

Design Guidelines for Streets and Drainage

City of North Pole

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Part 1. General

1.1 Intent. It is the intent of these guidelines to ensure that newly constructed streets in subdivisions within the City of North Pole be built to a standard that will maintain or enhance property values within the neighborhood, and built of such material and in such a way that the City will be able to maintain them with the resources available to it.

The requirements for streets constructed within the City of North Pole are more stringent than for those within the Borough at large or two major reasons. First, the City aspires to eventual paving of all streets in its neighborhoods. Thus, the initial street installation should be a first step toward this goal. Second, City streets are maintained by the City while the Borough roads are maintained at the expense of individuals living in a particular Service Area. Thus, a poorly constructed street in the City will sooner or later be a direct financial liability for all citizens of the City.

These guidelines were drafted to aid in meeting the requirements of the City. No single document can possibly present guidelines for all situations that will be encountered. The City shall have ultimate authority to interpret this document, and may direct modifications for specific situations. Any proposed alternative materials and methods must be approved in writing by the City prior to installation. Substantial variations from these guidelines must be approved by the City Council. Special warranties may be required.

1.2 Procedure. The design of all streets and associated drainage systems which are to become public streets in the City of North Pole (except for State of Alaska highways) shall be submitted to and approved by the City before construction. The design shall be in accordance with these guidelines and with all applicable codes and ordinances. Where requirements differ, the most stringent shall be met.

The Borough requires that Developers furnish preliminary and final plats to the City (and other agencies) for comment before submitting them for Borough review and approval. In order to foster cooperation and to minimize subsequent delays, an informal conference should be arranged between the City and the Developer as early as possible. This will enable the City to answer questions as to the extent to which existing and proposed City facilities may affect the planned development, as well as questions regarding procedural requirements.

The City will then review the plans and specifications for each preliminary plat for compliance with these guidelines and will work with the Developer to correct any deficiencies prior to formal submittal to the Borough. The plans and specifications shall be developed under the supervision of a civil engineer licensed and in good standing with the State of Alaska and shall be sealed thereby.

Once the Developer has submitted an acceptable development package, the City will write a letter of non-objection to the Developer for submittal to the Borough.

1.3 Standards of Construction. The Developer shall incorporate in the plans and specifications all the details of construction necessary to obtain a well constructed, easily maintainable road and drainage system.

As-built plans and specifications shall be stamped by a professional civil engineer or registered land surveyor and shall be submitted to the City within one week of the completion of construction. The engineer or surveyor shall certify that the as-builts are an accurate depiction of what actually exists.

Part 2: Streets

2.1 Intent. The City's goal is to provide good, maintainable streets for the use of its residents. Thus, developers are encouraged to provide paved streets, curb and gutters, and a storm drain system for their subdivisions. The design of the street and drainage system shall be coordinated with all utility system designs to avoid conflicts.

The layout of street patterns should provide adequate and convenient access to all lots within a subdivision. Through traffic should be discouraged in residential subdivisions, but attention must be given to alternative access routes for emergency vehicles. Particular attention should be focused on Fairbanks North Star Borough, Title 17, and *A Policy on Geometric Design of Highways and Streets* by the American Association of State Highway and Transportation Officials. Street layout must consider placement of utilities to keep them inside or adjacent to the right-of-way (rather than along back or side lot line easements) to facilitate maintenance.

2.2 Types of Streets: Title 17 identifies and defines eight road classifications, with minimum standards established for each. The City will approve or direct the classification of proposed roads within the development, based on the following definitions:

Local Road: Local roads provide access to adjacent residential lots. Any road which does not fall into one of the other categories will be designated a local road.

Minor Collector: Minor collectors join one or more local roads to the surrounding road system and may provide access to adjacent lots as well. As a rule, any road or section of road which handles the traffic from more than fifty (50) residential lots itself, or serving one or more local roads with a cumulative total of more than fifty lots, will be designated as a minor collector or better. Any road serving commercial or industrial lots will be designated as a minor collector or better.

Major Collector: Major collectors will be designated by joint agreement between the Developer, the City and the State of Alaska DOT&PF.

Arterial: Arterials will be designated by joint agreement between the Developer, the City and the State of Alaska DOT&PF.

Frontage Road: Frontage roads provide access to lots that otherwise would be landlocked by a limited access arterial or major collector. Frontage road design will require close cooperation between the Developer, the City and the State of Alaska DOT.

Alley: Alleys provide secondary access to back or side lot lines of lots and may be a convenient route for utilities. Under no circumstances may an alley provide the sole access to a lot.

No pioneer access roads will be approved within the City.

2.3 Required Widths: Street widths required within the City are generally greater than those required by the Borough. The following are minimum widths for new developments:

Classification	Minimum Traveled Way	Minimum Shoulder Each Side	Minimum Right-of-Way
Local Road	22 ft.	4 ft.	60 ft.
Minor Collector	24 ft.	4 ft.	80 ft.
Major Collector	24 ft.	6 ft.	100 ft.
Arterial	24 ft.	8 ft.	100 ft.
Frontage Road	24 ft.	8 ft.	80 ft.
Alley	20 ft.	N/A	30 ft.

These are minimum widths. Traffic volumes, heavy turning movements, on-street parking requirements, presence of utilities and other factors may dictate greater widths. Minimum design speed shall be 30 mph for local roads, 40 for minor collectors and determined by the City and DOT/PF for others.

If curb, gutter, and storm drain are constructed, the minimum width of right-of-way may be reduced to fifty (50) feet for local roads and seventy (70) feet for minor collectors.

2.4 Alignment: Acceptable alignments will be based on the design speeds approved by the City for each road to be developed. Deflection angles greater than two degrees (2°) in the alignment of roads require connecting curves. Curves shall be engineered with a radius and super-elevation meeting AASHTO Guidelines.

The intersection of streets shall be as nearly at right angles as possible but not less than seventy-five degrees (75°) without approval of the City. In residential areas, three-way intersections are preferred to four-way intersections for safety. Four-way intersections should be at least two hundred feet (200') apart, when measured centerline to centerline. This distance to a three-way intersection may be reduced to one hundred feet (100'). Intersections should be designed with a

minimum corner radius of fifteen feet (15') on local roads and designed for a WB-50 semi-tractor trailer on all others. Corner lots shall have an appropriate radius corner at the intersection to maintain sufficient right-of-way width to allow for ditches around the turn radius.

Centerline of the constructed street shall be centered in the right-of-way.

2.5 Grades: Maximum grades are as defined in Title 17. Changes in grade shall be connected with vertical curves meeting AASHTO standards for sight distance at the design speed.

2.6 Grading and Surfacing: Asphalt pavement shall be the required surface for all newly developed streets within the City. The following minimum depths of embankment and surfacing are required:

Classification	Minimum Gravel	Minimum Crushed Rock	Minimum Asphalt Pavement
Local Road	12 in.	4 in.	1.5 in.
Minor Collector	18 in.	4 in.	1.5 in.
Major Collector	24 in.	4 in.	2 in.
Arterial	24 in.	4 in.	2 in.
Frontage Road	18 in.	4 in.	2 in.
Alley	12 in.	Not Required	Not Required

If the Developer elects to pave alleys, minimum pavement thickness shall be 1.5 inch.

These are minimum thicknesses. When adverse subsurface conditions, high traffic volumes or heavy anticipated truck traffic warrant, the City will require a pavement design calculation. The design method and design data must be submitted and approved by the City. Special measures may be required at specific locations such as slough crossings. The minimum depths may be reduced by the City when warranted by soils borings.

Except in super-elevated areas, the paved street surface shall slope two percent (2%) from the center crown into a drainage system on either side.

2.7 Materials and Construction: Proposed roads shall be cleared and grubbed to the limits of construction. No waste or clearing debris shall be placed within the roadway, except that a small amount of waste with roots and stumps removed may be placed on slopes and seeded.

Once clearing and grubbing are complete, the underlying material shall be compacted to 85% of maximum density prior to placing gravel.

2.7.1 Gravel. Gravel used in the construction of streets shall meet the requirements of Title 17, and be compacted to 90% or more of maximum density. The City will require the use of a filter-

type geotechnical fabric where necessary to protect the gravel embankment from contamination by underlying silt, such as at old slough crossings.

2.7.2 Crushed Rock. Crushed rock over which pavement is to be placed shall be made of pit run gravel, with specified gradation, hardness and fracture requirements acceptable to the City.

Compaction of crushed rock shall be to 95% of maximum density.

2.7.3 Prime Coat. Prime coat of a suitable type, grade and application rate shall be applied to the crushed gravel before installation of asphalt pavement or surface treatment.

2.7.4 Asphalt Pavement. Asphalt pavement shall be plant mixed and placed with a laydown machine. Asphalt cement grade and content, and aggregate gradation, fracture and hardness, shall be clearly specified by the design engineer and approved by the City. Minimum compaction shall also be specified.

2.7.5 Quality Control. Construction quality control testing by an independent laboratory will be required at the Developer's expense to ensure the specifications approved by the City are met. Type and frequency of such tests shall be spelled out in the specifications.

2.8 Traffic and Safety

2.8.1 Signing. Signing shall be in accordance with the *Manual of Uniform Traffic Devices with Alaska Supplement*. Minimum signing shall include intersection control, street names and speed regulation. Warning and informational signs shall be installed as warranted.

Sign post shall be 2 ½" x 2 ½" perforated steel tubing, with embedded 3" x 3" sleeves, or an acceptable substitute.

2.8.2 Stripping. At a minimum, centerline striping will be required on all paved streets. Shoulder striping will be required on collectors, arterials and frontage roads, and strongly encouraged on local roads. Striping and other traffic markings shall be designed and installed in accordance with the *Manual of Uniform Traffic Devices with Alaska Supplement*.

2.8.3 Sight Distance. Sight distance on horizontal and vertical curves and at intersections shall meet AASHTO standards for the approved design speed. Where additional clearing is required to meet this requirement, the affected area shall be grubbed and seeded with grasses. Easements or additional right-of-way shall be dedicated as required for maintenance of sight distance.

2.9 Miscellaneous Features

2.9.1 Cable Crossing: All buried cable crossings shall be installed either by the affected utility or under its direct supervision. An easement shall be platted for each crossing within the proposed development.

2.9.2 Driveways. Maximum driveway widths shall be twenty feet (20') for single family residences, thirty feet (30') for multiple family residences and commercial, and forty feet (40') for large commercial. Additionally, no driveway entrance shall be closer than fifty feet (50') to a street intersection, measured from shoulder of driveway to shoulder of street. More than one driveway entrance to a lot or greater driveway width may only be allowed with written authorization from the City. Driveways need not be constructed at the time of street construction, but they must be designed to the extent of location, width, profile and culvert size and length.

Driveways connected to streets with ditches for drainage will usually require culverts. A swale system may eliminate the necessity for these culverts. The driveway going across the swale must be properly sloped to avoid "bottoming out" of vehicles. To achieve this, the algebraic sum of the road side slope and the adjacent driveway slope shall not be more than fourteen percent (14%). Thus, at driveways, the backslope would be cut down to a maximum of six percent if the slope of the swale adjacent to the road is the typical eight percent (six inches in six feet). In no case shall driveways impede the flow of a swale or ditch.

Driveways which provide access to a paved street shall themselves be paved for at least 12' from the edge of street pavement.

Part 3. Drainage

3.1 Scope. The City's fundamental concern is that snow melt and rain runoff is drained away from structures and building lots. Runoff shall be conveyed to the ultimate disposal point through storm drains, culverts or ditches, but not over streets, sidewalks, curbs, or other public improvements. If an existing public system is not available or is of insufficient capacity, on-site disposal or retention is required with easements for maintenance access. The design of the drainage system shall comply with all requirements of the City of North Pole NPDES permit for Storm Water Discharge from Small Municipal Separate Storm Sewer Systems. (MS4)

Ideally, curb and gutters will be provided by the developer to immediately enhance property values and to avoid future assessments. However, a well designed drainage system consisting of ditches and culverts, or a swale with associated drainage system is an acceptable substitute.

3.2. Design Criteria.

3.2.1 Recurrence Interval. The minimum acceptable drainage system design shall be based on the five year peak rainfall rate for one hour for North Pole. Where circumstances warrant, the City may designate a longer recurrence interval. The design shall be based on the area being fully developed.

The drainage system design shall identify an ultimate destination for surface runoff compatible with other existing and future development in the area, and one or more routes by which runoff could be carried to that destination. Existing and necessary future easements shall be identified. The City may, at its discretion, waive construction of a portion of the ultimate runoff system provided that the interim drainage pattern is compatible with the ultimate system. Suitable ultimate destinations might include live sloughs or streams, an existing ditch system (provided it

has sufficient capacity and an ultimate destination of its own) or an engineered disposal method. Existing drainage systems shall not be obstructed, and may only be used if they are shown by the Developer to have sufficient capacity for the additional flow.

3.2.2 Snowmelt. Snow removal, including runoff, must be proved for in the drainage design. Snow dump sites with suitable drainage are desirable within the development if existing City sites are not readily available or are not of sufficient size to accommodate the necessary quantity of snow. Ditches should be wide enough for temporary snow storage on arterials, frontage roads and major collectors, and wide enough for the annual snow accumulation on minor collectors and local roads.

3.3 Ditches and Culverts. The minimum slope for ditches and culverts shall be twenty-five hundredths of one percent (0.25%). Drainage for relatively flat areas shall be achieved through roller coasting the ditch line a minimum grade of twenty-five hundredths of one percent (0.25%) and draining the ditch laterally at the low points.

Culverts used shall be corrugated steel pipe, with minimum diameter of twelve inches (12") for driveway crossings and eighteen (18") for street crossings. Culverts shall be covered a minimum depth of twelve inches (12").

The in slope of ditches shall be three to one (horizontal to vertical) or flatter, with maximum one to one acceptable for the back slope of the ditch. Maximum depth of ditch is four feet (4') for industrial and commercial areas and three feet (3') for residential neighborhoods and public areas such as schools and playgrounds.

3.4 Swales. Properly designed swales may be used on the sides of streets for drainage. Swales have much less depth than ditches and may allow the elimination of culverts at driveways. Swales may also require more associated lateral drainage systems than ditches.

The slope of the swale shall correspond to the adjacent street with a minimum slope of four-tenths of one percent (0.4%). The bottom of the swale shall be at least six inches (6") below and six feet (6') away from the road surface shoulder. From its low point, the swale shall slope upward to adjacent property at a maximum steepness of one foot vertical for each four feet horizontal. Slope shall extend into adjacent property as necessary.

3.5 Curb and Gutter. A minimum 0.25% grade should be maintained on paved roads with curbs, gutters and storm drain systems. Where the gutter discharges of a side drain or at a curb return, shoulders and slopes shall be protected against erosion.

3.6 Erosion Control. Wherever culverts, ditches, gutters or storm drains discharge to the slopes of a new or existing street, slope protection shall be provided.

3.7 Miscellaneous Features.

3.7.1 Insulation. Insulation shall be required on storm drains and culverts at locations where their placement reduces the effective depth of burial of water and sewer lines below minimum

required depths (four feet for water and five feet for sewer), increasing the risk of freezing. Storm drains and catch basins within seven feet of sewer main, water mains, and services shall be covered with at least two inches of urethane insulation. Extruded polystyrene may be an acceptable insulation for specific situations if approved by the City. If the Storm drain is within twelve inches of services at least six inches of urethane shall separate them.

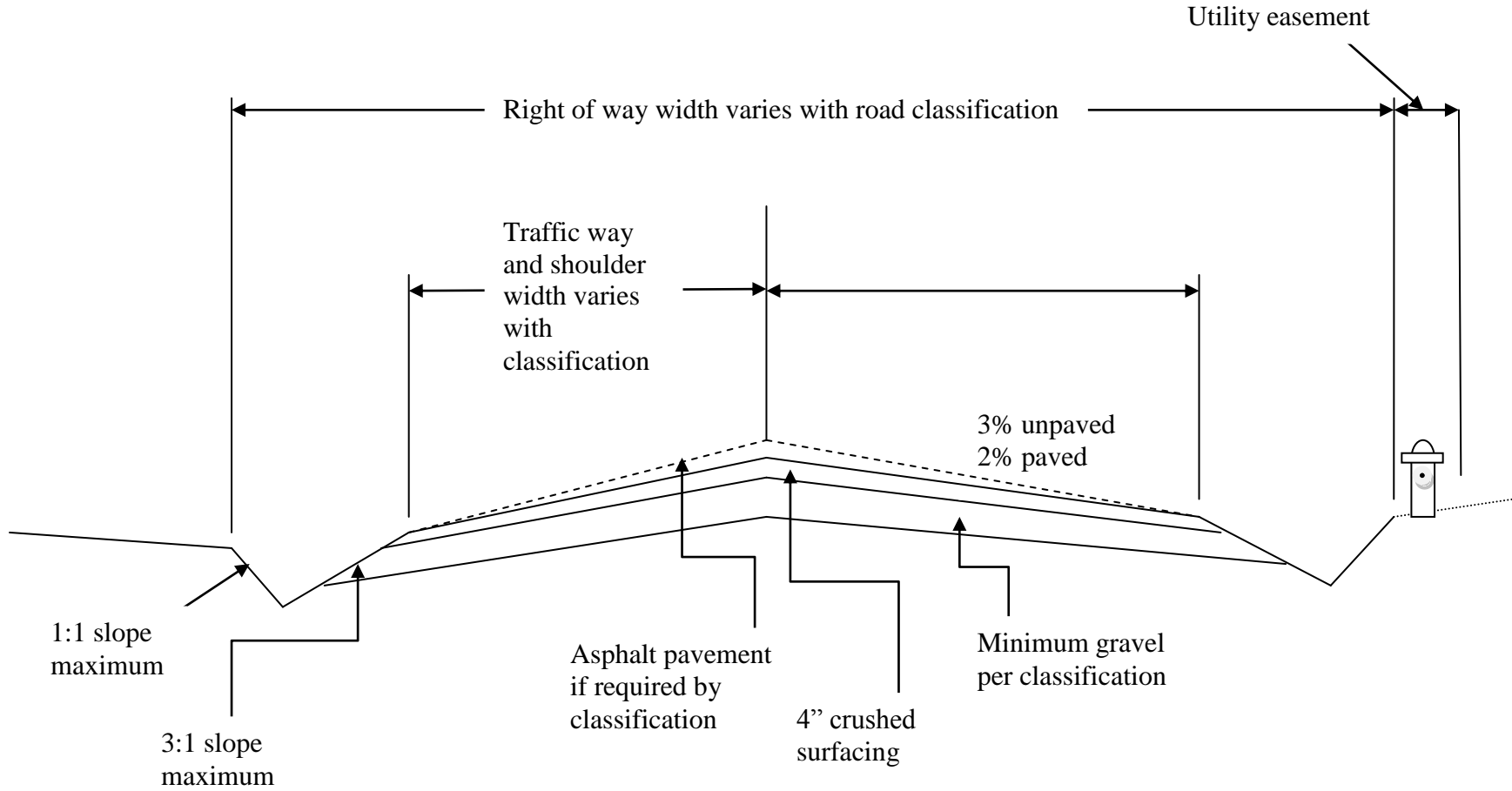
Proposed ditch crossings of existing and proposed water and sewer mains and services shall be checked for minimum burial depths, and insulated if necessary.

Part 4. Attachments

4.1 TYPICAL STREET SECTION.

4.2 TYPICAL STREET SECTION WITH SWALE ALTERNATIVE

4.1 Typical Street Section, City of North Pole Alaska



4.2 Typical Street Section with Swale Alternative

