods as approved by the director that emphasize primary front entrances.

10. Landscaping

a. ***Semi-Private Transition Space***
For dwelling units that front onto a street, the area between an individual unit's front entry porch or landing and the abutting street shall be planted as provided in 10.d. below. Front driveway width and other motor vehicle parking facilities shall not encroach into this area. The director may modify or exempt this requirement in site specific instances (such as narrow lots and shared entry porches) that will not allow the area to extend to the street due to other requirements of code.

b. ***Front Driveway Separations***

Where units are served by individual garages or driveways fronting onto the street or on the same building elevation as the primary front entry to the dwelling, a landscaping planting area with a width of no less than four feet shall be provided between each individual driveway. The planting area shall extend out from the building façade or front entry landing the full distance to the street, shared driveway, parking bay, or circulation aisle, but in no case extend out less than eight feet from the building garage facade. Driveways may be combined for a maximum of two dwellings, however no driveway or driveway combination shall exceed 32 feet in width without a landscaped break. A parking courtyard may provide an alternative design that departs from this provision in accordance with subsection 21.07.060F.18.



c. ***Common Parking Facilities and Driveways***

A foundation planting bed of at least five feet in width shall separate parts of residential building elevations not subject to subsections 10.a. or 10.b. above from common parking and access facilities, including parking bays, circulation aisles, and access driveways shared in common among multiple units.

d. ***Landscaping Bed and Planting Material Standards***

i. Landscaping areas required by subsections 10.a. and 10.b. above shall be planted as follows:

(A) Where the building elevation is eight feet or less from the street or driveway, the landscaping areas shall be planted with one tree and five shrubs for every two units. No landscaping area shall be devoid of plant material.

(B) Where the building elevation is 20 feet or more from the street or driveway, the landscaping areas shall be planted with one tree and five shrubs in front of each dwelling.

ii. The foundation planting bed area in subsection 10.c. above shall be planted with at least ten shrubs per 20 linear feet of applicable building length. Trees may be used in lieu of shrubs with one tree replacing five shrubs.

iii. The director may modify or exempt the standards where it can be shown that plantings would interfere with solar panels, foundation insulation, or other elements that promote other objectives in title 21.

11. Mechanical and Electrical Equipment Screening
Mechanical and electrical equipment serving a single building shall be screened from view as required by subsection 21.07.080G.4.

D. Standards for Some Single-Family and Two-Family Residential Structures

1. Applicability
The standards of this subsection D. apply to the developments listed below that are constructed after January 1, 2014. This section does not apply to dwellings constructed prior to January 1, 2014, accessory dwelling unit uses, or in Girdwood.

a. Any single-family use except for single-family residential uses on lots of 20,000 square feet or greater.

b. Any two-family use that is not constructed in townhouse-style and is on a lot less than 20,000 square feet.

c. Any multifamily use with single-family or two-family style construction.

2. Mix of Housing Models
Any subdivision or development of five or more units shall have a mix of housing models, as determined during the building permit process, according to table 21.07-10. This applies to abutting or adjacent lots.

TABLE 21.07-10 MIX OF HOUSING MODELS

Number of units	Number of different models required
5-10	2
11-20	4
21-30	5
31 or more	6

Each housing model shall be noticeably different through at least three of the following variations. For the purposes of this provision, “noticeably different” means a change that is easily apparent when looking at building plans and elevation drawings, without resorting to using measurements and scales/rulers in order to determine a difference in design.

a. Window placement and entrance location.

b. Façade detail elements, siding material, or siding colors.

c. Placement of the building footprint on the lot. A four foot setback differential to the closest front corner of the adjacent façade shall be acceptable.

d. Garage placement.

e. Roof design/feature. This includes the main ridgeline being oriented differently, two or more additional roof planes, addition of at least one dormer, or a different roof style.

f. Exterior elevations.

g. Building massing.

The development (of five or more units) shall be arranged to avoid placing identical housing types, including mirror image floor plans, on lots that share side lot lines.

3. Primary Entrance

a. A porch or landing with at least 16 square feet shall be provided at the primary entrance. The porch or landing shall be covered by a roof of at least 16 square feet.

b. The primary entrance of each residence and the walkway to that entrance shall be clearly visible from the street. Primary entrances shall not be located on the rear of the structure.

c. A hard-surfaced pedestrian walkway shall be provided from the street, sidewalk, or driveway to the primary entrance. Roof drainage shall not fall upon the walkway.

4. Garages

a. Where a garage (with no habitable floor area above) extends from the rest of the structure towards the street, the width of the non-garage portion of the front building elevation shall be no less than the length that the garage extends from the rest of the structure.

b. Garage doors facing the street shall comprise no more than 67 percent of the total width of a dwelling's building elevation.

c. Dwelling units with a street-facing building elevation that is 40 feet wide or narrower and with garage doors that face the street shall feature at least one design element from each of the three lists below.

i. *List A:*

(A) At least one dormer that is oriented toward the street.

(B) The front building elevation has two or more facades that are offset by at least 16 inches. Each façade or a combination of offset facades shall be at least one third of the area of the building elevation.

(C) Front-facing balcony, accessible from a habitable room, at least six feet wide, that projects from a façade at least two feet and is enclosed by an open railing.

ii. *List B:*

(A) A primary entrance area with a covered porch or landing at least eight feet wide, incorporating visual enhancements such as gabled roof forms, roof brackets, fascia boards, side lights, and/or ornamental columns divided visually into top, middle, and bottom.

(B) A bay window on the front elevation at least six feet wide that extends a minimum of 12 inches outward from a façade, forming a bay or alcove in the room within.

(C) If the garage is more than one car wide, multiple garage doors are used.

iii. *List C:*

(A) Windows and primary entrance door(s) that occupy a minimum of 25 percent of the wall area of the front elevation. Windows in the garage door do not count towards the 25 percent.

(B) Trim (minimum three and one half inches wide) of a different color from the primary siding color, shall outline all windows, doors, and

roof edges on the front building elevation, and may outline corners and projections/recesses on the front building elevation.

(C) A minimum of two different siding materials and/or patterns are used on the front building elevation. Doors and trim do not qualify as a type of siding material.

d. The house may encroach into the primary front setback by up to five feet when there is no garage, or where there is a garage (attached or detached) where the front wall of the garage is located at least 8 feet behind the front façade of the house.

5. Windows

a. ***Minimum Window Area Requirement***
Windows and primary entrance door(s) shall occupy a minimum of 10 percent of the wall area of a building elevation facing a street or required private common open space (up to a maximum of two elevations). The director may eliminate or reduce the requirement on one elevation (in instances where up to two apply) based on site specific circumstances, structural requirements for shear, and organization of spaces in the home (windows are not required in rooms not normally inhabited or in garages).

b. ***Wall Area Calculation***
Wall area calculation shall be in accordance with subsection 21.07.110C.3.b.

c. An overall reduction in required window area may be approved if demonstrated by calculation by an energy rater certified by the state of Alaska that installing the required window area will reduce the energy rating below a 5-star energy rating.

d. ***Narrow Lot/Small Home Reduction***
An overall reduction in required window and primary entrance door area to 7% may be approved when the calculated wall area is under 500 square feet. Units using this reduction shall comply with subsection 21.07.110D.4.c.

e. ***Additions and Renovations***
On existing structures, only the wall area affected by either an addition or a renovation shall be required to comply with the opening requirements. Unaffected wall areas need not comply. Garage additions are exempt from opening requirements. The director may eliminate or reduce the requirement for window openings on additions/renovations based on project-specific circumstances (such as the nature of the spaces being added, building orientation, or structural requirements).

E. Prohibited Structures

[RESERVED]

F. Site Design

1. Subdivisions
Subdivisions of land shall comply with the standards of chapter 21.08, *Subdivisions*.

2. Multiple Structures on One Lot

a. ***Intent***
This section regulates the development of multiple residential structures on a single lot. The section is intended to allow flexibility from the subdivision regulations while still achieving neighborhoods that are healthy, safe, and convenient, and meet the goals of the comprehensive plan. The approval

processes and standards are intended to result in a development with a cohesive neighborhood identity, an attractive and functional streetscape, a hierarchy of streets and driveways, convenient and safe pedestrian circulation, sufficient parking near each dwelling unit, usable and well-located open space, a positive image of higher density residential development, and well designed and visually pleasing structures and neighborhoods.

b. ***Applicability and Review Process***

i. This section applies to the development of three or more principal residential structures on a single lot. It does not apply to the development of an accessory dwelling unit or a caretaker's unit.

ii. Multiple residential structures on a single lot are permitted in the R-2M, R-3, R-4, R-4A, B-3, and RO districts.

iii. Applicable developments with between three and 30 dwelling units shall be approved by administrative site plan review pursuant to subsection 21.03.180C. Applicable developments with 31 or more dwelling units shall be approved by major site plan review pursuant to subsection 21.03.180D.

iv. All approvals under this section shall use the approval criteria of subsection 2.c. below, in addition to the general site plan review approval criteria. The decision-making body may place conditions on the development as it may deem necessary to meet the approval criteria.

c. ***Approval Criteria***

i. The proposal shall clearly distinguish between streets and driveways. Streets shall allow vehicles to travel into and within the development, and shall be the means for assigning an address to dwelling units. Driveways shall access garages and parking areas. Some small developments may not need a street network.

ii. Dwelling units shall be oriented towards streets (either within the development or along the boundary of the development) or towards a courtyard or similar common open space. Buildings with frontage on both a street and a driveway shall be oriented towards the street. If the development is so small that no internal street network is necessary, then buildings and dwelling units shall be oriented towards the local public streets on the boundaries of the development, or towards common open space.

iii. The area between the front of a unit facing a street and the street shall include landscaping or lawn, so that the streetscape features green space rather than just paved parking areas. Adequate snow storage area shall be provided. On-street parking shall be accommodated (if provided).

iv. Developers should make every effort to design and arrange dwelling units in such a manner as to provide "eyes on the street," take advantage of solar access, and to the extent feasible, provide privacy for neighboring units' yards.

v. In addition to sidewalks required by section 21.07.060, pedestrian pathways shall be provided to large open space areas and in the middle of long blocks. Pedestrian circulation should be convenient both within the development and to appropriate neighboring areas outside the development.

vi. The development is designed to take advantage of any significant natural features on site, and to provide usable open space and recreation areas.

d. ***Development Agreement***
The developer shall enter into a development agreement with the department, using the provisions established in subsection 21.03.100E., *Improvements Associated with Land Use Permits*.

e. ***Minimum Standards***
All development with multiple residential structures on a single lot shall meet the following minimum standards, in addition to the applicable standards of this title.

i. *Open Space*
For developments with 31 or more dwelling units, at least half of the private open space required by section 21.07.030 shall be provided as common private open space, meeting the standards of section 21.07.030, and designed and placed to serve all residences. The decision-making body may adjust the amount of open space required to be common by up to 10 percent, based on written findings regarding site specific conditions.

ii. *Building Spacing*
If subsection 21.07.110C.4. does not apply, then the following shall apply: within a development, no portion of any single-, two-, or three-story building shall be closer than 10 feet from any other single-, two-, or three-story building. All portions of any building taller than three stories shall be separated by no less than 20 feet from any other building.

iii. *Vehicle Plug-In*
Each unit with no garage shall be provided with at least one electrical outlet that is convenient to the required parking space(s).

3. Driveway Width

a. ***Purpose***
This section limits the width of a driveway at the property line and at the street curb. The intent of these limitations is to provide adequate space for snow storage within the right-of-way, to have space for on-street parking where appropriate, and to discourage the majority of the front area of a lot from being paved and/or used for vehicle parking.

b. ***Applicability***

i. This section applies to driveway throat width at the property line and street curb.

ii. Residential driveways are also subject to the municipal driveway standards currently established by the traffic engineer. Where there is a conflict, this section shall govern. Access to streets owned by the state of Alaska requires compliance with state driveway standards, as provided in subsection 21.07.090H.8.d.

iii. When a driveway serves both residential and nonresidential principal uses, the driveway dimensions shall be as required for the nonresidential use, unless approved otherwise by the traffic engineer.

c. ***Percent of Lot Frontage***
The total width of driveway entrances to a residential lot from a street shall not exceed 40 percent of the frontage of the lot, or 33 percent of the frontage if the platting authority or traffic engineer finds that conditions warrant it.

i. A driveway for multifamily dwellings, mixed-use dwellings, or a group living use may always be at least 14 feet wide.

ii. A driveway for a single-family, two-family, or townhouse dwelling may always be at least ten feet wide, provided the traffic engineer determines snow storage, traffic flow and safety, and the urban context are addressed, and provided townhouse driveways are attached in pairs to the maximum extent feasible.

iii. Flag lots are exempt from the percentage limitations, but shall have a maximum driveway width of 20 feet. Abutting flag lots may share a driveway up to 24 feet wide (12 feet per lot).

d. ***Exceptions***

The traffic engineer may approve a departure from the standards of this section, such as a narrower driveway, if documentation prepared by a traffic engineering professional demonstrates to the satisfaction of the traffic engineer that the change is appropriate. Traffic engineer approval shall be contingent on factors such as street classification, street typology, urban context, traffic volume and speed, curb return radii, street travel lane offset from face of curb, pedestrian and bicycle facilities, snow storage, driveway configuration and length, site and project characteristics, number of vehicles expected to use the driveway, and comprehensive plan policies. The traffic engineer may also be more restrictive than the standards of this section, provided the traffic engineer documents the rationale.

4. Alleys

a. Access to parking for residential uses shall be from the alley when the site abuts an alley, except that street access is permitted in any of the following situations:

i. Access to a townhouse dwelling on a corner lot may be from the street frontage having the secondary front setback or the alley.

ii. Due to the relationship of the alley to the street system and/or the proposed housing density of the development, the traffic engineer determines that use of the alley for parking access would be a significant traffic impact or safety hazard.

iii. The traffic engineer determines that topography or other natural feature or physical barrier makes alley access infeasible.

iv. The alley is not improved and traffic engineer determines that improvement is not feasible.

v. A single-family dwelling, two-family dwelling, or townhouse dwelling with two units, with alley access may have a garage or driveway that faces the street if the garage door is no wider than 10 feet and the driveway no wider than 12 feet at any point.

b. In situations where a group of lots front an entire block on one side of a street between two intersections, abut a mid-block alley, and are being developed together, then parking access to the structures shall be from the alley, and building(s) may encroach into the front setback by up to five feet.

c. If a new development includes alleys, the lot depth requirement is reduced by half the width of the alley and the lot area requirement is reduced by 12 percent for those lots that abut an alley. Vehicular access to all dwelling units on lots abutting

alleys shall be from the alley, and vehicular access to such units from the street is prohibited.

G. Affordable Housing

1. Purpose

This subsection provides the minimum acceptable standards for affordable housing units that are intended to be counted towards a bonus incentive or any other requirement of this title, to ensure that affordable housing will provide a benefit to future residents and the community overall.

2. Standards

Affordable housing units shall meet the following standards in order to be credited towards a requirement, menu choice, or as a special feature bonus incentive of this title.

a. The affordable housing units shall meet the definition of affordable housing in chapter 21.14.

b. To determine if the housing units meet the definition for affordable housing, the housing cost burden to households shall be calculated based on the household and unit size assumptions in table 21.07-11 below, unless the housing development is subject to different assumptions imposed by other governmental regulations.

TABLE 21.07-11: HOUSEHOLD AND UNIT SIZE ASSUMPTIONS

Unit Size	Household Size
Studio or efficiency	1 person
1 bedroom	2 persons
2 bedroom	3 persons
3 bedroom	4 persons
Each additional bedroom	Add one person

c. An owner that receives a floor area bonus for affordable housing shall enter into a written agreement with the municipality, as provided in subsection 21.06.030E. The agreement shall ensure the housing units will remain available and affordable as long as the development uses the FAR bonus, or for a period of 20 years from the date the final certificate of occupancy is granted, whichever is less.

d. The property owner shall submit an annual report to the department, using a form provided in the title 21 user's guide, that documents compliance with the affordable housing requirements.

e. At least 50 percent of the habitable floor area of affordable housing units shall be located in a story above grade plane, as defined in chapter 21.14, except that the finished surface of the floor above the affordable housing unit shall be a minimum of four feet above grade.

f. The affordable housing units shall be intermingled with all other dwelling units in the development.

g. The exterior appearance of the affordable housing units shall be indistinguishable from the other dwelling units in the development, except where the director determines that the exterior is compatible in appearance and consistent in quality with the other dwelling units.

H. Conditional Use for a Residential Planned Unit Development

1. Intent and Approval

A residential planned unit development (PUD) is intended to allow flexibility for residential development in the zoning ordinance and to achieve the creation of a more desirable environment than would be possible through a strict application of the zoning ordinance. A residential PUD shall be processed as a conditional use in accordance with section 21.03.080. The planning and zoning commission shall evaluate the proposed planned unit development in accordance with the conditional use approval criteria at section 21.03.080D., and the following additional criteria:

a. Creative use of the land, imaginative architectural design, a consolidation of usable open space and recreation areas, and the preservation of natural features.

b. The mixing of compatible land uses, residential densities, and housing types within the neighborhood.

c. The efficiency of the configuration of utilities, vehicular circulation, and parking facilities.

d. Enhancing the surrounding environment.

e. Maintaining population densities and lot coverage that are consistent with available public services and the comprehensive plan.

2. Minimum Standards

All planned unit developments shall meet the following minimum standards. In addition, the planning and zoning commission may require compliance with such other design standards relating to the construction, design, and placement of buildings, landscaping, streets, roadways, walkways, drainageways, and other site design features as it may deem necessary. A PUD shall comply with any special limitations of the zoning district. The user's guide may include guidelines to assist developers in meeting such standards.

a. ***Minimum Site Area***

The minimum site area for a PUD shall be 2.0 acres for PUDs located entirely in the R-2M, R-3, and R-4 zoning districts. If any portion of a proposed PUD is located within the R-1, R-1A, R-2A, R-2D, R-5, R-7, GR-1, GR-2, GR-2A, GR-3, GR-4, or GR-5 zoning districts, the minimum site area shall be 5.0 acres. If any portion of a proposed PUD is located within the R-6, R-8, or R-9 zoning districts, the minimum site area shall be 10 acres.

b. ***Open Space***

A minimum of 30 percent of the site shall be reserved as open space which shall meet the following standards:

i. At least one-half of such open space shall be contiguous;

ii. The open space shall not include public or private streets or rights of way; parking facilities, driveways, other motor vehicle circulation areas, loading areas, or refuse collection areas; slopes over 15 percent; 50 percent of designated snow storage areas; drainage easements, ditches, swales, or other areas intended to collect and channel water;

iii. In class A districts, no portion of the required open space shall be less than 2,000 square feet in area or less than 30 feet in its smallest dimension, except for individual yards, balconies, or decks pursuant to b.iv. and b.v. below;

iv. In class B districts, no portion of the required open space shall be less than half of the minimum lot size of the underlying district in area, or less

than 100 feet in its smallest dimension, except for individual yards, balconies, or decks pursuant to b.v. and b.vi. below;

v. A minimum of 12 percent and a maximum of 50 percent of required open space shall consist of yards which shall be reserved for the residents of individual dwelling units; and

vi. In multistory buildings, balconies or decks may be used in lieu of individual yards provided that the total area of all balconies or decks is not less than the total yard area otherwise required.

c. ***Design***

i. Any nonresidential use permitted in a PUD shall be compatible with the residential nature of the development. Parking areas which are intended to serve nonresidential uses shall be separated from those designed to serve residential areas. Unless nonresidential and residential uses are combined within a single structure, nonresidential uses shall be separated from dwelling units by L2 buffer landscaping.

ii. Pedestrian walkways shall connect residential and nonresidential uses within a PUD.

iii. L2 buffer landscaping shall be planted along each boundary of the PUD adjacent to a nonresidential district or a right-of-way designated for collector or greater capacity on the *Official Streets And Highways Plan*.

iv. Common open space with L3 screening landscaping shall be provided along any lot line abutting a residential neighborhood where any abutting lot is greater than 150 percent of the average lot size along that lot line of the PUD.

v. Any two adjacent buildings within a PUD shall be separated from each other by a distance equal to one-half the height of the taller building.

vi. Each dwelling unit shall be provided with either heated parking, or at least one electrical outlet that is convenient to the required parking space(s).

d. ***Access and Connectivity***

PUDs shall comply with section 21.07.060, *Transportation and Connectivity*.

e. ***Utility Installation***

All new utilities shall be installed underground.

f. ***Homeowners' Agreements***

Any PUD which will involve the formation of a horizontal property regime under the terms of AS 34.07.010 et seq. or any mandatory homeowners' or similar association shall submit for review by the commission the articles of incorporation and bylaws of any such association prior to the sale of any property subject to the association. The commission may require any provisions necessary to ensure that the provisions and intent of this title are met.

3. Development Options

The following provisions allow the developer of the PUD to propose changes from the provisions of the underlying zoning district with regard to density, allowed uses, and dimensional standards. The extent of the changes to the standards shall be determined by the planning and zoning commission in accordance with the approval criteria of subsection F.1. above.

a. ***Density***

The number of dwelling units per acre allowable on the gross are of a PUD shall be determined by the planning and zoning commission. However, in no event shall the number of dwelling units per acre exceed the maximums established by the following schedule:

TABLE 21.03-2

Zoning District	Dwelling Units per Acre (gross area)
R-1 and R-5	8
R-1A	6
R-2A	12
R-2D	15
R-2M	22
R-3	55
R-4	110
R-6	2
R-7	4.5
R-8	0.5
R-9	1.0
GR districts	As determined by the planning and zoning commission

b. ***Uses***

The applicant may propose any residential use, and in class A zoning districts, may propose any commercial use that is allowed in the R-4 district in table 21.05-1. A PUD may not include the storage or use of mobile homes or quonset huts. Any nonresidential use must be specifically authorized as to its exact location, type, and size. In no event shall the total gross floor area of all nonresidential uses exceed 10 percent of the total gross floor area of the PUD.

c. ***Dimensional Standards***

i. Height limitations in the R-1, R-1A, R-2A, R-2D, R-2F, R-2M, R-6, R-7, R-8, R-9, GR-1, GR-2, GR-2A, GR-3, GR-4, or GR-5 zoning districts may be exceeded by an additional five feet. Height limitations in the R-3 and R-4 districts may be exceeded by an additional 10 feet.

ii. The applicant may propose changes to minimum lot area, maximum lot coverage, and minimum setbacks for the PUD.

4. Planned Unit Developments in the Turnagain Arm District

PUDs in the TA district shall conform, with regard to uses and residential density, to the land use plans of the *Turnagain Arm Area Plan* and the standards of this section.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13; AO 2014-132, 11-5-14; AO 2015-36, 5-14-15; AO 2015-100, 10-13-15; AO 2016-34(S), 4-12-16; AO 2016-136, 11-15-16; 2017-160.12-19-17)

21.07.115 NONRESIDENTIAL DEVELOPMENT

A. Conditional Use for a Business-Industrial Park Planned Unit Development

1. Intent and Approval

A business-industrial park planned unit development (BIP-PUD) is intended to provide comprehensively planned commercial-industrial developments that are compatible with surrounding areas. BIP-PUD developments should have integrated, campus-style site plans designed to accommodate a variety of

public/institutional, commercial, and industrial uses. High standards for architecture, landscaping, and site planning are encouraged. A BIP-PUD shall be processed as a conditional use in accordance with section 21.03.080. The planning and zoning commission shall evaluate the proposed planned unit development in accordance with the conditional use approval criteria at section 21.03.080D.

2. Zoning District

A BIP-PUD is allowed only in the B-3 and I-1 districts. Business-industrial parks existing on January 1, 2014 in other zoning districts shall be considered conforming in those districts.

3. Allowed Uses

a. For a BIP-PUD in the B-3 district, in addition to the uses allowed in the B-3 district, a developer may propose to include the following industrial uses in a BIP-PUD: general industrial service; governmental service; manufacturing, general; warehouse or wholesale establishment, general.

b. For a BIP-PUD in the I-1 district, in addition to the uses allowed in the I-1 district, a developer may propose to include the following uses in a BIP-PUD: child care center, health services, and government administrative and civic facilities, if the location of the latter is consistent with subsection 21.05.040C.4.b.ii.

c. For initial uses proposed in the BIP-PUD that require a conditional use approval, the conditional use application(s) may be combined with the BIP-PUD conditional use and treated as one application and approval process.

4. Development Agreement

The developer shall enter into a development agreement with the private development division, using the provisions established in subsection 21.03.100E., *Improvements Associated with Land Use Permits*.

5. Minimum Standards

All BIP-PUDs shall meet the following minimum standards, in addition to the applicable standards of this title. The planning and zoning commission may apply additional standards as it may deem necessary to meet the approval criteria.

a. The minimum site area for a BIP-PUD is seven acres.

b. In keeping with a campus-style site plan, the number of access points to the BIP-PUD shall be limited to only what is necessary, as determined by the traffic engineer.

c. Pedestrian walkways shall be provided to streets abutting the BIP-PUD. All transit stops abutting a BIP-PUD shall be connected to the internal street/sidewalk system by a pedestrian walkway. Where abutting streets have no transit stops, the BIP-PUD shall have a pedestrian walkway connection to the abutting street at least every 500 feet, unless the abutting street is a restricted access street without pedestrian facilities.

d. L2 buffer landscaping shall be provided along the exterior lot lines of the BIP-PUD.

e. A BIP-PUD shall have a defined internal street system, which shall have pedestrian facilities and landscaping in accordance with the provisions of this title. Streets shall allow vehicles to travel into and within the development. Driveways shall access parking areas.

f. Except for stand-alone restaurants located along an outside edge of a BIP-PUD, all buildings shall have a common architectural character utilizing similar materials. The standards of section 21.07.130 shall not apply.

g. Maximum individual building footprint shall be 30,000 square feet.

h. Individual tenancies for health services; and office, business or professional, shall not exceed 5,000 square feet.

i. Individual tenancies for government administration and civic facilities and religious assembly shall not exceed 15,000 square feet.

j. Individual tenancies for instructional services and uses in the retail sales use category shall not exceed 20,000 square feet.

k. The uses in the entire BIP-PUD may aggregate their parking as long as the following standards are met:

i. Required parking for each use shall be located no farther than 800 feet from the primary entrance of the use;

ii. Relatively direct pedestrian pathways shall be available from required parking to each use;

iii. The sum of the required parking for all uses in the BIP-PUD, which may include parking reductions and alternatives noted in subsection 21.07.090F., shall be provided at all times.

l. Loading areas and refuse collection areas shall be internal to the site and not located between any building and any BIP-PUD exterior lot line.

m. The maximum floor area devoted to retail sales uses shall not exceed 35 percent of the total gross building area of the entire development.

n. Outdoor storage and display is prohibited.

(AO 2015-36, 5-14-15)

21.07.120 LARGE ESTABLISHMENTS

A. Large Commercial Establishments

Large commercial establishments often have high visibility from major public streets and a great volume of use by many residents and visitors. As a consequence, their design determines much of the character, function, and image of this community and its streetscapes and commercial areas. The purpose of this section is to encourage major commercial developments to contribute to and respect the municipality as a unique place and to physically integrate with the community in a positive and architectural and site design sensitive manner. The standards of this section augment existing basic standards for development found elsewhere in this chapter with more specific interpretations that apply to large commercial establishments. These standards promote: a basic level of architectural variety and interest; a compatible appearance and scale; pedestrian and parking lot access; orientation of buildings and entrances in relation to surrounding streets; provisions for adaptive reuse of prominent vacant buildings; and mitigation of negative impacts of large scale commercial developments.

1. Applicability

The standards of this section 21.07.120 shall apply to any use in the Retail Sales; Animal Sales, Service, and Care; Food and Beverage Services; or Entertainment and Recreation

use categories, or any combination thereof, occupying more than 20,000 gross square feet of floor area, provided the following limitations:

a. The standards of this section shall apply only to buildings which are intended exclusively or principally for the uses listed above, such as a general merchandise retail store, grocery store, or multi-tenant retail building.

b. This section shall not apply to distinct floors and/or sections of buildings designed specifically for residential, office, or other uses not listed in subsection 21.07.120A.1. above.

c. [RESERVED—POTENTIAL AMENDMENTS TO SELF-STORAGE FACILITIES IN 21.05 TO ADDRESS MULTI-STORY FACILITIES]

2. Relationship to Other Standards

The provisions of this section shall apply in addition to all other generally applicable standards found elsewhere in this chapter and title. Where there is a conflict with generally applicable standards in this chapter, the standards of this section shall apply. Where there is a conflict with district-specific standards in chapter 21.04 of this title, the district-specific standards shall apply.

3. Alternative Equivalent Compliance

The alternative equivalent compliance procedure in subsection 21.07.010D. may be used to propose alternative means of complying with the intent of this section. Applicants for alternative equivalent compliance shall demonstrate design strategies that address each of the mandatory standards set forth below in subsection A.5.

4. Major Site Plan Review

All applicable large commercial establishments shall by approved by major site plan review in accordance with section 21.03.180. The applicable commission shall ensure that the site plan provides architectural variety, compatible scale, access amenities, mitigation of negative impacts, and convenience and safety of patrons.

5. Mandatory Standards

a. ***Vehicular Access***

Primary vehicular access shall be from a street designated collector or greater on the *Official Streets and Highways Plan*. Secondary vehicular access may be from a street designated less than a collector, provided the applicant demonstrates that any traffic and visual impacts on adjacent residential and commercial areas are sufficiently minimized.

b. ***Parking***

Aesthetic features, landscaping, and the design of parking lots shall reduce the appearance of large expanses of parking from neighboring streets, and enhance the view of the establishment from its principal point(s) of access.

c. ***Weather Protection for Pedestrians***

i. Buildings and roofs shall be designed so that drainage from the roof shall not fall on sidewalks, walkways, or building entrances.

ii. All primary entrances shall have a roof, canopy, arcade, overhang, or similar effective weather protection that meets the standards of subsection 21.07.060F.9., *Pedestrian Shelter*.

iii. Building elevations that face public streets or customer parking lots and that have a walkway along the façade shall provide weather protection meeting the standards of subsection 21.07.060F.9., *Pedestrian Shelter such as a Canopy, Awning, or Marquee*, or subsection 21.07.060F.10.,

Arcade (or Building Recess), along at least 60 percent of such building elevation. This standard is intended to apply to up to two elevations, but the applicable commission may increase or reduce the requirement.

d. ***Adjacent Residential Development***
L3 screening landscaping shall be provided along property lines that are adjacent to a residential district. The landscaping shall allow for any pedestrian connections provided by this section.

e. ***Community Space***
The establishment shall provide at least one public space, such as a plaza, patio, courtyard, or atrium, either indoors, outdoors, or a combination of indoors/outdoors, at or near the principal customer building entrance. Each public space shall be no less than 5 percent of the gross building area, up to a maximum of 2,000 square feet, and no dimension shall be less than 30 feet. Outdoor community space shall meet the standards for plaza or courtyard in subsection 21.07.060F.6. Indoor community space shall meet the standards for atrium, galleria, or winter garden in subsection 21.07.060F.11. Common spaces are encouraged to provide views of the Chugach mountains or other major landmark(s). Community space fulfills the private open space requirement of section 21.07.030. If any standards of this subsection conflict with subsection 21.07.030, this subsection shall control.

f. ***Wall Modulation***
Each building elevation that faces a street or a customer parking lot shall be modulated. The wall and foundation line shall be offset at intervals so that there is at least one offset every 140 feet of wall length that varies the depth of the building wall by a minimum of 12 feet. Offsets shall comprise at least 20 percent of the length of the elevation, for at least 60 percent of the building height.

g. ***Ground Level Expression***
Each building elevation that faces a public street shall provide, along at least 60 percent of the building length, three of the following features:

i. Windows with kickplates or projecting sills;

ii. Architectural bays and mullions dividing windows;

iii. Pedestrian scale ornamental lighting;

iv. Tilework, masonry or stone veneer, glass block, or other similar accent materials;

v. Belt courses or masonry strips of distinct color or texture;

vi. Columns with plinths; or

vii. Other façade detail features integrated into the façade design.

h. ***Materials and Colors***
The buildings shall have exterior building materials and colors which are aesthetically pleasing and compatible with the overall site plan. Construction material shall provide color, texture, and scale.

i. ***Roofs***
Provide a modulated roof on each building elevation facing a street or residentially zoned lot, using features such as a terracing parapet, multiple peaks, jogged ridge lines and dormers, with a maximum of 140 feet of uninterrupted roofline between

roof modulation elements. Each modulation element shall provide a minimum of three feet of vertical change in the roofline. Modulation elements shall equal at least 20 percent of the roofline on each applicable building elevation.

j. ***Entryways***

Primary entrances shall incorporate changes in architectural mass, surface, or finish to provide a clearly defined primary entrance that is easily visible from streets and sidewalks. At least two of the following features shall be provided:

i. Recessed or projected entrance;

ii. Peaked, arched, or other entrance roof form;

iii. Transom or clerestory windows, along with double entry doors and sidelight windows;

iv. Façade detail features such as tilework, moldings, or lighting, integrated into the building design; or

v. Integrated planters or wing walls that incorporate landscaped and/or seating areas.

k. ***Prohibited Materials***

Exterior building materials shall not include the following as a general field material:

i. Plywood;

ii. Unstained or untreated wood, except for cedar or redwood; and

iii. T-111 siding.

l. ***Mechanical and Electrical Equipment Screening***

Large commercial establishments shall comply with the mechanical and electrical equipment screening provisions of subsection 21.07.080G.4.

m. ***Outdoor Sales, Display, and Storage***

i. *Intent Statement*

To screen storage and display areas of large commercial establishments from adjacent properties, public streets, and customer entrances, and to mitigate visual and noise impacts, and to provide different standards for vehicle sales display.

ii. *Permanent Outdoor Display, Sales, and Storage of Merchandise, Except Vehicles for Sale*

(A) Any outdoor storage, display, or sales location shall be permanently defined on a site plan.

(B) The maximum size of permanent outdoor storage, display, and sales areas shall be 10 percent of the footprint of the principal building, or 15,000 square feet, whichever is less.

(C) Permanent outdoor storage, display, and sales areas shall be contiguous to the building and shall not be within 100 feet of residential property.

(D) All outdoor storage, display, and sales areas shall have permanent walls and/or screening fences, no more than 15 feet high, made of materials and colors designed to be complementary to those used as predominant materials and colors on the building.

Merchandise shall not be stacked above the height of the screening wall or fence.

(E) Outdoor storage, display, and sales areas shall be counted when calculating required parking.

iii. *Outdoor Sales and Display of Vehicles for Sale*

(A) The vehicle display area shall be permanently defined on a site plan.

(B) The vehicle display area shall not occupy required parking or landscaping areas.

(C) The vehicle display area shall comply with subsection 5.b. above. The vehicle display area shall not adversely impact vehicular or pedestrian circulation within the parking lot or access to the parking lot.

(D) No building shall be erected in the vehicle display area. Any area used for a temporary office shall be shown on the site plan.

n. ***Master Site Plan and Secondary Buildings***

i. *Intent*

To integrate the location, orientation, and appearance of all structures and improvements within a large commercial establishment as a unified, coherent and accessible site development.

ii. *Master Site Plan*

Large commercial establishments on sites that include more than one building, or that include multiple pad lots or commercial tracts, shall, at the time of plat review or major site plan review, be required to establish a master site plan for the location, design and orientation of principal and secondary buildings on site.

iii. *Applicability of Large Commercial Establishment Regulations*

Building and site design standards for large commercial establishments in this section, unless stated to apply specifically to principal buildings, apply to both principal and secondary buildings on any commercial tract within a large commercial establishment site or site master plan area.

iv. *Secondary Building Orientation to Public Streets*

Peripheral secondary buildings located at the edge of the site next to a public street or street corner shall provide windows on the street-facing elevation as follows: visual access windows and/or primary entrances for at least 35 percent of the length and 15 percent of the ground floor wall area. Qualifying windows shall be no more than four feet above finished grade.

6. Optional Standards Menu

In addition to the mandatory standards of subsection A.5. above, establishments shall choose two features from the options below.

a. ***Location of Parking Lots***

No more than 50 percent of vehicle parking spaces provided shall be located in the front parking area (defined in chapter 21.14).

b. ***Building Placement Close to the Street***

A minimum of 30 percent of the front building elevation of the principal building shall be within 20 feet of a property line abutting a street, and a customer entrance shall be located in the 30 percent.

c. ***Pedestrian-Friendly Entrance***
At least one primary entrance of the principal building is located within 90 feet of the property line abutting the street from which the main access to the site is taken, and connected to the street by a direct walkway.

d. ***Multiple Entrances***
The principal building(s) shall have customer entrances on at least two sides of the building that face an abutting street from which access to the site is taken, with at least one of the required entrances facing the street to which the building is closest. A corner entrance shall be counted as an entrance on either façade.

e. ***Building Walkways***
Walkways a minimum of six feet unobstructed clear width, excluding vehicular overhang, shall be provided along the full length of every building elevation that has a customer entrance or abuts a customer parking lot.

f. ***Street Facing Windows***
Provide visual access windows and/or primary entrances on each street-facing building elevation (up to a maximum of two elevations) comprising at least 15 percent of the ground-floor wall area. An elevation that is more than 150 feet away from the facing street right-of-way shall be exempt, unless it is the only applicable elevation. Qualifying windows shall be no more than four feet above finished grade.

g. ***Screening Vegetation***
L3 screening landscaping shall be provided along lot lines that abut public streets, totaling at least 25 percent of the site perimeter.

h. ***Foundation Landscaping***
Planting beds at least eight feet wide with one tree and six shrubs per 20 linear feet shall be provided along at least 50 percent of each building elevation that faces public streets and/or parking lots.

i. ***Ice-free Walkway***
Provide an ice-free (snow melting) walkway along a minimum of 35 percent of the length of the building elevation that contains a primary entrance. The walkway shall be a minimum of six feet unobstructed clear width, excluding vehicular overhang. This feature is not applicable for credit where the walkways and entrances are covered.

B. Large Non-Residential Establishments in or Surrounded by Large Lot Residential Districts

Certain non-residential uses that are allowed in large lot residential districts have the potential to create negative impacts on large lot residential neighborhoods when the nonresidential uses are significantly larger and more intensive than the typical development in these areas. This section provides consistent standards for such cases.

1. Applicability

The standards of this section shall apply to any child care center, neighborhood recreation center, religious assembly, educational facility (elementary, middle, or high school, or instructional services), commercial horticulture, animal boarding, veterinary clinic, cultural facility, or utility facility, or any combination thereof, where the sum of the gross floor area of all applicable buildings on the lot is more than 10,000 square feet, and the use is within a class B zoning district or the parcel under development abuts property in a class B zoning

district for more than 50 percent of its boundary. Single-family residential dwelling units associated with such a use (e.g., a rectory) shall not be counted toward the gross floor area size threshold, but shall meet the standards below.

2. Relationship to Other Standards
The provisions of this section are in addition to other requirements of this title, and may be more stringent than other requirements of this title. Where there is a conflict with other applicable standards, the more stringent standard shall apply.

3. Setbacks
Structures that are over 35 feet in height shall be setback beyond the underlying side or rear setbacks of the district by one foot per foot of height over 35 feet.

4. Buffers

a. L3 screening landscaping shall be provided along all lot lines that abut a residential zoning district or a street.

b. The developer shall retain existing vegetation in buffer areas that are in the side and rear setbacks.

c. The decision-making body may adjust the buffer requirements of subsections 4.a. and 4.b. above if the applicant demonstrates that the requirements are unreasonable for the specific situation.

5. Parking

a. No parking lot, circulation aisle, driveway, loading area, or vehicular storage area shall be within 25 feet of any side or rear lot line.

b. Vehicle storage and fleet vehicle parking are not allowed within setbacks equal to those of the abutting property.

6. Vegetated Open Space
A minimum of 35 percent of the lot area shall remain as planted open area, landscaped area, bio-retention area (and other similar vegetated area designed to retain/detain storm water runoff), or natural vegetation area, to exclude buildings, driveways, parking areas, sidewalks, etc., unless the decision-making body determines that retention of less than 35 percent provides a development character in keeping with the surrounding neighborhood.

7. Long Elevations
Building elevations longer than 100 feet that face residential lots or public streets shall provide façade modulations that meet either subsection 21.07.110C.7.a., or 21.07.110C.7.d., or provide an eight-foot wide foundation planting bed along the foundation of the entire elevation (breaks allowed for garage doors and pedestrian entrances), planted with at least one tree and six shrubs per 20 linear feet.

C. Tall Buildings

This section addresses the effects of tall buildings in Alaska's northern climate, including wind downdraft impacts on pedestrian comfort and safety, and shadowing impacts on sunlight access to neighboring properties.

1. Wind
Buildings that exceed 90 feet in building height (as measured in subsection 21.06.030D.), including additions or modifications to the exterior building envelope, shall be designed so that wind speeds on sidewalks, walkways, and other pedestrian spaces surrounding the building will remain within thresholds for outdoor comfort and safety, or at least not add to existing wind problems, as follows:

a. ***Wind Speed Criteria***
Acceptable wind speed thresholds for outdoor comfort and safety shall be provided in the title 21 user's guide, or shall be as supported by ASCE publications, and based on the types of pedestrian activity anticipated to occur around the proposed building.

b. ***Method for Determining Wind Conditions***
A wind study by a wind engineering/building aerodynamics expert shall be used to forecast wind conditions and present wind control measures or design modifications as necessary to demonstrate that wind speeds will remain within the accepted thresholds.

c. ***Incentives for Wind Mitigation***
Any development that incorporates a wind tunnel test and the wind speed criteria of this section into the design of a multistory building shall be eligible for a floor area bonus as provided in section 21.04.030H.2.b.

2. Sunlight Access
[RESERVED]

3. Exceptions
The director may allow wind speeds to exceed accepted thresholds for comfort, and/or shadowing beyond the accepted minimum threshold for sunlight access, if:

a. The building avoids worsening pre-existing conditions;

b. The impact will be insubstantial because of the limited location or time period in which the wind speed or sunlight shadowing threshold is exceeded; or

c. It has been demonstrated that the proposed development conforms to the maximum extent feasible.

(AO 2012-124(S), 2-26-13; AO 2013-117, 12-3-13)

21.07.130 SKYWAYS AND OTHER PROJECTIONS INTO PUBLIC AIRSPACE

[RESERVED: Updated land use regulations to address overpasses, skywalks, building marquees, and similar substantial projections into the public airspace from private property, will be prepared and adopted separately. These development standards will not apply to bridges that are part of the street and trail network. Instead, these development standards will be specific to updating the pre-existing title 21 regulations in order to provide for skywalks and other structures originating from private property and projecting over or across rights-of-way and other public property.]

(AO 2012-124(S), 2-26-13)

21.07.140 OPERATIONAL STANDARDS

A. Purpose

The purpose of these operational standards is to prevent land or buildings within the municipality from being used or occupied in any manner so as to create any dangerous, injurious, noxious, or otherwise objectionable condition that would create adverse impacts on the residents, employees, or visitors on the property itself or on nearby properties.

B. Applicability

The provisions of this section 21.07.140 shall apply to all land within the municipality. The director may authorize temporary exemptions from one or more of the standards in this section during construction.

C. Standard

No use may cause excessive noise, vibrations, smoke, dust or other particulate matter, toxic or noxious matter, humidity, heat, or glare at or beyond any lot line of the lot on which it is located. No equipment or process shall be used which creates visual or audible interference in any radio or television receivers off the premises, or causes a fluctuation in line voltage off the premises.

The term “excessive” is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare, or convenience.

(AO 2012-124(S), 2-26-13)

Introduction

Scientific research clearly documents that riparian buffers, *particularly forested buffers and those along headwater streams*, deliver tremendous benefits. Through the interaction of their soils, hydrology, and biotic communities, riparian buffers serve many important physical, biological, and ecological functions (Klapproth, 2009).

Definition

Riparian buffers are the lands and assemblages of plants bordering rivers, streams, bays and other waterways. They directly affect and are directly impacted by the aquatic environment. Buffers have high levels of soil moisture, experience frequent flooding, and are populated by plant and animal communities that are adapted to life along the water. The boundary between the buffer and adjoining uplands is gradual and may not be well defined (Klapproth, 2009).

Degradation

The USDA Forest Service estimates that over one-third of the rivers and streams in Pennsylvania have had their riparian buffers degraded or altered, a sobering statistic when the value of their functions is considered (DEP, 2006).

Benefits

Scientific research clearly documents that riparian buffers, *particularly forested buffers and those along headwater streams*, deliver tremendous economic, ecological and other benefits. Among these benefits, riparian buffers:

- protect the quality of the water we drink;
- intercept non-point source pollutants carried by surface water runoff and remove the excess nitrogen, phosphorus and other substances that can pollute water bodies;
- stabilize stream banks and minimize erosion;
- decrease the frequency and intensity of flooding and low stream flows;
- prevent sedimentation of waterways;
- through shading, reduce swings in stream temperatures and prevent elevated temperatures harmful to aquatic life;
- provide food and habitat for wildlife of the land, water and air and allow for wildlife movement within natural corridors; and
- replenish groundwater and protect associated wetlands.

Width

The width needed for a riparian buffer to be effective depends on a number of factors, but, in general, the wider the buffer, the greater the benefits delivered.

Forested Versus Grass Buffers

Forested riparian buffers provide substantially more and better ecosystem services than grass buffers (Burgess, 2004). The roots of herbaceous and woody plants

strengthen the stream bank and prevent stream bank erosion. Roots and downed trees slow the flow of stormwater and form a physical barrier to the stream or river, which allows sediment to settle out and be trapped. The forest canopy shades water, moderating water temperature. The plants are an important source of woody material in streams, which provides habitat and food for aquatic wildlife. They also provide quality habitat and food for terrestrial wildlife. These services are discussed in detail below.

Headwaters

As described in the Headwater Streams section below, research demonstrates that healthy riparian buffers along headwaters streams, both perennial and intermittent, deliver exceptionally high ecological value.

Buffer Functions

The following sections highlight key ecosystem services delivered by riparian buffers:

- reducing erosion;
- filtering sediment;
- filtering pollution;
- providing shade to moderate water temperatures;
- providing habitat; and
- storing water and reducing flooding.

Reduce Erosion

Riparian buffers reduce erosion, which both conserves topsoil and lessens the amount of sediment in streams and rivers. A buffer's roots of herbaceous and woody plants strengthen the stream bank by going through the topsoil and into a stream bank's weathered or fractured bedrock and other more stable strata. This increases the stream bank cohesiveness and adds a tensile strength that can resist shear stresses on stream bank soil (Castelle, 2000).

Filter Sediments

Riparian buffers filter sediment from stormwater runoff, reducing the amount of sediment in streams and rivers. Tree roots and downed trees slow the flow of surface water and form a physical barrier, which allows sediment to settle out and be trapped. Several studies have shown the effectiveness of riparian buffers in filtering sediment, including:

- In Blacksburg, VA, when 9.1m and 4.6m wide orchard grass buffers were exposed to shallow, uniform waterflow, they removed an average of 84% and 70% of incoming suspended solids respectively (Dillaha, Renea, Mostaghimi, & Lee, 1989).
- Over a 100-year period (1880-1979), a riparian zone of a coastal plain agricultural watershed in Georgia accumulated an estimated 190,667 to 283,276 pounds of sediment per acre per year (Lowrance, Sharpe, & Sheridan, 1986).
- In North Carolina, the movement of runoff was measured through two types of riparian buffers: a grass buffer and a buffer composed of grass, weeds and small shrubs that became an area with hardwood trees. The buffers reduced sediment load in the runoff by 60% to 90%. The effectiveness of the filters varied with the erosiveness of the watershed and storm intensity (Daniels, 1996).

Filter Pollutants

Filter Sediment, Trap Pollutants

Filtration of sediment is also important for removing chemical pollutants that bind to sediment. For example, excess phosphorus binds to soil and is found primarily in the top few inches of the soil, which are very susceptible to erosion. Trapping sediments is the most effective way to reduce non-point source pollution (Bongard, 2009).

Vegetation Removes Pollutants

Riparian vegetation removes metals, nutrients, and other chemicals from runoff via plant uptake and by facilitating bacterial degradation of the pollutants (Castelle & Johnson, 2000). Although narrow buffers can generally remove sediment in runoff, wide buffers are needed for effective nutrient removal (Dabney, Moore, & Locke, 2006).

The removal of nitrogen, a major pollutant of many watersheds, from runoff occurs almost exclusively in water-saturated zones where abundant organic matter is present. Bacteria in the buffer use nitrogen as an energy source, converting it to gas. Plant roots also absorb nitrogen in groundwater and use it for plant growth. Buffers act as a nitrogen sink when it is taken up by trees and stored in their biomass.

Multiple studies have shown that buffers are effective in removing pollutants from water:

- A study of 16 streams in eastern Pennsylvania found that forested streams were far more efficient at re-

moving key pollutants from water than non-forested streams. In the case of nitrogen pollution, 200-800 times more nitrogen reached the stream in the non-forested segments than reached the stream in the forested segments (Chesapeake Bay Foundation, n.d.).

- In Coastal Plain, Georgia, researchers measured agricultural runoff through a 38-meter riparian buffer. The riparian buffer lowered the concentrations of atrazine and alachor by a factor of 20. Atrazine and alachor are both commonly used herbicides. Atrazine is among the most common contaminants in American reservoirs and other sources of drinking water (Duhigg, 2009).
- The degradation of the herbicide metachlor before it reaches water bodies is given extra importance because it does not readily break down in aquatic environments. It is, however, metabolized in the soil by microorganisms. It reaches water bodies by soil leaching and surface runoff. In Mississippi, the half-life of the herbicide metachlor was 10 days in a vegetated buffer as compared to 23 days in an adjacent bare field. This was likely due to a higher level of organic matter and microbial activity in the riparian strip. The enhanced degradation of metachlor in buffers may limit how much reaches water bodies (Staddon, Locke, & Zablotowicz, 2001).
- In northern Baltimore County, MD, Minebank Run flows past residential areas, corporate offices, the Baltimore beltway, a high school, and a county park before reaching the Gunpowder River. For decades, heavy volumes of stormwater running off of impervious surfaces, like roads, rooftops and parking lots, have impacted the stream. Restoration efforts included widening the riparian buffer with over 3,000 new trees and 6,000 shrubs. The restoration work, which affected nearly 3.5 stream miles, prevents up to 50,000 pounds of sediment from entering the stream annually and reduces the stream nitrogen levels by 25-50% (Lutz, 2006).

Cool Streams and Moderate Temperature Swings

The trees of riparian buffers shade the water, moderating water temperature. Temperature is a critical influence in aquatic ecosystems, affecting both the physical and biological characteristics of the stream. Changes in temperature can decrease stream biodiversity and impede animal growth. Increases in summer temperatures can increase the susceptibility of fish to pathogens; decrease food availability; alter the feeding activity and body metabolism of fish; inhibit spawning, and block spawning runs into streams (Castelle and Johnson, 2000). At the same time higher stream temperatures reduce the amount of dissolved oxygen in water; they also increase the metabolic rate of aquatic animals, increasing their oxygen needs.

In small streams, the presence of a forest canopy greatly affects the intensity of light reaching the surface of the stream. Depending on the season, light intensity in a shaded area of a stream can be 30 to 60% less than that of an exposed area (Sweeney, 1992). By limiting the amount of solar radiation that can reach a stream, trees limit both the daily fluctuations in stream temperature and the maximum stream temperatures reached (Bongard, 2009). A British Columbia study found that streams without buffers have temperatures up to 1-2 ◦C higher than those with buffers (Rayne, Henderson, Gill, & Forest, 2008). A study from Washington State found that non-buffered streams have maximum temperatures 2.4 ◦C higher than those with buffers (Pollock, Beechie, Liermann, & Bigley, 2009). In Oregon, studies of stream temperatures following the removal of riparian vegetation found that maximum stream temperatures both increased by 7 °C and occurred earlier in the summer. (Shifts in the timing of maximum temperatures, with greater increases in early summer stream temperatures, can impact sensitive stages of aquatic animals.)

Water Temperature and Chemical Toxicity

Increased water temperature increases the toxicity of many chemicals, such as ammonia. Ammonia is an inorganic form of nitrogen. It is present in water in two forms, un-ionized (NH3), which has a relatively high toxicity, and ionized (NH4+), which has a relatively negligible toxicity. As water temperatures increase, more of the ammonia is converted to the toxic un-ionized ammonia form (EPA, 1995). Polluted runoff is a large source of ammonia and nitrogen to streams (EPA, 1995). When riparian buffers are not preserved, both their ability to remove nitrogen from runoff and their ability to maintain lower water temperatures and prevent it from converting to its un-ionized ammonia form are lost.

Provide Habitat

Aquatic Habitat

Large woody debris is an essential part of stream life. It provides fish habitat and changes the stream's physical condition. Organic matter from riparian buffers, such as

leaves, twigs, logs and stems that fall from the buffer into the water are a main source of food for aquatic macroinvertebrates. Aquatic macroinvertebrates are animals without a backbone, are visible with the naked eye and spend all or part of their life in the water. These animals, which include worms, mollusks, insects and crustaceans, consume the wood and the biofilms (bacteria, fungi, and algae) that form on it (Pitt & Batzer, 2011), serving as a vital link in the food web between the producers (e.g. leaves, algae) and higher consumers, such as fish.

The wood from buffers also traps additional leaf litter and wood. Macroinvertebrates use the wood as habitat, living inside the wood, under residual bark, and on surfaces that protrude out of the water. Some insects use the protruding surfaces as sites to emerge into adults or to lay eggs (Pitt & Batzer, 2011). A study of 16 streams in eastern Pennsylvania found that forested stream segments have over six times the amount of large woody debris than do grass buffered streams, even though two-thirds of the grass buffered streams were immediately downstream of forested areas (Sweeney, 1992)

Forested riparian buffers are also essential for maintaining stream and river bottom habitat. Most of the biological activity in stream ecosystems takes place on inorganic (sand, gravel, cobble, etc.) and organic (leaves, woody debris, etc.) materials on stream bottoms. Networks of tree roots, the organic debris from buffers and the variety of sizes of cobble and gravel these trap can increase the overall size of bottom habitat more than a thousand times when compared to a bare mineral soil bottom in a grass-buffered stream (Sweeney, 1992). In addition, where riparian buffers have been deforested, streams are narrower because of encroachment by herbaceous plants, mostly grasses, that would have been shaded out under forest cover, causing an additional loss of river bottom habitat (Sweeney, 1992).

Deforestation of a section of a riparian buffer can change stream bottom habitat and influence biodiversity, even if the deforested section is still vegetated. In southern Appalachia, 12 streams with deforested, but vegetated, buffers were studied. The deforested sections were up to 5.3 km long. The stream segments studied were all downslope of watersheds with at least 95% forest cover. As the length of deforested sections increased, habitat diversity decreased and riffles became filled with fine sediments (Jones, Helfman, Harper, & Bolstadt, 1999). As the length of the non-forested segments increased, overall fish abundance decreased, though the number of non-native species increased. Even in heavily forested areas, clearing a 1-3 km stretch of forested buffer was found to have substantial impacts on fish assemblages (Jones, Helfman, Harper, & Bolstadt, 1999).

Terrestrial Habitat

A broad range of mammals, birds, reptiles and amphibians rely on riparian buffers for habitat. Riparian buffers are core habitat for many semi-aquatic and terrestrial ecotone species, such as salamanders, frogs, turtles, minks, beavers and otters, and these species require a buffer that is both long and wide. Long stretches of riparian buffer also serve as wildlife travel corridors. Many birds, such as herons, fishers, eagles, and ospreys, as well as some mammals, rely on forested buffers for both habitat and resting places. These birds hunt for fish in the water and nest in adjacent forests.

For buffers to provide adequate habitat for forest dependent songbirds, they must be wide. Several studies have shown that bird species richness increases in buffers that are at least 100 meters wide and that the presence of forest dependent songbirds decreases dramatically when buffers are less than 50 meters (Bongard, 2009). For more information on the importance of protecting species richness, see the guide *Biodiversity*.

Store Water and Reduce Flooding

Riparian buffers, especially forested buffers, absorb rainwater, which recharges ground water supplies and allows storm runoff to be released more slowly. This reduces the intensity and frequency of flooding as well as allows for more water flow in streams during dry periods.

Minimum Buffer Width Needed

The minimum width needed for an effective riparian buffer depends on the function you want the buffer to serve. For example, sediment can be physically filtered out of stormwater faster than dissolved nitrogen, which requires bacterial transformation to remove it. Thus, a narrower buffer would be needed to remove sediment than that needed to remove dissolved nitrogen. Scientific studies have shown that efficient buffer widths range from 10 feet for bank stabilization and stream shading to over 300 feet for wildlife habitat. (Hawes & Smith, 2005). Necessary widths will also vary depending on site conditions, such as soil type, slope and adjacent land use and other factors. (Hawes & Smith, 2005)

In *Riparian Buffer Zones: Functions and Recommended Widths* (Hawes and Smith, 2005), the authors summarize the results of scientific studies, identifying the buffer widths needed for a buffer to effectively serve particular functions; they report the following ranges:

Erosion/sediment control	30 feet to 98 feet
Water quality:	
Nutrients	49 feet to 164 feet
Pesticides	49 feet to 328 feet
Biocontaminants (e.g. fecal matter)	30 feet or more
Aquatic habitat:	
Wildlife	33 feet to 164 feet
Litter/debris	50 feet to 100 feet
Temperature	30 feet to 230 feet

Regarding terrestrial habitat, research suggests a range of 30 to 1,640 feet. However, because the habitat needs for terrestrial wildlife vary widely, the authors do not believe it is feasible to capture the needs of all species with a uniform buffer size. They recommend reviewing information about specific animals in the targeted area as well as land conservation work at adjacent and nearby lands.

Headwater Streams

Definition

Headwater streams are the smaller tributaries that carry water from the upper reaches of the watershed to the main channel of the river. They are rarely named and are often so small that it takes little effort to jump across them. While there is no universally accepted definition of headwaters, they are often defined as first and second order streams. A stream with no tributaries, recurring or perennial, is a first order stream. When two first-order streams come together, they form a second-order stream. The Stroud Research Center defines headwaters as "tributary streams, intermittent streams, and spring seeps" (Kaplan, Bott, Jackson, Newbold, & Sweeney, 2008).

Ubiquity and Vulnerability

Headwaters represent 50-70% of the total stream miles in the U.S. (Fritz, Johnson, & Walters, 2008). Nearly everyone in the United States has a headwater stream within a mile or two of their home, leaving headwaters close to human activities such as urbanization, dams and diversions, water withdrawals, point and non-point source pollution, deforestation, and agriculture (River Keeper, 2005). The small size of headwater streams, along with their integration into the landscape, makes them highly vulnerable to degradation (Kaplan et al., 2008).

Headwater streams are not as resilient as larger streams because they lack sufficient water flow to transport and dilute sediment and pollution (Kaplan et al., 2008). Forested buffers are needed to remove pollutants from stormwater before they reach the stream. The aquatic wildlife of headwaters are usually coldwater adapted (Kaplan et al., 2008), and therefore rely on the temperature moderation effects of riparian trees. Riparian buffers are essential to the provision of food for both the headwaters themselves, and the resulting downstream food web. Riparian vegetation provides up to 90% of the organic matter (food) necessary to support headwater stream communities (Cummins & Spengler, 1978).

Essential to the Health of Water Ecosystems

Water quality, biodiversity, and ecological health of freshwater systems depend on the ecosystem services of healthy headwater streams (Kaplan et al., 2008). According to Lowe and Likens (2005),

> There is no doubt that it is important to safeguard lowland sites, but it is difficult to see how any conservation action with a goal of protecting the long-term ecological integrity and ecosystem services of natural systems, whether aquatic or terrestrial, can succeed without a foundation of intact and functional headwaters.

Headwaters are the source of much of the water, gravel, wood, and nutrients that flow through the stream network and eventually to the ocean (USDA, 2008). Headwaters can help to keep sediment and pollutants out of the stream system's lower reaches. (Kaplan et al., 2008).

Recycling organic carbon contained in the bodies of dead plants and animals is a crucial ecosystem service and is the basis for every food web on the planet (Meyer et al., 2003). In freshwater ecosystems, much of this recycling happens in small streams and wetlands (Meyer et al., 2003). This recycling process makes nutrients more biologically available to organisms downstream (Meyer et al., 2003). Headwater streams have been found to be significantly more efficient at breaking down the larger organic materials of dead plant and animals into nutrients usable to small animals, such as mayflies and caddis flies. The nutrients then work their way through the food web into larger animals downstream such as trout and birds. The processing of organic carbon in headwaters also prevents

large amounts of organic material from being taken downstream, where the decomposition of large quantities could deplete dissolved oxygen levels and kill or harm aquatic life (Meyer et al., 2003).

Owing to favorable microclimate and availability of water, headwaters provide habitat for distinct assemblages of plants and animals (USDA, 2008). Hydrological conditions of many headwaters, which include running seasonally and drying out in the summer, periodically flowing underground, and frequent cascades and obstacles, lead to a lack of fish, which provides habitat that many amphibians can thrive in. Headwaters act as refugia for riverine species during specific life-history stages and critical periods of the year, such as warm summer months (Lowe & Likens, 2005).

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Riparian Buffer Protection Ordinances

Water Quality

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A Scientific Foundation for Shaping Riparian Buffer Protection Regulations

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Submit Comments and Suggestions

The Pennsylvania Land Trust Association would like to know your thoughts about this guide: Do any subjects need clarification or expansion? Other concerns? Please contact Andy Loza at 717-230-8560 or aloza@conserveland.org with your thoughts. Thank you.

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DEC Water Quality

Presentation to MSB Waterbody Setback Advisory Board

January 9, 2024

DEC mission

Conserving, improving, and protecting Alaska's natural resources and environment to enhance the health, safety, and economic and social well-being of Alaskans.

Division of Water

➢Improving and Protecting Alaska’s Water Quality

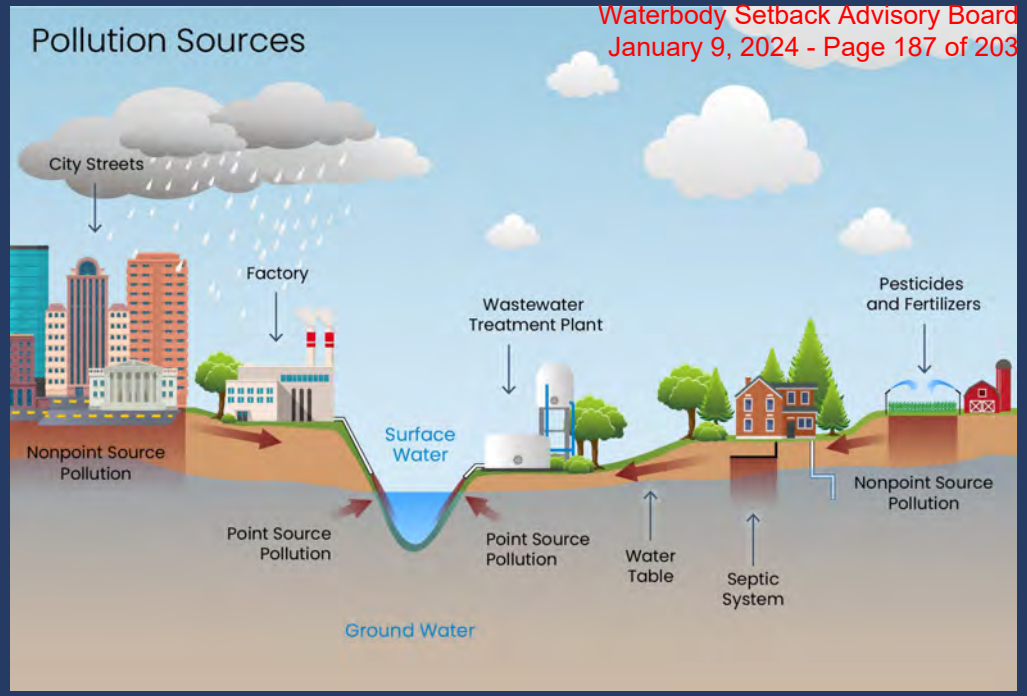
- Establishes standards for water cleanliness
- Regulates discharges to waters and wetlands
- Provides financial assistance for water and wastewater facility construction and waterbody assessment and remediation
- Trains, certifies, and assists water and wastewater system operators
- Monitors and reports on water quality

➢Science-based decisions & information

What is nonpoint source water pollution?

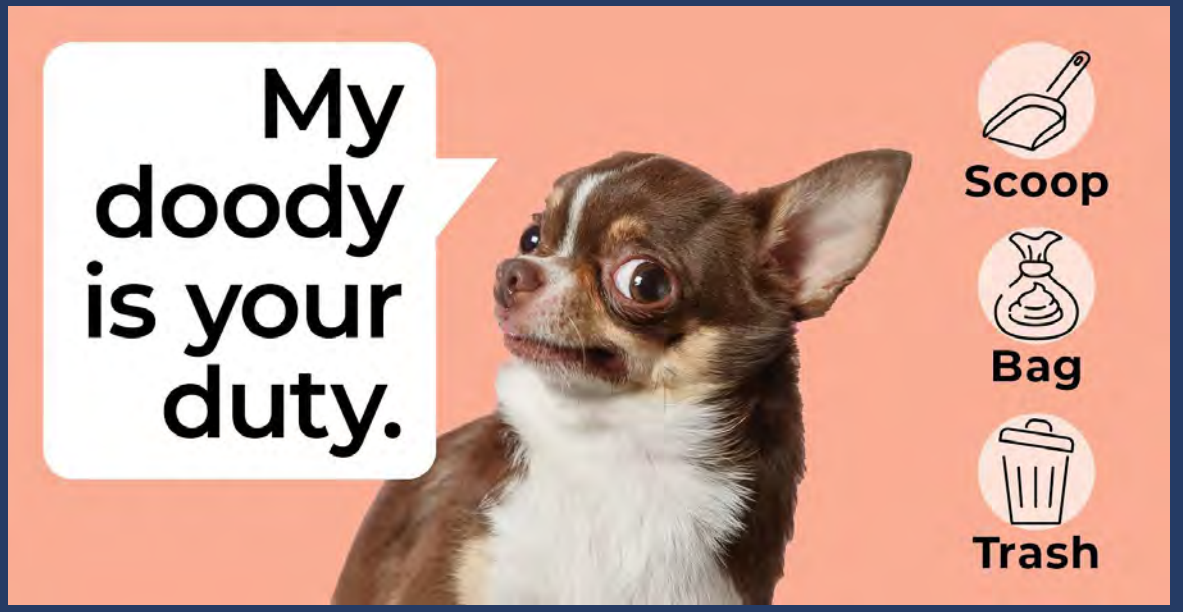
- Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground.

- As the runoff moves, it picks up and caries away natural and human-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters, and ground waters.



Types of pollutants associated with residential neighborhoods

- Nitrates and bacteria from improperly installed/maintained septic systems
- Bacteria from animal wastes (pets, chickens, livestock, horses)
- Nutrients from lawn fertilizer
- Household and vehicle chemicals
- Sediment from construction activities & land disturbances
- Chemicals from pesticides, herbicides, insecticides
- Pollutants from neighborhood roadways
  - Oils and toxic substances
  - Hydrocarbons
  - Heavy metals
  - Sediments
  - Trash



Why is nonpoint source pollution important?

- Implications for human health
- Drinking water quality (DEC does not regulate private wells)
- Lake water quality
- Risks to wildlife, pets, and aquatic life
- Impacts on recreation
- Represents the most significant source of pollution overall in the country and in Alaska

Affects on Water Quality - Examples

- Excess nitrogen or phosphorus (sources: septage, fertilizers, animal waste)
  - Increased aquatic plant growth
  - Increased algal growth
  - When those die, leads to decreased dissolved oxygen in the water column and its availability to things living in the water (fish kills)
- Sediment
  - Smothering of spawning gravels and fish eggs
  - Decreased water clarity
  - Increased water temperature (absorbs more sunlight)
    - Can lead to increased algal growth and decreased dissolved oxygen
  - Many other pollutants attach to sediment particles and are transported to waterways (nitrogen, metals, hydrocarbons, fecal coliform)

Both examples have consequences to aquatic life and to human use and enjoyment of lakes. There is increased disease potential with increased algal growth and lower dissolved oxygen. Additionally, some pollutants are toxic even in small amounts.

Lake Water Quality Monitoring & Assessment

- In general, very little lake data overall in Mat-Su compared to the number of lakes
  - MSB volunteer lake monitoring program
  - A few agency studies several years ago
- The possible links between groundwater, lakes, and private drinking water wells is not fully understood
- DEC does not have an ongoing lake monitoring program
  - As resources allow, we conduct intensive lake monitoring for Clean Water Act decisions on lakes of highest concern
- Grant program to fund monitoring in high priority watersheds – Alaska Clean Water Actions grants

DEC Water Regulatory Programs that include Lakes

- Wastewater Disposal regulations 18 AAC 72
  - On-site septic must be 100 feet from waterbody
- State Water Quality Standards 18 AAC 70
  - Set the criteria to determine waterbody health for different designated uses
- Alaska Pollutant Discharge Elimination System 18 AAC 83
  - Construction general permit
  - Multi-sector general permit
  - Excavation Dewatering general permit
  - Pesticide general permit

Riparian Zone

- USDA Climate Hubs Website (https://www.climatehubs.usda.gov/taxonomy/term/390)
  - Riparian areas are zones of vegetation adjacent to water, such as on floodplains and streambanks. Riparian areas exist across a range of climatic environments and support various communities of vegetation from native plants, grasses, shrubs to trees. Riparian areas are critical water storage areas that enhance local water supply through the infiltration and storage of water. Riparian areas also influence local water quality acting as filters of nutrients, pollutants, and sediments. Riparian vegetation physically protects landscapes by stabilizing streambanks, reducing erosion and storm runoff. As the climate changes, the benefits of riparian vegetation may become increasingly important for species reliant on clean, cold water and shade. Riparian areas are vulnerable to change due to land-use conversion and a warming climate that changes the habitat and distribution of riparian area species, and intensifies stressors such as fire, pests or pathogens.

Riparian Zone

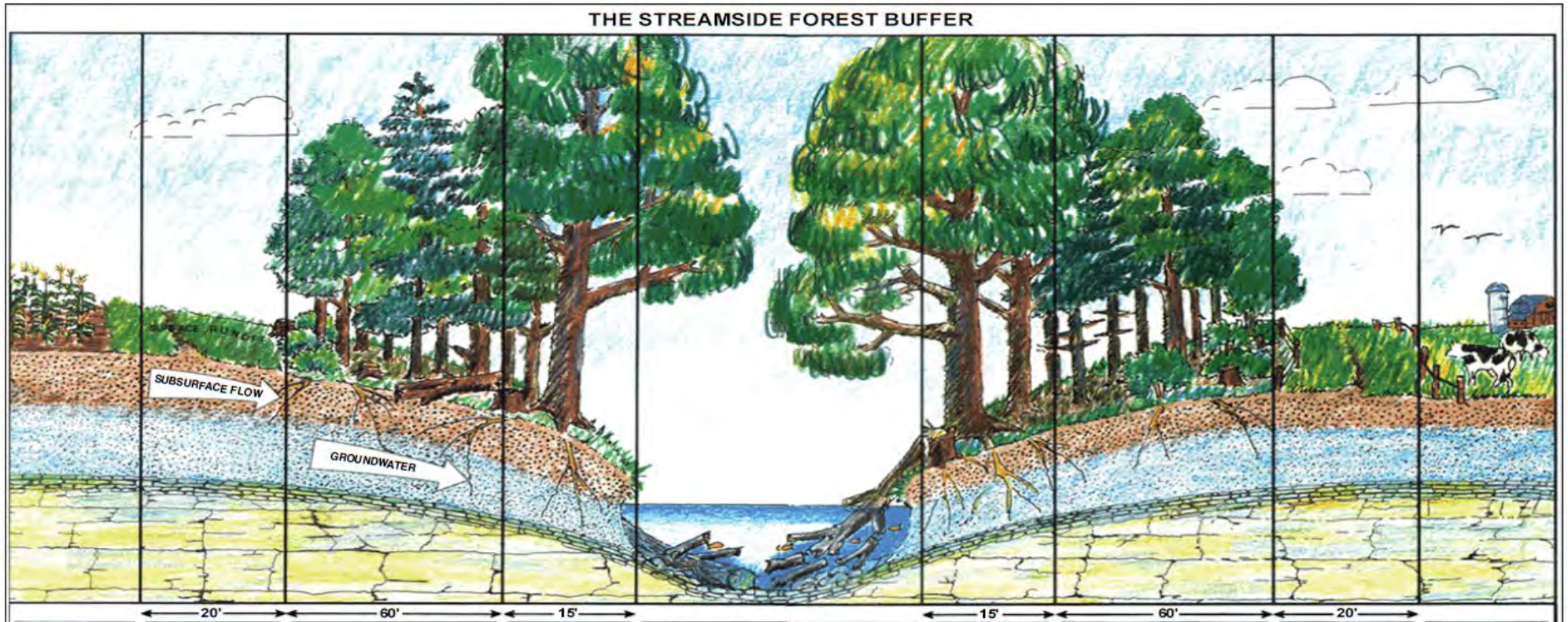
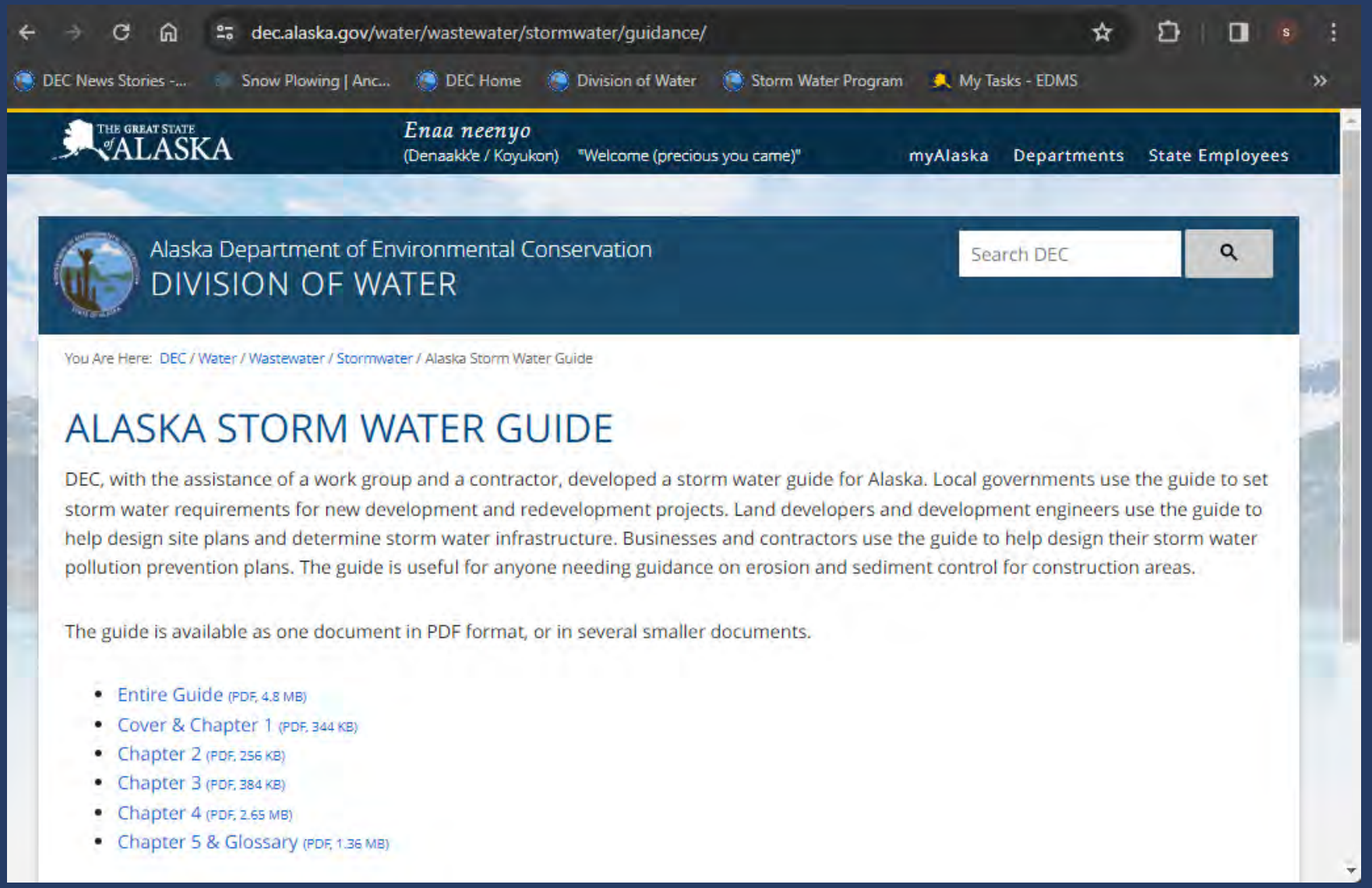
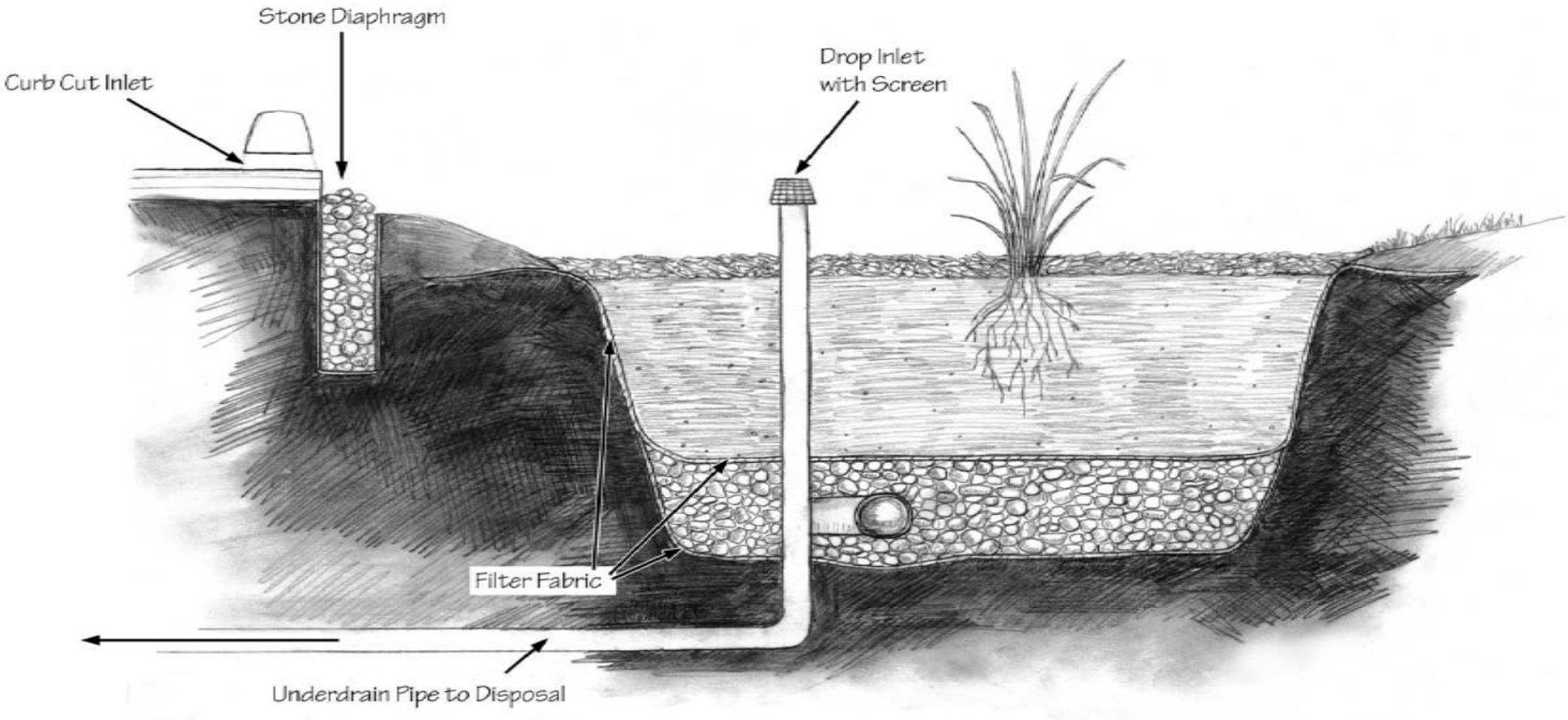


Figure 3. Illustration of a three-zone riparian forest buffer.
Source: USDA Forest Service

Alaska Storm Water Guide



Alaska Storm Water Guide (Bioretention BMP)



Bioretention Basin

Alaska Storm Water Guide (Bioretention BMP)

Bioretention Design Adaptations for Alaska

STP	Alaskan climatic regions				
	Coastal	Southcentral	Western	Interior	Arctic
	○	○	□	○	✪
Basic Bioretention Design Adaptation for Alaska	• A two-cell design is recommended, with the first cell designed as a pretreatment cell to capture sediments and the second cell designed as the bioretention filter. • Bioretention areas should be used for snow storage only if an overflow is provided and they are planted with salt-tolerant, non-woody plant species. To reduce the potential for freezing, the filter bed and underdrain pipe should be extended below the frost line, or the underdrain should be oversized by one pipe size, or both. • For a plant species list, see Web Link 70 in Appendix A. • Tree and shrub locations cannot conflict with plowing and piling of snow into storage areas. • A combination of peat and sand should be used for soil media (or loamy sand or sandy loam). • The surface layer can consist of river stone or hardwood mulch.				
Extreme Design	• In high rainfall areas, an oversized overflow and underdrain are needed so the bioretention area does not become continuously saturated and soggy. The plant mix should be adapted to rainforest conditions. • For areas with permafrost, the filter depth can be shallow (one foot) with a 9-inch underdrain layer.				

Feasibility symbols:

○ Widely feasible

✪ Feasible only with major design adaptation

□ Might be feasible in certain situations

■ Infeasible and not recommended

Notes

Performance studies show that bioretention effectively captures and treats runoff during winter months with average daily temperatures in the –5 to 10 degree Celsius (° C) range (Traver 2005; UNH 2005). Frost penetration of filter media occurred and varied from zero to 17 cm in studies at the University of New Hampshire (Roseen 2007). While bioretention frequently captures runoff containing high chloride concentrations, the chloride will pass through without treatment.

EPA Bioretention (Rain Garden)

Description

Bioretention practices, such as rain gardens, are landscaped depressions that treat on-site stormwater discharge from impervious surfaces such as roofs, driveways, sidewalks, parking lots and compacted lawns. They are used to collect stormwater and filter it through a mixture of soil, sand and/or gravel. The designs of bioretention practices mimic volume reduction and pollutant removal mechanisms that work in natural systems. The filtered stormwater soaks into the ground, provides water to plants and can help recharge the local groundwater supply. Through these processes, bioretention practices reduce peak flows within downstream sewer systems and allow pollutant removal through filtration and plant uptake.

A bioretention practice in a suburban road median, capturing stormwater during a rain event.

EPA Model Aquatic Buffer Ordinance

- EPA has an Aquatic Buffer Model Ordinance for reference and use by local governments.
- It includes many aspects that may not be relevant to a particular application, and may not include some issues .
- This model is provided as supporting documentation for this presentation.

Aquatic Buffer Model Ordinance

☞ *This ordinance focuses primarily on stream buffers. Communities creating coastal buffers may wish to incorporate additional features. For an example of a coastal buffer ordinance, see the Rhode Island ordinance.*

Section I. **Background**

Buffers adjacent to stream systems and coastal areas provide numerous environmental protection and resource management benefits that can include the following:

1) Restoring and maintaining the chemical, physical, and biological integrity of the water resources
2) Removing pollutants delivered from urban stormwater
3) Reducing erosion and sediment entering the stream
4) Stabilizing stream banks
5) Providing infiltration of stormwater runoff
6) Maintaining base flow of streams
7) Contributing the organic matter that is a source of food and energy for the aquatic ecosystem
8) Providing tree canopy to shade streams and promote desirable aquatic organisms

☞ *This benefit applies primarily to forested buffer systems. In some communities, such as prairie settings, the native vegetation may not be forest. See the example ordinance from Omaha, Nebraska, for an example.*

9) Providing riparian wildlife habitat
10) Furnishing scenic value and recreational opportunity

Anchorage Municipal Code Excerpts

21.07.020 NATURAL RESOURCE PROTECTION

B. Stream, Water Body, and Wetland Protection

4. Buffer/Setback Requirements

d. Water Bodies In all districts, buildings, accessory structures, and parking lots **shall be set back at least 25 feet horizontally from the ordinary high water mark of water bodies.** The setback shall be vegetated, except for minimal areas to allow for access to those uses such as docks, boathouses, and floatplane storage that require direct access to a water body by their very nature or function.

6. Development Standards

d. Prohibited Activities

i. No person shall engage in any activity that will disturb, remove, fill, drain, dredge, clear, destroy, or alter an area, including vegetation, within water courses, water body edges, wetlands, or their associated setback areas, except as may be expressly allowed in this section or title.

7. Preservation and Restoration of Vegetation

All existing vegetation within the stream or wetland setback area shall be preserved and, where necessary to repair damaged riparian areas, supplemented with additional native planting and landscaping. The removal of trees or vegetation that are a threat to the public health, safety, or welfare; the removal of species identified as invasive by the state of Alaska; or the removal of dead or naturally fallen trees or vegetation, shall be exempt from this requirement.

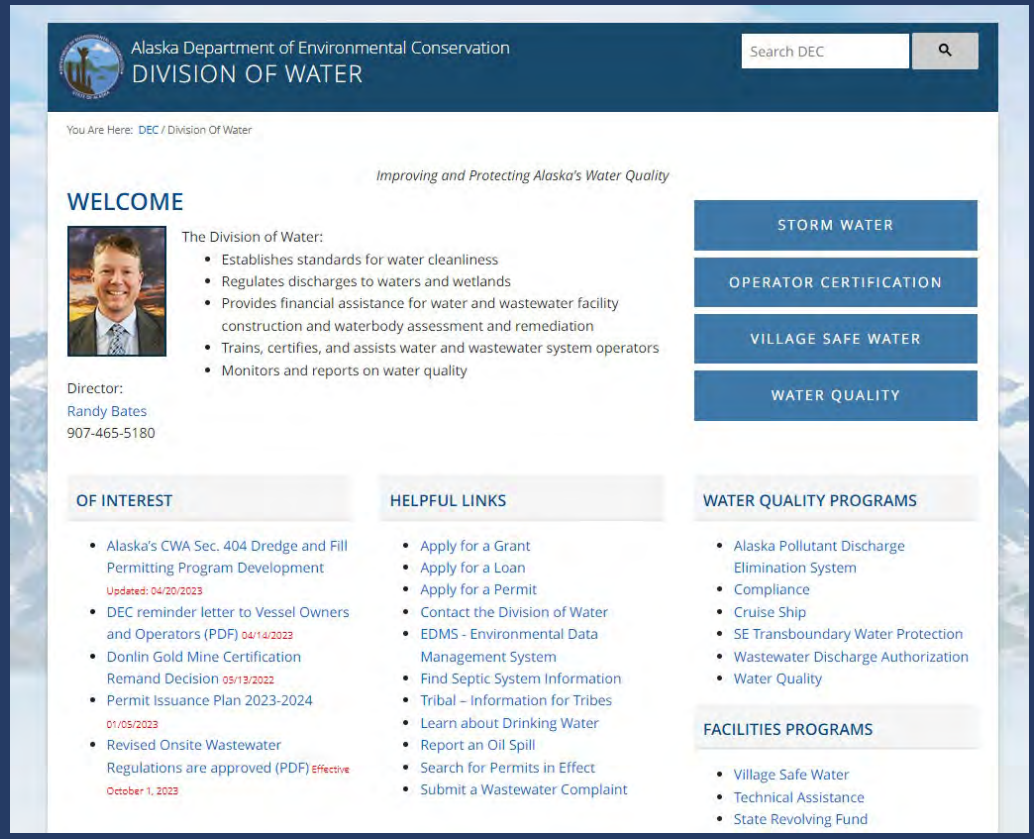
Additional Resource Links

- USDA Riparian Zone Website
  - www.climatehubs.usda.gov/taxonomy/term/390
- ADEC Stormwater Website
  - dec.alaska.gov/water/wastewater/stormwater/
- ADEC Snow Disposal Site Guidance Website
  - dec.alaska.gov/water/wastewater/stormwater/snow-disposal/snow-disposal-guidance
- ADEC Gravel Extraction Website
  - dec.alaska.gov/water/wastewater/stormwater/gravel/
- EPA Riparian Buffer Scientific Review
  - www.epa.gov/sites/default/files/2019-02/documents/riparian-buffer-width-2005.pdf
- Penn State Riparian Buffer video
  - extension.psu.edu/what-are-riparian-buffers#:~:text=A%20good%20quality%20well%2Ddesigned,the%20size%20of%20the%20buffer

Other DEC Water Resources

- Guidance documents
  - On-site wastewater
  - Green Infrastructure
- Permit information, water quality data and reports
- Funding grants & loans
  - ACWA grants
  - State Revolving Fund loans for clean water and drinking water

www.dec.alaska.gov/water/



Thank you & Questions

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