KENAI

Street Design Standards Manual

City of Kenai Public Works Department

Date: April 28, 2026

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Tables

SECTION A. ACRONYMS & ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADFG	Alaska Department of Fish and Game
ADT	Average Daily Traffic
ADOT&PF	Alaska Department of Transportation and Public Facilities
ATM	Alaska Test Method
COK	City of Kenai
FHWA	Federal Highway Administration
ft	feet
h:v	Horizontal to vertical
IFC	International Fire Code
in	inches
LRTP	Long Range Transportation Plan
mph	miles per hour
N/A	Not applicable
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NTP	Notice to proceed
OHWM	Ordinary high water mark
OSHP	Official Streets and Highways Plan
ROW	Right-of-way
SCS	Soil Conservation Service
VPD	Vehicles per day

SECTION B. DEFINITIONS

Access Point The location along a road at which a driveway or road intersects.

Alley A narrow street located behind or between buildings, often used as pedestrian access or rear vehicle service.

Arterial A road that provides a high level of mobility within the transportation network. Arterials have managed access with a minimal number of intersections or interchanges.

Average Daily Traffic The total number of vehicle trips during a given time period (in whole days greater than one day and less than one year) divided by the number of days in that time period.

Backslope On a roadway section in a cut, the portion of the roadside that slopes up from the roadside ditch and away from the roadway to the top of the cut, see Figure A-1.

Catchment Area The total area contributing stormwater runoff to a particular point, site, or structure.

Collector A road that links local roads with arterials and performs some duties of each. Collectors have managed access with a moderate number of intersections and driveways.

Curve Return The curve located at the corner of an intersection, connecting the roadway edge of one road to the roadway edge of an intersecting road or driveway.

Detention The temporary storage of runoff, for later controlled release.

Drainage Pattern The configuration of a drainage system including manmade and natural features within a catchment area.

Driveway A vehicular access way between a road and a parking area within a lot or property.

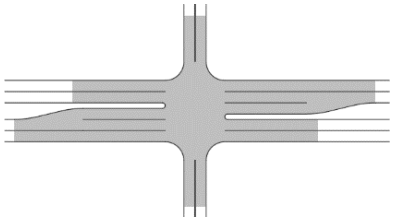
Embankment Earthen material that is placed and compacted for the purpose of raising the grade of a roadway.

Engineer An individual who is registered as a Professional Civil Engineer in the State of Alaska.

Feasible Reasonable and capable of being done or carried out.

Foreslope On a roadway section, the portion of the roadside that slopes down and away from the roadway, see Figure A-1.

Functional Area The physical area of an intersection and the area extending both upstream and downstream which includes perception reaction distance, maneuver distance, and storage length.



Intersection The general area where two or more roads join or cross.

Local Road A road that provides access to abutting property, rather than to serve through traffic. Local roads are not access controlled and can have frequent intersections and driveways.

Lot Frontage A property line that abuts the right-of-way that provides access to the lot.

Ordinary High Water Mark The elevation marking the highest water level which has been maintained for a sufficient time to leave evidence upon the landscape. Generally, it is the point where the natural vegetation changes from predominately aquatic to upland species.

Positive Drainage Clear, unobstructed flow of water away from structures and roadways without localized ponding.

Regulated Stream Any watercourse along which the flood hazard areas have been mapped and approved by the Federal Emergency Management Agency; any stream which harbors fish, as determined by the Alaska Department of Fish and Game; or any stream designated as regulated by COK.

Retention The prevention of runoff. Stormwater, which is retained, remains indefinitely, with the exception of the volume lost to evaporation, plant uptake, or infiltration.

Right-of-way A strip of land reserved, used, or to be used for a street, alley, walkway, airport, railroad, or other public or private purpose.

Road A general term denoting a public thoroughfare used, or intended to be used, for passage or travel.

Road Prism The foundation that supports the roadway; see Figure A-1.

Roadway The portion of a road that includes driving lanes and shoulders, see Figure A-1.

Segment A portion of road between two significant intersections or an intersection and its terminus.

Shoulder The portion of a roadway contiguous to any traveled way for lateral support of surface courses, see Figure A-1.

Street A general term usually denoting an urban or suburban road.

Stub A right-of-way or road segment that is planned to be extended, typically short in length, which terminates at the boundary of a subdivision or masterplan phase.

T-intersection A three-leg intersection in the form of a "T".

Through Street A road given preferential right of way; roads which intersect a through street are controlled, such as with a stop sign or yield sign.

Water Body A permanent or temporary area of standing or flowing water. Water depth is such that water, and not air, is the principal medium in which organisms live. Water bodies include, but are not limited to: lakes, ponds, streams, rivers, sloughs, and all saltwater bodies.

INTRODUCTION

This manual is intended to accomplish the following goals:

(1) To establish standards for the design and construction of transportation networks throughout the City of Kenai right-of-ways.
(2) To provide information and guidelines for the design, construction, and upgrade of roads within rights-of-way.
(3) To develop and maintain a safer and more efficient transportation system.
(4) To minimize operation & maintenance efforts.

SECTION A. STREET DESIGN

A1 General

These provisions establish appropriate standards for the design of roads. The purpose of these provisions is to:

(1) promote the safety and convenience of motorized and non-motorized traffic;
(2) promote the safety of residents and users;
(3) minimize the long-term costs for maintenance and repair; and
(4) provide guidelines and standards for public use

A2 Applicability

These standards apply to the design and construction of all subdivision road improvements and construction within the City of Kenai (COK).

A3 Street Classifications

Roads within the COK fall within one of the following functional classifications as defined by the State of Alaska Department of Transportation, Interstate, Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local Road. Functional classification of a road is based on its function, design, and current potential use. The functional classification of existing roads abutting or affecting the design of a subdivision or land development may be reviewed during the preapplication process. Existing mapping can be found here,

https://akdot.maps.arcgis.com/home/webmap/viewer.html?webmap=8d34059bbfed4fada20a4fdc2a138aca

This section provides design guidance for roads falling below arterials classifications. All interstates and arterials located within City of Kenai are owned, designed and maintained by the Department of Transportation. Local road, and collector functions including residential, residential sub-collector, residential collector, commercial, and pioneer road classifications are covered in this guide.

City of Kenai Road Classification Map included as Appendix 1.

A3.1 Residential Street

Residential streets are local roads intended to carry the least amount of traffic at the lowest speed. The Residential Street will provide the safest and most desirable environment for a residential neighborhood. Developments should be designed so that all, or the maximum number possible, of the homes will front this class of street.

A3.2 Residential Sub-Collector Street

Residential Sub-collector streets are local roads that carry more traffic than Residential streets.

A3.3 Residential Collector Street

Residential Collector streets are the highest order of residential streets and are a type of collector. In large residential developments, this class of street may be necessary to carry traffic from one neighborhood to another or from the neighborhood to other areas in the community. Residential Collector streets should offer minimal direct access points.

A3.4 Pioneer Road

Pioneer Roads are intended to allow road development to access lots through undeveloped Right-of-Way and may only be used where allowed by COK. This classification establishes minimum requirements for roads providing physical access, but should otherwise be designed to Residential, Residential Sub-Collector or Residential Collector standard as required by this section. No COK maintenance will be provided for Pioneer Roads. Pioneer Roads may be constructed no less than ½-width as required by the classification and be offset from the centerline of the ROW to facilitate future expansion. COK may require engineering or construction of a Pioneer Road at a higher classification if future development of a ROW is anticipated.

A3.5 Commercial Street

Commercial Streets serve corridors with large amounts of adjacent commercial land uses. Commercial streets should emphasize convenient vehicular traffic movement and access to adjacent properties.

A3.6 Alleys

Alleys are permitted provided legal and physical access conforms to COK or other applicable code. Alleys provide secondary access to lots. No COK maintenance will be provided for Alleys.

A4 Design Criteria

The minimum design criteria for Residential, Residential Sub-Collector, Residential Collector streets, Pioneer Roads, and Commercial Streets are set forth in Table A-1. Any unspecified design criteria shall meet or exceed the design criteria for the roadway design speed in the latest edition of *A Policy on Geometric Design of Highways and Streets* (AASHTO). Higher design speeds may require corresponding changes to other design parameters such as alignment and will be proposed by design engineer and approved by City.

Commercial streets should be designed to meet the standards of AASHTO, International Fire Code (IFC), and any other applicable standards or code along with the COK code.

Table A-1: Design Criteria

	Unit	Residential	Residential Sub-Collector	Residential Collector	Pioneer Road	Commercial
Average Daily Traffic	VPD	≤400	401 – 1000	1001 – 3000	–	–
Typical Section						
ROW Width[1]	ft	60	60	60	60	60
Lane Width	ft	10	11	12	11	14
Standard Gravel Shoulder Width	ft	2	2	2	0	2
Shared Paved Shoulder Width[2]	ft	4	4	6	N/A	6
Roadway Width	ft	24	26	28	12	32
Foreslope[3]	h:v	3:1	3:1	3:1	2:1	3:1
Backslope[4]	h:v	2:1	2:1	2:1	2:1	2:1
Crown, gravel	%	3	3	3	3	3
Crown, pavement	%	2	2	2	2	2
Engineering Criteria						
Design Speed[6]	mph	25	25	25	25	25
Stopping Sight Distance	ft	155	155	155	155	155
Horizontal Alignment						
Minimum Centerline Radius	ft	225	225	225	225	225
Minimum Tangent Between Curves	ft	100	100	100	100	100
Vertical Alignment						
Maximum Centerline Grade	%	10	10	10	10	6
Minimum Flow Line Grades	%	0.5	0.5	0.5	0.5	1
Intersections						
Minimum ROW Corner Radius	ft	30	30	30	30	45
Minimum Curve Return Radius[5]	ft	20	25	30	20	40
Maximum Grade on through street within 50 feet of intersection	%	4	4	4	-	4

[1] Minimum ROW required for new dedications; width of existing ROW may vary.

[2] An optional paved shoulder may be provided on one or both sides of paved streets for non-motorized shared use.

[3] Install guardrail when required by the latest edition of the *Roadside Design Guide* (AASHTO).

[4] 2:1 Back slopes may be steepened to 1.5:1 if cuts exceed 5 feet and appropriate slope stabilization, as determined by the design engineer, is used. Retaining walls may be used to replace or augment backslopes.

[5] 40-foot minimum curve return radius at intersections with higher order streets.

[6] Posted speeds are variable and approved by COK. Design speeds may be increased as approved by COK.

A5 Typical Section

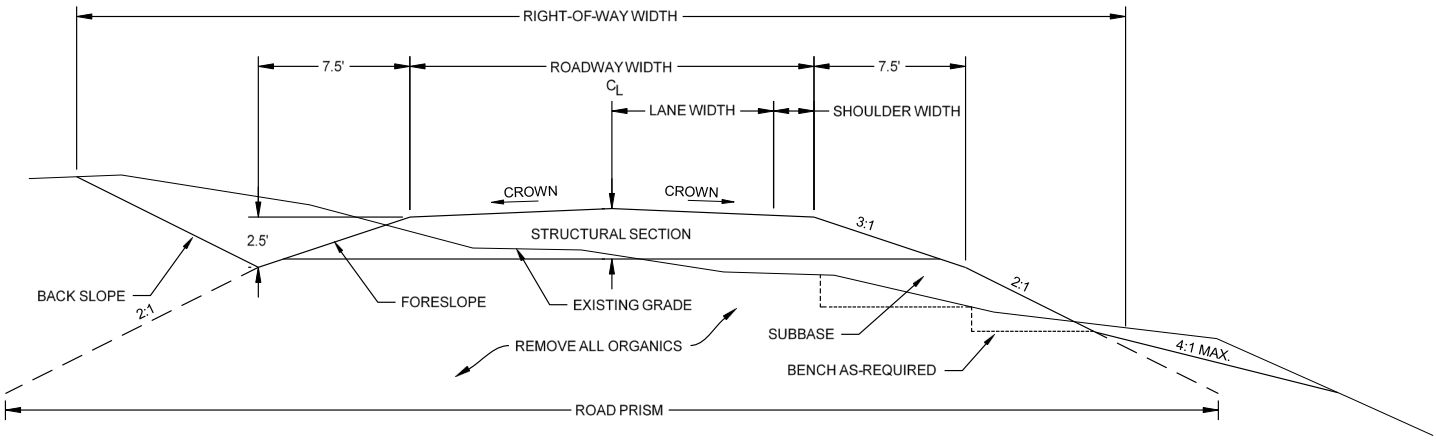


Figure A-1: Typical Section

A6 Turnarounds

Streets with only one inlet shall terminate with a constructed turnaround, unless otherwise provided by A6.2. 24' road width shown in variable based on street classification.

A6.1 Cul-de-sac Turnarounds

(a) A cul-de-sac turnaround with a drivable surface diameter (shoulder to shoulder) of 96 feet centered in a ROW diameter of 120 feet shall be provided at the terminus.

(b) Cul-de-sac turnarounds shall meet the configuration and dimensions shown in Figure A-2.

(c) The grade throughout the surface of a cul-de-sac, as depicted in the shaded portion of Figure A-2, shall not exceed 4 percent.

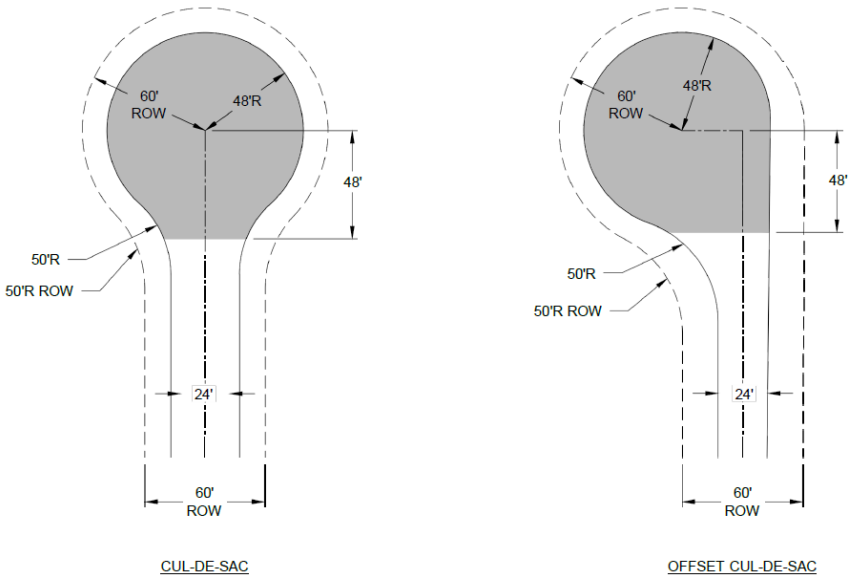


Figure A-2: Cul-de-sac Options

A6.2 Alternate Turnarounds

(a) COK may permit a street to terminate with an alternative turnaround that meets fire code when such a design is required by extreme environmental or topographical conditions, unusual or irregularly shaped tract boundaries, insufficient room for a cul-de-sac, or when the location of the turnaround is intended to become an intersection.

(b) Alternate turnarounds shall meet the configuration and dimensions shown in Figure A-3.

(c) The grade throughout the turnaround surface, as depicted in the shaded portion of Figure A-3, shall not exceed 4 percent.

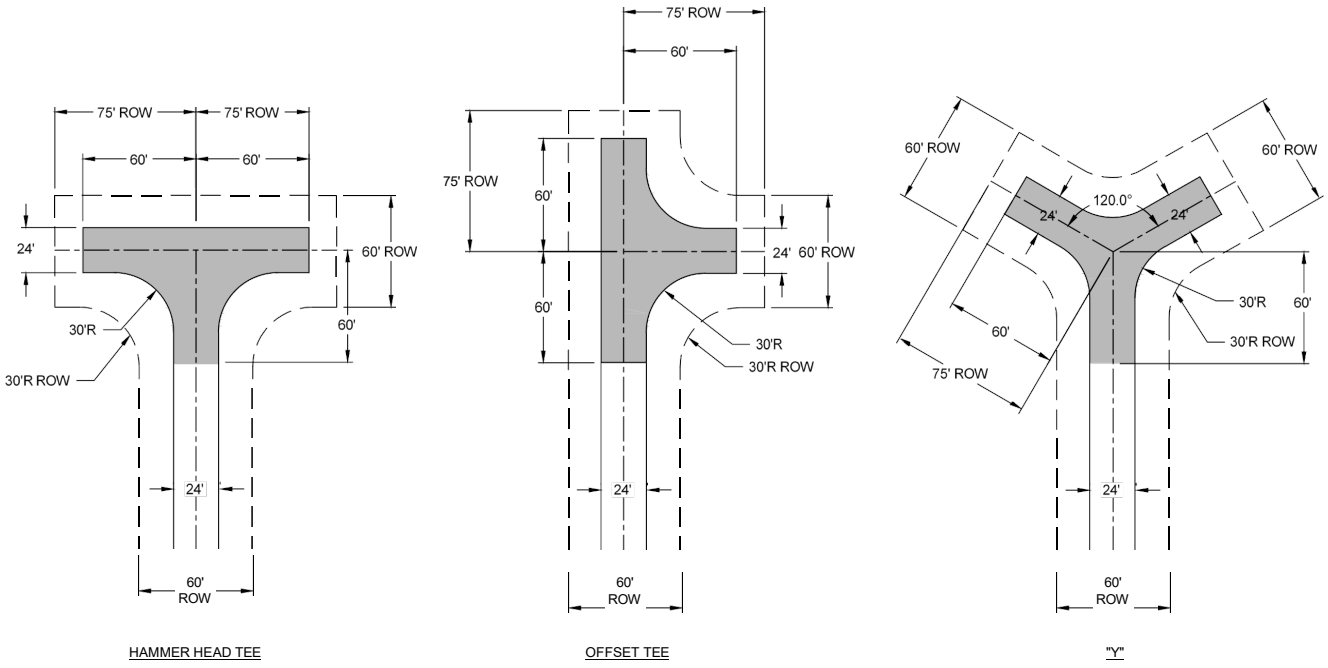


Figure A-3: Alternate Turnarounds

A7 Stub Streets

A7.1 Stub Street Construction

No construction is required if physical access is provided to all lots by adjoining streets as required by COK or other applicable code.

A7.2 Temporary Turnarounds

Stub streets requiring construction that exceed 200 feet in length (measured from the intersection point to the end of required construction) will meet the requirements of A6.1 or A6.2. A temporary easement will be provided for the turnaround, which will automatically terminate upon extension of the street and physical removal of the turnaround. The centerline grade on stub streets without turnarounds shall not exceed 4%.

A8 Intersections

A8.1 Intersection Sight Distance

(a) Whenever a proposed street intersects an existing or proposed street of higher order, the street of lower order shall be made a stop-controlled street, unless alternate intersection control is used as allowed by this subsection.

(b) Stop controlled streets shall be designed to provide intersection sight distance as specified in this subsection, Table A-2, and Figure A-4.

(c) The entire area of the intersection sight triangles shown in Figure A-4 shall be designed to provide a clear view from point A at 3.5 feet above the roadway to all points 3.5 feet above the roadway along the lane centerlines from point B to point C and point D to point E.

(d) Sight distances less than the recommended shall only be used when there are topographical or other physical constraints outside of the applicant's control.

(e) The minimum sight distances listed in Table A-2 are for a passenger car to turn onto a two-lane undivided street and minor road approach grades of 3 percent or less. For other conditions, the minimum sight distance should be calculated by the applicant's engineer according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(f) Sight distances less than the minimum, where no other options exist, will require alternate intersection control or warning signs as determined by the Applicant's engineer and approved by COK.

(g) Intersection sight triangles shall be located in their entirety within ROW or a sight distance maintenance easement.

(h) Yield controlled intersections shall conform to sight distance requirements according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(i) Intersections with state or other municipal ROW are subject to their respective requirements and review.

Table A-2: Recommended and Minimum Intersection Sight Distance

Design Speed or Posted Speed Limit (whichever is greater)	S_d Recommended	S_d Minimum
MPH	Ft	ft
15	225	170
20	300	225
25	370	280
30	450	335
35	580	390
40	750	445
45	950	500

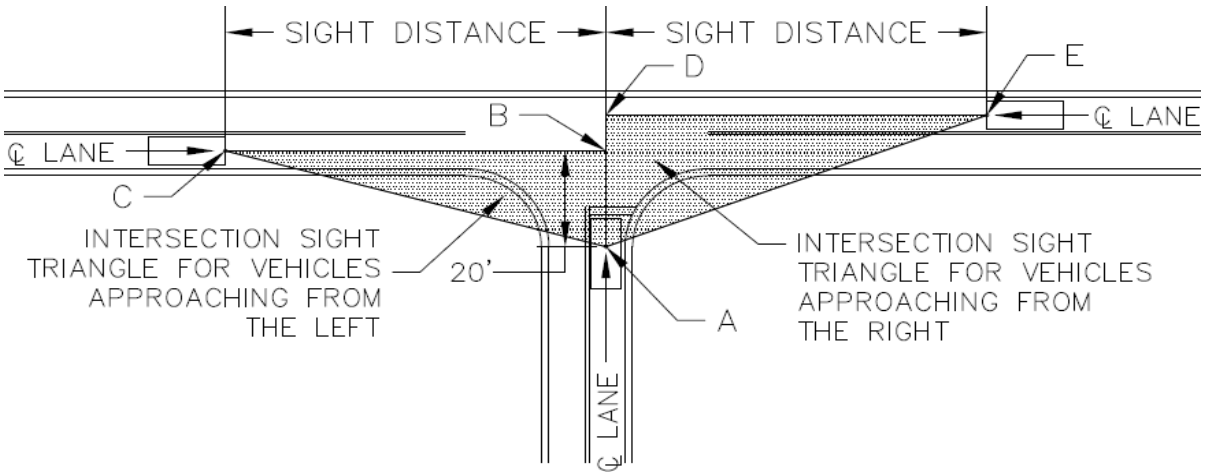


Figure A-4: Intersection Sight Distance

A8.2 Intersection Spacing

(a) Minimum centerline to centerline distance between intersections on the same side or opposing sides of the through street shall be:

(1) 155 feet on Residential streets;

(2) 200 feet on Residential Sub-Collector streets; or

(3) 300 feet on Residential Collectors and Commercial streets.

(b) If the above spacing along the through street cannot be met, intersections shall be aligned directly across from each other.

(c) Where pre-existing conditions do not allow for the above spacing and no other legal access exists, alternate spacing or offset most closely meeting (a) or (b) above may be allowed.

(d) Additional intersections should be avoided within the functional area of major intersections with turning bays and approach tapers. Exceptions require COK approval based upon constraints and no other feasible alternatives.

A8.3 Minimum Intersection Angle

Streets should intersect with a straight segment at an angle as close to 90° as possible, but no less than 70°, for a minimum of 75 feet from the intersection point, as shown in Figure A-5.

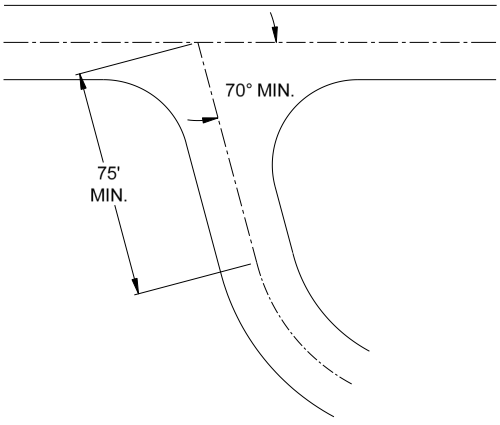


Figure A-5: Intersection Angle

A8.4 Landing

Controlled streets shall be provided with a typical 30-foot landing, conforming to Figure A-6, at its approach to a through street. The landing shall be sloped to match the crown of the through street. Vertical curves shall not be located in the landing to the extent feasible. Where a negative slope away from the through street is not feasible due to topographical constraints, the road shall be constructed in a manner that prevents water from flowing onto the through street.

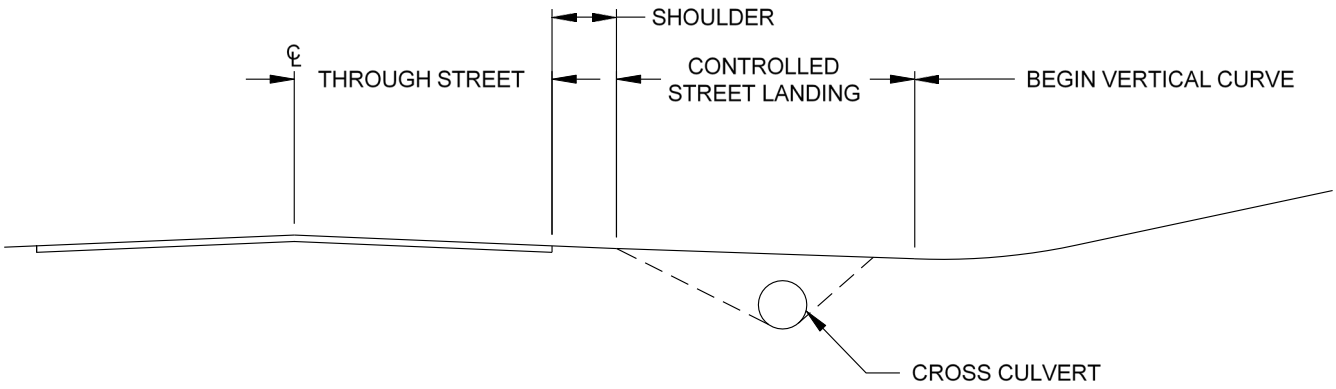


Figure A-6: Controlled Street Landing Profile

A8.5 Paved Apron

A proposed street, not requiring pavement, which intersects an existing paved street shall be provided with a paved apron 30 feet from the edge of the existing pavement.

A9 Driveways

Driveways are not usually required to be constructed within the ROW at time of road construction. However, if an applicant chooses to construct driveways, driveway permits are required. An individual permit is required for each individual driveway along a road construction project. A driveway permit application can be obtained from COK.

Maximum width of driveways shall be 30 feet. Waivers for wider driveways must be approved through Planning and Zoning Commission. New driveways through sidewalks or multi-use pathways must conform to ADA guidelines and use parallel ramps where the cross slope does not exceed 2%. Driveways connected to paved roads at a minimum must have a 2" thick, 2' wide apron extending off the edge of the paved roadway.

Access onto State of Alaska or Kenai Peninsula Borough owned roads is regulated by those agencies and must conform to their requirements. COK does not require a COK Driveway Permit for access onto these roads, but the approved permits from the proper agency will be required for submittal for development of the lot.

A10 Bicycle and Pedestrian Paths

Bicycle and pedestrian paths constructed within public ROW shall conform to the current edition of *Guide for the Development of Bicycle Facilities* (AASHTO), and any other applicable local, state, and

federal requirements.

A11 Signage

Signs shall be provided and installed by the applicant in conformance with the latest edition of the *Alaska Traffic Manual* (ADOT&PF) and the *Alaska Sign Design Specifications* (ADOT&PF).

Signage shall be installed per Figure A-7, A-8 and A-9.

Install sign posts according to soil conditions. In firm soils, drive the post to a minimum depth of 30” or refusal. In loose soils use Figure A-9, excavate the post foundation 24” in diameter and depth specified based on sign area, place the base of the post in the bottom of the hole and backfill with subbase material to existing grade. Compact the backfill with a tamping bar or other method until firm. Soil conditions and point of refusal will be determined by Designer of Record or City Representative.

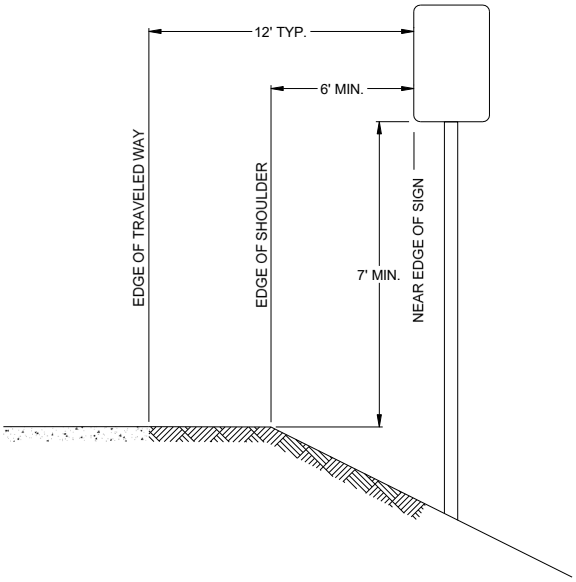


Figure A-7: Sign Placement

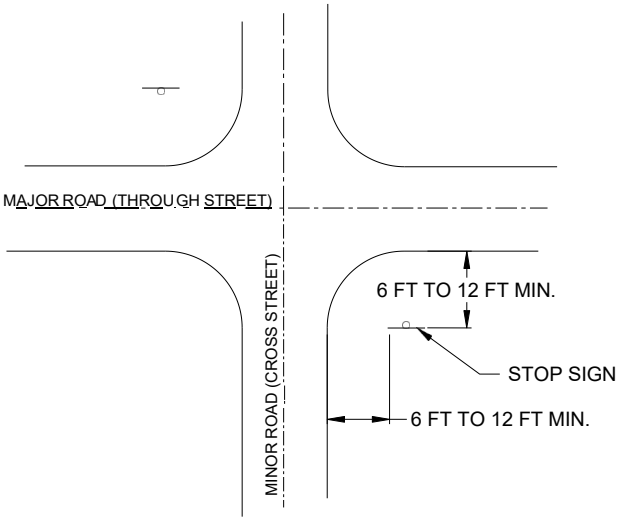
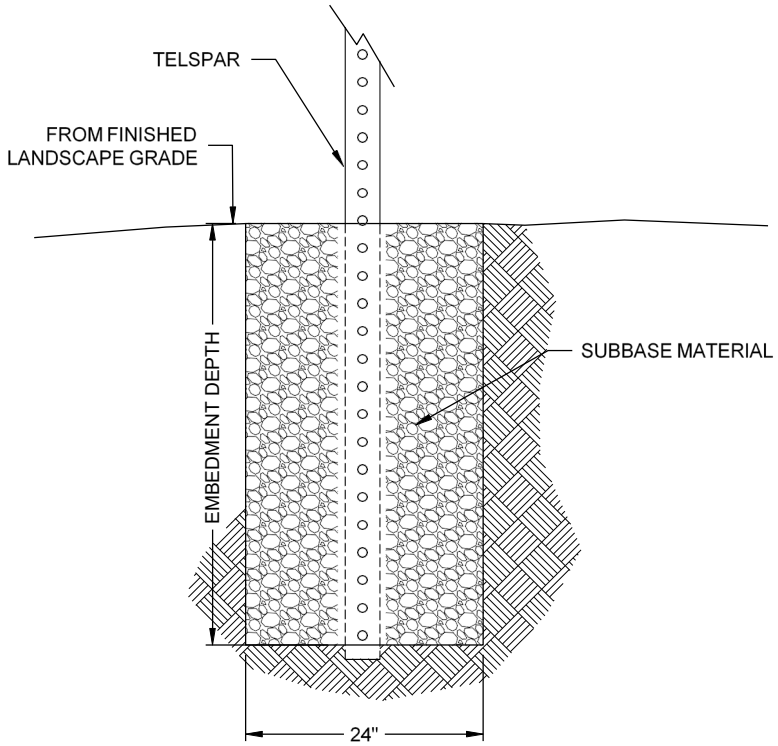


Figure A-8: Stop Sign Location



PERFORATED STEEL TUBES (P.S.T.) (12ga. - 0.105" WALL THICKNESS		
SIGN SURFACE AREA SQUARE FOOT	POST SIZE	EMBEDMENT DEPTH
7' OR LESS	2" x 2"	30"
GREATER THAN 7'	2-1/2" x 2-1/2"	36"

Figure A-9: Foundation for Sign Post

A12 Average Daily Traffic

The following formula shall be used to determine the required classification of streets: ADT = Number of lots x 10 for single-family residential use. ADT for commercial streets shall be determined by design engineer.

A13 One Way Streets

One way streets shall be allowed to reduce the minimum lane width by half. All streets should handle two way traffic if feasible and request to develop a one way street must be submitted for approval with supporting information to develop one way street.

A14 Access-Driveway Standards

(a) The average access point spacing on roads, where other access standards do not exist, shall not exceed the minimums listed in Table A-3, based on the posted speed limit. Average access point spacing is calculated per segment and is equal to the segment length divided by the number of access points on both sides of the street. Undeveloped lots with only access to the major road corridor are counted as having at least one access point.

(b) When the average access point spacing on a segment of an existing major road corridor is less than the minimum listed in Table A-3, the average access point spacing shall not decrease due to the subdivision.

(c) On Roads with a speed limit of 25 mph or lower, the minimum spacing between the edges of adjacent driveways on the same side of the street shall be 35 feet.

(d) Minimum corner clearance for a driveway to a corner lot shall be 50 feet from the property corner to the driveway edge.

(e) Deviations in minimum spacing between access points or distances from corners may be administratively approved through Driveway Permit process.

Table A-3: Average Access Point Spacing

Posted Speed Limit (mph)	Minimum Average Access Point Spacing (feet)
30	250
35	300
40	360
45	425

A15 Paving

Asphalt Paving may be required by COK. Paving may be required if extending a new road off an existing paved road and/or providing a connection between two paved roads. Isolated roadways that do not connect to existing paved roadways will not be permitted to be paved and COK would likely require paving of connecting streets until main access is reached.

A16 Design Deviations

Design deviations will be considered to address extenuating circumstances including but not limited to: existing substandard ROW, environmental conditions, or existing utilities or other structures. Design deviation requests shall be submitted in writing and contain supporting information, justification, and suggested solutions.

Section B. CONSTRUCTION REQUIREMENTS

B1 General

This section establishes minimum construction requirements. Prior to any ground disturbing activities, call the Alaska Dig Line for utility locates in accordance with AS 42.30.400. Work in the ROW requires an approved License to Excavate in Public ROW and an approved Individual Project Permit for Excavation in or Adjacent to City ROW, both through COK.

B2 Road Construction

B2.1 Clearing

Cut and dispose of all trees, down timber, stumps, brush, bushes, and debris. Cut trees and brush to a height of not more than 6 inches above the surrounding ground. Clear the ROW, slope easements, and sight distance triangles. Where ROW exceeds 60 feet, clear a minimum of 60 feet. Clear utility easements, if used, for utilities constructed with the development.

B2.2 Grubbing

Remove and dispose of all stumps, roots, moss, grass, turf, debris, or other deleterious material within the fill and cut catch limits of the road, within the ROW, and cleared utility easements for underground utilities.

B2.3 Disposal

Dispose of clearing and grubbing debris in an area designated by the applicant outside of all ROW, platted utility easements, and platted private road corridors. Organic debris 3 inches in diameter by 8 inches long, or smaller, may be left in place, outside of the road prism. Burial of cleared and grubbed organic matter within the ROW is not permitted.

B2.4 Embankment Construction

(a) Construct the road with the required structural section, see Table A-1 and Figures A-1, B-1 and B-2 as determined by its classification.

(b) Clear the full extents of the right-of-way. Clearing debris must be removed from the right-of-way.

(c) Prepare the subgrade. Remove all organics from the area below the road prism and dispose of offsite. Bench existing slopes that are steeper than 4:1, measured at a right angle to the roadway, where roadway embankment is to be placed. Excavation waste may be utilized as slope flattening where slopes exceed 2:1 upon COK approval. City may require placement of geotextile fabric.

(d) Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection B6 to a minimum depth as required for road classification with the upper 6 inches having no material with a diameter larger than 6 inches. Place embankment in horizontal layers not exceeding 12” thickness for the full width of the embankment and compact as specified before the next lift is placed.

(e) Place Surface Course meeting the requirements specified in subsection B6. Finish with a 3 percent crown for a gravel road or 2 percent crown for a paved road, and compact as specified.

(f) Compact all embankment to not less than 95 percent of the maximum dry density at the optimum moisture content.

(g) Optimum moisture and maximum dry density will be determined by Alaska Test Method (ATM) 207 and ATM 212 or alternative methods approved by COK.

(h) In-place density shall be determined by ATM 213 or alternative method approved by COK. Compaction tests on the Subbase layer shall be taken at representative locations along the roadways as follows:
   (1) a minimum of three;
   (2) at least one per segment;
   (3) one additional test per 1000 linear feet, or portion thereof, when the combined length of roadway exceeds 1000 linear feet;
   (4) at least one out of every three within three feet of the shoulder, and the remainder in the center of a driving lane.

(i) For paved roadways, substitute Surface Course with a minimum of 2 inches of Base Course and 2 inches of Class E Asphalt Concrete Pavement per COK Standard Specifications and Figure B-2. The width of the pavement shall be equal to two lane widths plus the shared paved shoulder width, if used, and finished with a 2 percent crown. If road is ditched, pavement edges shall be backed with additional Base Course graded and compacted flush with the pavement surface and tapered to the edge of the roadway. The pavement shall be washed or swept immediately following shouldering work. If road has concrete curb and gutter, tack should be applied per COK specifications on concrete and pavement shall be compacted flush with concrete surface.

(j) Remove all loose material exceeding 6 inches in diameter from the ditches and foreslopes. Where slopes are 3:1 or steeper and longer than 10 feet measured along the slope face, trackwalk perpendicular to the slope, or the equivalent, to form 1-inch wide grooves parallel to the road no more than 12 inches apart. Stabilize foreslopes outside of structural section with topsoil and seed. Stabilization may be allowed to establish during warranty period. Other stabilization methods must be approved prior to placement.

(k) Permanently stabilize backslopes with topsoil and seed. Stabilization may be allowed to establish during the warranty period. Other stabilization methods must be approved prior to placement.

(l) Cross drainage culverts, minimum 18-inch diameter, will be installed where determined necessary and 30-inch ditches will be provided for drainage.

(m) Geotextile shall be utilized when specified by Designer of Record.

(n) All material testing is the responsibility of the Developer. Testing records will be made available to the COK prior to final approval. Tests need to meet or exceed specification referenced above. Designer of Record shall be present onsite to observe material testing.

B2.5 Unsuitable Subgrades

When structurally unsuitable material such as peat, saturated material, or permafrost are present within the ROW, provide an appropriate structural design for approval by COK, according to Section E, prior to construction. Place embankment to a depth that will produce a stable road surface with a final grade 18 inches above the surrounding ground.

B3 Pioneer Road Construction Requirements

Pioneer Roads shall meet the requirements of Table A-1 and Figure A-1. Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection B6 to the minimum depth of 24 inches. Additional road embankment may be required to provide a stable road surface. Surface course is not required. Roads may be constructed no less than ½-width and offset from the centerline of the ROW to facilitate future expansion of the road. Cross drainage culverts, minimum 18-inch diameter, will be installed where determined necessary and 24-inch ditches will be provided for drainage. Drainage galleries may also be required by City upon review. Developer shall schedule City of Kenai staff for two inspections to construct Pioneer Roads consisting of one inspection to verify existing ground after clearing, grubbing and removal or organics from the road prism and a second inspection to verify installation of road. City may require installation of geotextile fabric under subbase if soils contain too much silt.

Pioneer Roads will not be maintained by COK. They are required to be constructed to a standard that could allow them to be expanded to meet the requirements of a Residential Street in the future that COK would maintain. They are not generally required to be designed by an Engineering Professional, but do require a permit be submitted and approved prior to construction.

Pioneer Roads will not be allowed to be paved unless designed by an Engineering Professional and the road meets all requirements of Section B. Road would need to be upgraded to meet paving requirements.

B4 Winter Construction

Winter construction may be allowed. Plan for winter construction must be submitted and approved by COK. COK will not accept any roads until all ground has thawed and any settlement areas corrected.

B5 Alternate Methods and Materials

Use of alternate materials and road construction methods that will more appropriately fit the conditions of the specific road locations, following general engineering practices, may be proposed by the applicant or their engineer in writing. Final acceptance of such plans must be approved by COK.

B6 Materials

B6.1 Subbase

(a) Is aggregate containing no muck, frozen material, roots, sod, or other deleterious matter;
(b) has a plasticity index not greater than 6 as tested by (ATM) 204 and ATM 205; and
(c) meets the requirements of Table C-2, as determined by ATM 304.
(d) Bottom 12 inches of Subbase may be substituted with native in-situ material consisting of non-frost susceptible material free from organics, with <6% passing the No. 200 sieve. Must be approved by Designer of Record and/or COK.
(e) If an existing gravel road is going to be paved, upper 6 inches of existing Surface Course shall be approved in lieu of subbase shown on Figure B-2.

B6.2 Base Course

(a) Crushed stone or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;
(b) free from clay balls, vegetable matter, or other deleterious matters;
(c) meets the requirements of Table B-1; and
(d) meets the requirements of Table B-2, as determined by ATM 304.

B6.3 Surface Course

(a) Is a screened or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;
(b) free from clay balls, vegetable matter, or other deleterious matters; and
(c) meets the requirements of Table B-2, as determined by ATM 304.

Table B-1: Aggregate Quality Properties for Base Course

Property	Test Method	Base Course
L.A. Wear, %	AASHTO T 96	50, max
Degradation Value	ATM 313	45, min
Fracture, %	ATM 305	70, min
Plastic Index	ATM 205	6, max
Sodium Sulfate Loss, %	AASHTO T 104	9, max (5 cycles)

Table B-2: Aggregate Gradations

Sieve Designation	Subbase	Base Course	Surface Course
4 inch	95 to 100		
2 inch	85 to 100		100
1 inch		100	100
3/4 inch		70 to 100	70 to 100
3/8 inch		50 to 80	50 to 85
No. 4	30 to 60	35 to 65	30 to 65
No. 8		20 to 50	20 to 60
No. 50		6 to 30	15 to 30
No. 200	0 to 6	0 to 6	6 to 10

(Percent Passing By Weight)

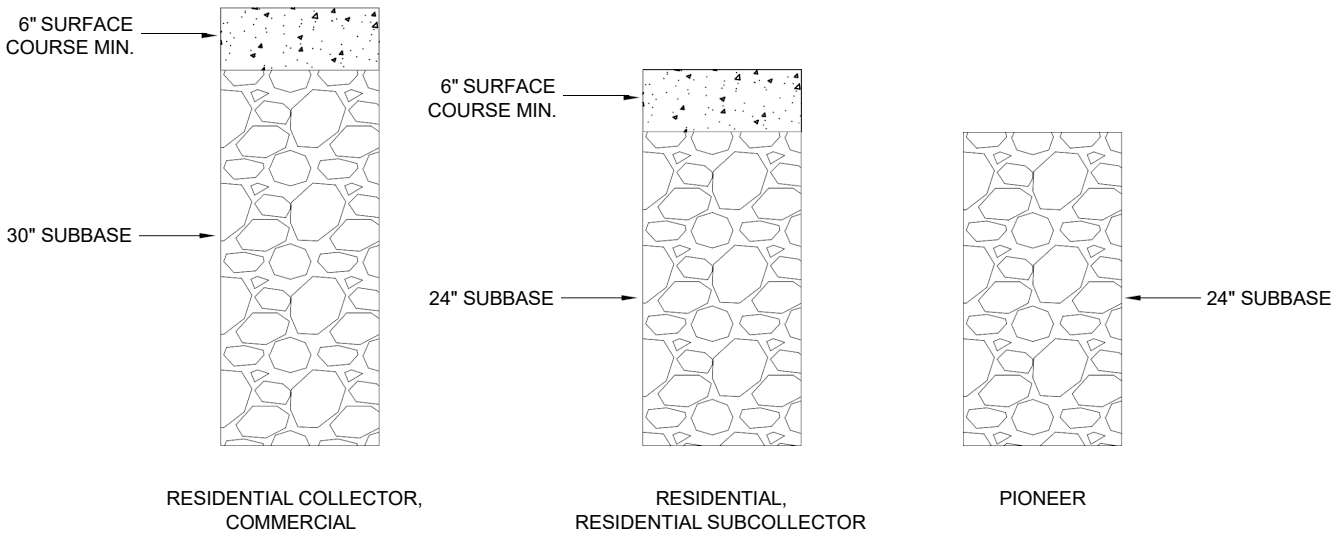


Figure B-1: Structural Sections for Gravel Roads

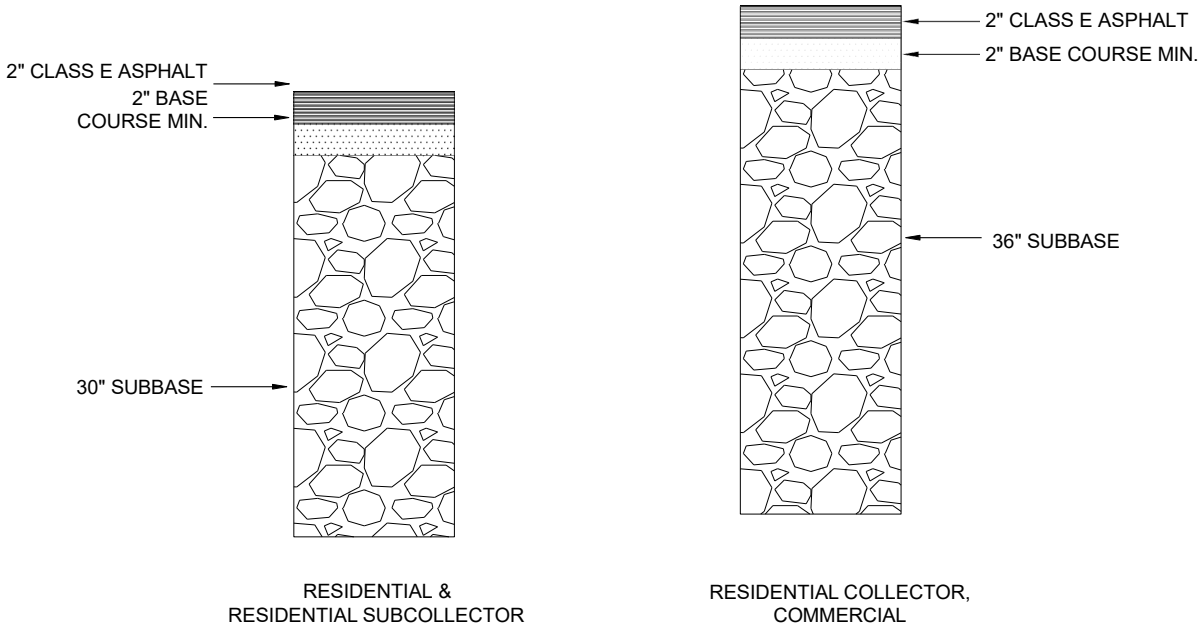


Figure B-2: Structural Sections for Paved Roads

SECTION C. DRAINAGE

C1 General

The purpose of this section is to ensure that stormwater management is provided with ROW development activities. Responsible stormwater management is the treatment, retention, detention, infiltration, and conveyance of stormwater and other surface waters without adversely impacting adjoining, nearby, or downstream properties and receiving waters.

C2 Requirements

A drainage plan is required for road construction projects. It is the applicant's responsibility to comply with all other applicable federal, state, and local codes and regulations including, but not limited to work in wetlands or flood plains.

The Applicant may request a waiver to this section. Waiver must be submitted and approved by COK. Justification for waiver may include, but is not limited to, sites where drainage is established and will not be altered or the construction will not substantially modify drainage on or through the project area.

C2.1 Drainage Plan

Submit a Drainage Plan, prepared by an engineer or other qualified professional registered in the State of Alaska, with the preliminary ROW construction permit application. The preliminary drainage plan shall show the project site and depict the following:

(a) Existing and proposed property lines, the OHWM of water bodies, and existing mapped flood hazard areas if applicable.
(b) Existing topography, with minimum 5-foot contour intervals.
(c) Existing features that convey or retain drainage, including but not limited to: water bodies, wetlands, natural valleys, swales, ditches, check dams, culverts, and pipe systems.
(d) Proposed drainage pattern and features, both constructed and natural, on site. Identify conveyance types, flow directions, and any drainage changes that may affect adjacent property if applicable.
(e) Proposed stream crossings and anticipated culvert sizes. Identify fish-bearing streams.
(f) Identify design elements, with supporting runoff calculations, necessary to show compliance with the drainage design criteria set forth in C3. No calculations required for ditching, curb and gutter, or driveway culverts.
(g) Fish passage culvert plans and permits, if applicable.

C2.2 Subdivisions or Large-Scale Development

COK may require development of storm water structures within ROW or adjacent properties to manage storm water for a large development. Drainage plan shall be reviewed by COK to determine if existing infrastructure is sufficient for development or requires new storm water management structures as a part of the development. COK may require more conservative design criteria than Section C3 upon their review of development and existing infrastructure.

C3 Drainage Design Criteria

(a) Design a drainage system for the project site for conveyance of a 10-year, 24-hour storm.

(b) Retain natural drainage patterns to the extent possible.

(c) Changes to drainage patterns must not adversely affect adjacent property or ROW.

(d) Base the size and capacity of the drainage system on runoff volumes and flow rates assuming full development of the catchment area.

(e) Drainage to state or other municipal ROW are subject to their respective requirements and review.

C4 Drainage Ditches

Stabilize ditches with gravel, turf, or rock riprap. See Table C-1 and Table C-2 for most common conditions and acceptable ditch lining materials.

Normal ditch depth shall be 30 inches and according to the typical section shown in Figure A-1. The design peak flow required by C3 shall be conveyed within ditches with a minimum freeboard of 12 inches.

Table C-1: Ditch Stabilization

Flow (cfs)	Ditch Slope (ft/ft)										
	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
2.0	A	A	A	A	A	A	A	A	A	A	A
4.0	A	A	A	A	A	A	A	A	B	B	B
6.0	A	A	A	A	A	A	B	B	B	B	B
8.0	A	A	A	A	A	B	B	B	B	B	B
10.0	A	A	A	A	B	B	B	B	B	B	C
20.0	A	A	A	B	B	B	C	C	C	C	C
30.0	A	A	A	B	B	C	C	C	D	D	D
40.0	A	A	B	B	C	C	C	D	D	D	E
50.0	A	A	B	B	C	C	D	D	D	E	E
60.0	A	A	B	C	C	D	D	D	E	E	E
70.0	A	A	B	C	C	D	D	E	E	E	E
80.0	A	B	C	C	C	D	E	E	E	E	E
90.0	A	B	C	C	D	D	E	E	E	E	E
100.0	A	B	C	C	D	D	E	E	E	E	E

Table C-2: Ditch Lining Materials

Type	Material	D50 (in)	Dmax (in)	Dmin (in)	Thickness (in)
A	Native Grass, Turf, or Gravel with < 6% fines				
B	Riprap or Bone Rock	3.0	4.5	1.5	6.0
C	Riprap or Bone Rock	6.0	9.0	3.0	12.0
D	Riprap or Bone Rock	9.0	13.5	4.5	18.0
E	Riprap or Bone Rock	12.0	18.0	6.0	24.0

C5 Curb and Gutter

Curb and gutter are used throughout City on all classifications of roads. Curb and gutter is preferred in locations where stormwater collection systems are needed and require underground piping. Curb and gutter type shall be approved by COK. Curb and gutter is not allowed on Pioneer Roads.

C6 Culverts

C6.1 General Culvert Design Criteria

The following criteria apply to all cross road culverts for runoff or seasonal drainage:

(a) The minimum culvert slope is 0.5 percent.
(b) Culverts longer than 100 feet require appropriate maintenance access and COK approval.
(c) Cross road culverts shall have a minimum diameter of 18 inches.
(d) Cross road culverts shall include end-sections.
(e) Driveway culverts, where required, shall have a minimum diameter of 15 inches and may be galvanized steel corrugated metal pipe, heavy gauge aluminum corrugated metal pipe or corrugated polyethylene plastic pipe.
(f) Culverts shall be sized to convey the design peak flow required by C3.
(g) In lieu of plastic pipe, corrugated metal pipe (CMP) gauges must be minimum:
    (1) 16 gauge galvanized steel on Residential and Residential Subcollector streets;
    (2) 12 gauge galvanized steel on Residential Collector and minor collector streets; or
    (3) 16 gauge aluminum or aluminized if needed due to soil or water conditions.
(h) Design and install energy dissipation rock aprons at culvert outlets in accordance with Hydraulic Engineering Circular No. 14 (FHWA).
(i) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

C6.2 Stream Crossing Culvert Criteria

The following criteria apply to all stream crossing culverts:

(a) Contact the ADFG, Division of Habitat to determine if a stream reach harbors fish. If so, stream crossing culverts shall be designed, constructed, and maintained according to C7.
(b) Stream crossing culverts shall be placed as close to the pre-existing channel alignment as possible. Avoid placing culverts at pools and stream bends.
(c) Road alignment shall be as close to perpendicular to the stream channel as possible.
(d) Culvert slope shall be within 25 percent of the natural stream slope. For example, if the natural stream slope is 1.0 percent, the minimum design slope of the culvert would be 0.75 percent and the maximum design slope would be 1.25 percent.
(e) Culvert outlet and inlet protection shall be used as necessary to reduce the risk of scour and perching.
(f) Stream crossings shall be composed of a single pipe or arch for the main stream channel.
(g) Overflow culverts may be used but should be placed at a higher elevation so that flows up to the OHWM pass through the primary culvert.
(h) Stream crossings shall maintain the connectivity of wetlands adjacent to stream channels and shall accommodate sheet flow within such wetlands.

(i) Stream crossing culverts shall not interfere with the functioning of floodplains and shall be designed to convey the design peak flow required. Non-Regulated streams shall be designed for a 10-year, 24-hour event and Regulated streams shall be designed for a 100-year, 24-hour event. If the stream crossing culvert is not designed to accommodate the 100-year flow, a route must be established to safely convey flows exceeding the design peak flow without causing damage to property, endangering human life or public health, or causing significant environmental damage.

(j) In cases of crossings within high entrenchment ratio environments, the ratio of the flood prone width to the OHWM width is greater than 2.2, floodplain overflow culverts may be beneficial to floodplain connectivity and can be used to pass the design flow. Minimum width requirements for the primary culvert still apply.

(k) Stream crossing culverts shall have a minimum diameter of three feet.

(l) Stream crossing culvert pipes and arches shall be metal.

(m) Culverts longer than 100 feet require appropriate maintenance access and COK approval.

(n) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

(o) Alternate designs may be submitted for approval by City of Kenai.

C7 Fish Passage Culverts

Fish Passage culverts shall meet the requirements of U.S. Fish & Wildlife Service Culvert Design for Ecological Function. Fish Passage Culverts must be designed by an engineer.

C8 Stormwater Collection Systems

Stormwater collection systems must be engineered and approved by the City of Kenai and the Alaska Department of Environmental Conservation. Systems must meet the following minimum requirements.

(a) Design system for a minimum 10-year, 24-hour event. City of Kenai may require 25-year or 100-year event depending upon review the drainage and associated stormwater collection systems.

(b) Minimum piping diameter shall be 12" and piping may be galvanized steel corrugated metal pipe, heavy gauge aluminum corrugated metal pipe or corrugated polyethylene plastic pipe.

(c) Manholes and catch basins shall be concrete and maximum spacing of manholes shall be 300 feet.

(d) Minimum pipe grades shall be according to Table C-3.

(e) Connection to an existing system may be allowed with City of Kenai approval. Engineer may be required to verify existing system is capable of supporting additional flows.

Table C-3: Stormwater Pipe Minimum Slopes

Pipe Diameter	Minimum Slope (ft/ft)
12"	0.005
15"	0.004
18"	0.003
21"	0.0025
24"	0.002
27"	0.0018
30"	0.0015
36"	0.0012

C9 Soil Infiltration Facilities

Soil infiltration may be used to reduce stormwater flow and volume with the following criteria:

(a) Soil infiltration facilities within City ROW or drainage easements should be designed such that they are not considered Class V injection wells. Per EPA's memorandum addressing the subject in June 2008.

(1) Private drainage facilities that are considered Class V injection wells require conformance with EPA regulations.

C10 Rainfall Data

C10.1 Rainfall Distribution

Intensity-Duration-Frequency and 24-hour rainfall data are furnished by NOAA Atlas 14 Point Precipitation Frequency Estimates. Use SCS Type-I Rainfall Distribution and 24-hour rainfall depth to compute runoff.

C10.2 Runoff Transformation

Use the Rational Method for estimating peak flows in drainage basins less than 200 acres and with times of concentration less than 20 minutes for design of conveyances. Use NRCS SCS Unit Hydrograph Method for estimating runoff volumes and peak flows for other conditions and applications. Other methods more appropriate for site conditions may be utilized upon COK approval.

SECTION D. SUPPLEMENTAL DESIGN ELEMENTS

D1 General

Roadways consist of many separate components that are not all applicable in every situation. When these elements are used, the following guidelines apply. Specific guidelines for the following components may be found in applicable DOT&PF or AASHTO publications. Any variation to the following guidelines must be approved by COK.

D2 Pedestrian Facilities

Pathways and sidewalks shall be designed according to AASHTO guide for the Planning, Design, and Operation of Pedestrian Facilities, the 2010 Americans with Disabilities Act Standards for Accessible Design, and the requirements of this section.

D2.1 Sidewalks

Sidewalks are generally installed on Commercial and Residential Collector roads, but can exist on Sub-Collectors and Residential roads. Sidewalks should be at least 5 feet wide and have a surface of concrete. The installation of curb and gutter for sidewalks is required.

D2.2 Multi-Use Pathways

Multi-use pathways may be installed on ROW throughout the City. Multi-use pathways must be paved asphalt and have a minimum width of 8 feet. Pathway separation should be a minimum 5 feet edge of road where feasible and roadside ditching should be in between road and pathway where feasible. Modifications will be allowed where ROW is limited.

D2.3 Accessibility Requirements

All new construction and alterations within COK ROW must be designed to be accessible for all pedestrians in accordance with ADA when applicable. The complete Americans with Disabilities Act Accessibility Guidelines (ADAAG), which is part of the regulations enforcing ADA, is available online from the U.S. Architectural and Transportation Barriers Compliance Board at www.access-board.gov.

Designs that include pedestrian facilities within COK ROW shall conform to the version of ADA Guidelines for Accessible Public Rights-of-Way in effect at the time of submittal.

The followings are examples of some design elements covered under ADAAG:

New or widened road: all pedestrian elements, including curb ramps, sidewalk cross slope, driveway cross slope, clearance around utilities, pedestrian access to adjacent commercial properties, and accessible pedestrian construction detours.

Roadway surface rehabilitation only: new and complying curb ramp for every road crossing that has both sidewalk and curb, unless there is an existing curb ramp that meets all ADA standards.

D3 Street Lighting

Lighting throughout COK consists of DOT&PF operated lighting along Kenai Spur Highway and Bridge Access Road, COK owned and operated lighting and Homer Electric Association (HEA) owned and operated lighting that is paid for by COK.

DOT&PF lighting managed by the State and is not regulated by these standards. COK lighting shall conform to COK Street Lighting Standards. HEA lighting may be installed in COK ROW at the request and/or approval of COK. HEA lighting may be installed for wayfinding or safety purposes in areas of the City where it is not cost effective to expand City owned lighting infrastructure.

City of Kenai may require street lighting be installed if expanding a residential or commercial area that City owned and operated lighting exists adjacent to and lighting would match adjacent infrastructure.

For more information on COK Street Lighting and Standards, please see 2025 Street Light Assessment.

D4 Mailboxes and Mailbox Pullouts

Installation of mailboxes or mailbox pullouts in COK ROW must be permitted through a ROW application permit. A site plan will be required with details for size of mailbox and foundation. COK may require a pullout be installed depending on location of mailbox, width of existing road and safety for queueing of vehicles in the area.

SECTION E. DEVELOPMENT IMPLEMENTATION

E1 General

This section describes the procedure that is to be followed before constructing any improvements required for constructing new residential classification or higher roads in existing ROW. The Applicant or their representative shall be the primary point of contact throughout this process.

It is the Applicant's responsibility to determine, acquire, and follow permits required by other agencies. Approval from COK does not supersede other agencies' permit requirements.

E1.1 Construction Plans

Submit construction plans to COK at least seven calendar days before the preconstruction conference. All plan drawing submittals shall be at a scale of 1-inch = 50-feet or more detailed, plottable on 11-inch by 17-inch paper. Plans must be completed and stamped by an Engineer. Construction plans shall include the following:

(a) Drainage Plan, according to C2.1;
(b) Road plan, profile, and cross-sections; and
(c) As-built survey of visible improvements and utilities within and adjacent to the right-of-way;
(d) Geotechnical information;
(e) Copy of agency accepted permit applications or approvals required for the improvements prior to construction; and
(f) Plans for any proposed improvements within the ROW that are outside of the scope of this manual (e.g. retaining walls or guard rails) or do not conform to the standards set forth herein, shall conform to ADOT&PF design criteria and standards.

E1.2 Preconstruction Conference

The preconstruction conference is for the purpose of reviewing and approving the Construction Documents for the required improvements. The Applicant may request scheduling of a preconstruction conference with COK after the construction plans have been submitted. The applicant, or designated representative, and the Applicant's engineer must attend the preconstruction conference. The applicant should identify any deviations from these standards.

In addition to the construction plans, the following items will be provided at or prior to the preconstruction conference:

(a) If applicable, proof of compliance with the Alaska Pollutant Discharge Elimination System Program (ADPES);
    (1) Acceptable proof includes a Notice of Intent (NOI), a Low Erosivity Waiver, or a determination by a qualified person that neither is needed.
    (2) Applicant will need to include COK in APDES permit due to ownership of ROW, but applicant will be responsible for all fees.
(b) Approximate construction schedule;
(c) Copy of any issued permits required for the improvements prior to construction;

The Construction Plans must be signed by the applicant, or designated representative, and the engineer. Upon acceptance of the Construction Plans by COK and approval of ROW permit, COK will issue an Approval to Construct (ATC).

Some construction plans or permit approvals may take longer to develop or obtain, such as fish passage culvert plans and associated permits. Approvals to Construct from these agencies must be received and reviewed by COK before construction begins within the respective areas.

E1.3 Interim Inspections

Applicant's engineer shall supervise all phases of construction and notify COK of changes to the approved plans. The changes should be approved by COK prior to completion of construction. Periodic interim inspections may be conducted by COK. Interim inspections may be requested by the Applicant's Engineer. Inspections by Applicant's engineer must be sufficient to complete as-built drawings and verify roadway was constructed per plans and specifications.

E1.5 Pre-Final Inspection

When the Applicant has determined that construction of the improvements will be substantially complete according to the approved plans, the Applicant will request a Pre-Final Inspection. The Pre-Final Inspection request must be received by September 30th and shall include a description of work yet to be completed. The Pre-Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the Applicant, Engineer, and COK. A punch list will be developed, if any work items remain, at the Pre-Final Inspection.

E1.6 Final Inspection

When construction of the improvements and punch list items are complete according to the Construction Documents, the Applicant will request a Final Inspection of the improvements. The Final Inspection request must be received by October 15th. Final Inspections will cease October 31st, or when winter conditions prohibit inspection, whichever comes first. The Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the Applicant, Engineer, and COK.

E1.7 Final Report

Upon COK approval of the Final Inspection, the Applicant or their designee shall submit a written Final Report to COK. The Final Report shall include:

(a) Stamped and signed memo describing at a minimum:
    (1) project was constructed per plans and specs with approved deviations noted on as-builts
    (2) road standard classification (Residential Subcollector, Residential, etc.) for each road constructed
(b) Stamped and signed final drainage plan, if required (minimum 11"x17");
(c) As-builts or record drawings;
(d) Documentation verifying Surface Course thickness such as inspection forms with photos, asbuilt surveys, or alternative methods approved by COK;
(e) Compaction test reports, as required;
(f) Gradation tests, as required; and

(g) photos of each stage of construction.

COK will review the report and provide comments, if necessary, within 14 calendar days.

E1.8 Construction Acceptance

Upon approval of the Final Report, COK will issue a Notice of Acceptance. COK will begin maintenance operations and ownership of road at this point. COK will not perform any maintenance on new roadway

If Construction is not accepted prior to winter conditions, Applicant will be responsible for any plowing and maintenance of the road until after thawing the following spring when any remaining work items can be completed and accepted by the City.

E1.9 Warranty

All improvements are to be warrantied until October 31st of the calendar year following COK approval of the Final Inspection.

During the warranty period, the COK will be responsible for any road maintenance including, but not limited to: snow removal, maintaining a smooth road surface and crown, maintaining stabilized foreslopes and backslopes, and maintaining positive drainage. If any deficiencies arise during the warranty, COK will issue a punch list to the applicant by September 1st to allow time for completion of repairs. The applicant must notify COK of completion of repairs by October 15th for the roads to be eligible for continued maintenance on November 1st.

Maintenance may be denied, and the Certificate of Construction Acceptance revoked if deficiencies are not corrected to the satisfaction of COK. A notice may be recorded indicating to the public that the COK is not responsible for road upkeep and maintenance until such a time that the deficiencies are corrected. COK may require security to perform maintenance activities if deficiencies cannot be repaired for an extended period of time due to freezing conditions.

E2 Subdivision Agreements

If a developer plans to construct a road within a proposed ROW that has not been platted, they will need to agree to an Installation Agreement per KMC 14.10.070. Installation Agreement will be required prior to approval of drawings for construction by COK. In lieu of an installation agreement, a developer may construct a road within a proposed ROW without City approval, but to be accepted by the City for maintenance, they must follow the Development Implementation of Section E1.

E3 Pioneer Road Development

The following guidelines are for construction of a Pioneer Road within COK ROW. Applicant will need to complete a Pioneer Road Application to submit to COK for approval.

Pioneer Roads allow for roadways to be constructed in City ROW, but are not maintained by COK. The purpose is to allow for possible future expansion of Pioneer Road into a maintained road and verifying proper construction methods allows for reduced costs in future expansion.

E3.1 Construction Plans

Submit construction plans to COK at least seven calendar days before the preconstruction conference. Plans shall show location of road within ROW, proposed width and any proposed drainage features. Applicant shall identify material and gradation of material being provided for backfill and it must meet requirements of Section B.

E3.2 Preconstruction Conference

The preconstruction conference is for the purpose of reviewing and approving Pioneer Road Application. The Applicant may request scheduling of a preconstruction conference with COK after the application has been submitted. The applicant or designated representative must attend the preconstruction conference.

E3.3 Excavation and Grubbing Inspection

After approval of the application, the Applicant may proceed with excavation and grubbing within the ROW. Prior to placing any fill, applicant must complete excavation of the proposed ROW down to native, non-frost susceptible soils and removing all organics from the road prism. The applicant shall coordinate an inspection with COK staff to verify and document limits of excavation prior to allowing backfill operations to proceed. A survey the length of the ROW the development is occurring in must be completed prior to inspection to clearly delineate the limits of the ROW and to verify that all work in taking place within ROW.

E3.4 Final Inspection

After placement, grading and compaction of subbase materials to complete road construction are finished, the Applicant shall schedule a final inspection for the City to document construction. Any work items to be completed will be identified at this time and an additional inspection may be necessary. After the final construction is approved by COK, the Applicant will be provided with a Notice of Acceptance.

SECTION F. UTILITIES

F1 General

These standards apply to the design and construction of utility facilities within the COK. All utility installation within existing or proposed ROW or utility easements must comply with the provisions of COK or other applicable code, or as otherwise approved by the permitting authority.

F2 Utility Location Guidelines

F2.1 Underground Utility Facilities:

(a) The location of utility facilities placed within the ROW shall be coordinated with COK.

(b) Water, sanitary sewer and storm sewer will be installed per COK requirements and may be placed in the roadway. Other utilities shall be placed in utility easements where feasible or per Figure F-1. Deviations may be approved by COK through ROW Permit Application process.

(c) Backslopes or foreslopes which extend into a utility easement should not exceed 4:1. These limits are necessary for construction equipment for utility installation.

(d) Utility facilities paralleling the road shall not be located within 10 feet of the edge of roadway unless otherwise approved by COK.

(e) Underground road crossings shall be buried a minimum of 48 inches below finished grade. Backfill and surface course shall be reinstalled according to the requirements of Section B, or as otherwise approved by the COK.

(f) Conduit road crossings, if used, shall be installed in accordance with each utility company's standards and applicable code.

(g) Standard burial depth of longitudinal utilities is 36 inches below grade. The applicant should delineate areas, such as where driveways and drainage easements are planned, where deeper burial may be needed.

(h) Warning tape shall be installed approximately 12 inches above underground utilities during installation.

(i) Contractor completing underground work in ROW is responsible for restoring surface to previous condition including replacement of concrete, asphalt, topsoil, and seeding. Within 1-year of completion of work, contractor is responsible to repair any issues in roadway such as settlement of subgrade or reseeding.

F2.2 Above Ground Utility Facilities:

(a) Above ground pedestals, poles, and utility facilities shall not be located within 10 feet of the roadway, unless an alternate design meets clear zone requirements.

(b) Above ground pedestals, poles, and utility facilities shall not be located such that they substantially block intersection or driveway sight triangles.

(c) Unless otherwise authorized by COK, above ground pedestals, poles, and utility facilities shall not be located within the ROW nearer than 40 feet from the point of intersection of the extension of the property lines at any existing or proposed intersection on Residential Collector streets or higher classification.

(d) Above ground pedestals, poles, and utility facilities shall not be located within a common access easement or drainage easement, within 20 feet of a common access point, or within 10 feet of a roadway cross culvert.

(e) All guy wires installed within the ROW or utility easements adjacent to, or near to a roadway shall have a minimum 8-foot long yellow delineator installed above the anchor.

(f) Pedestals located within the ROW shall be located within the outer 1 foot of the ROW.

F2.3 Separation of Utilities:

(a) Recommended 5-foot horizontal separation between power poles and buried utilities.

(b) Recommended minimum 1-foot physical separation between all underground utilities.

(c) Separation of storm, sewer, and water utilities shall meet the requirements of the Alaska Department of Environmental Conservation.

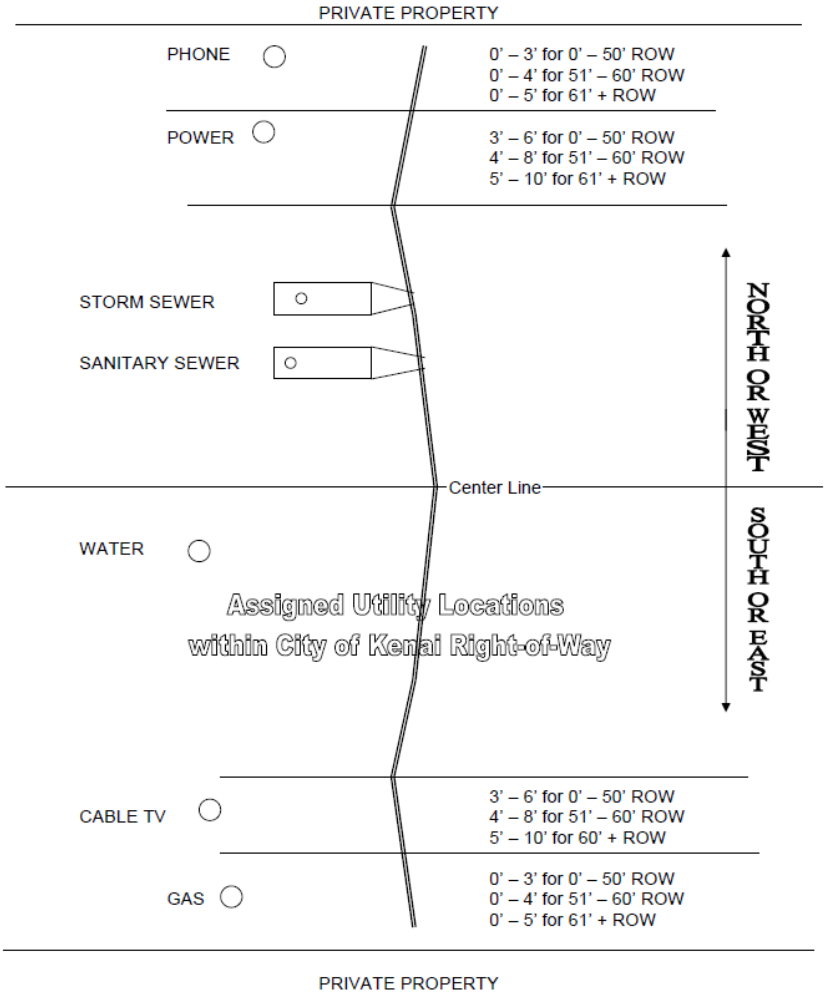


Figure F-1: Utility Locations

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