Section 300

Design Criteria

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301. General Design Criteria

301.01. All designs shall be based on criteria listed in the Highway Standards for the Associated Highway Districts. Any variance from these Standards and/or use of other standards or design criteria must be submitted and reviewed in accordance with Section 500 of these Standards prior to use. Reference Manuals for design criteria (latest editions):

- MUTCD (Manual on Uniform Traffic Control Devices)
- AASHTO A Policy on the Geometric Design of Highways and Streets
- AASHTO Roadside Design Guide
- AASHTO Bridge Design Manual
- AASHTO Guide for the Development of Bicycle Facilities
- AASHTO Manuals as appropriate and not listed herein
- Idaho Transportation Department (ITD) Standard Drawings & Standard Specifications
- ITD Traffic Manual (online only)
- Idaho Standards for Public Works Construction (ISPWC) Standard Specifications and Standard Drawings
- Local Highway Technical Assistance Council (LHTAC) Manuals
- Public Right-of-Way Accessibility Guidelines
- Idaho Department of Environmental Quality, Stormwater Best Management Practices

302. Roadway Classification

302.01. All roadways within each Highway District shall be classified in accordance with the current version of the Federal Highway Act. All roads shall be classified as Arterials (Rural or Urban), Collectors or Local Residential Roads. It shall be the prerogative of the Highway District having jurisdiction over the area to define which roads are classified as Arterials, Collectors or Local Residential Roads. Refer to SD-1 for information on roads.

303. Public Right-of-Way

303.01. Arterial routes shall have a right-of-way between 80 and 120-feet in width with additional right-of-way or easement as needed to accommodate cut and fill sections.

303.02. Collectors shall have a right-of-way width of between 60 and 120-feet with additional right-of-way or easement as needed to accommodate cut and fill sections.

303.03. Local residential roads shall have a right-of-way width of between 60 and 80-feet with additional right-of-way or easement as needed to accommodate cut and fill sections.

303.04. Right-of-way for future connectivity of local public roads shall be provided. Additionally, roads providing access to 25 or more properties shall have multiple points of access from another public roadway.

303.05 Cul-de-sacs shall have a minimum right-of-way radius of 60-foot with additional right-of-way or easement as needed to accommodate cut and fill sections and snow storage area. Cul-de-sacs of a temporary nature may be allowed providing each right-of-way is shown on the plat and approved by the Highway District. A standard cul-de-sac layout is shown in the **Appendix**.

303.06. All intersecting rights-of-way lines at road intersections shall be connected by a curve having a minimum radius of 30 feet. All intersecting rights-of-way lines at cul-de-sac bulbs and private driveway approaches shall be connected by a curve having a radius of 20 to 30 feet or as directed by the Highway District.

303.07. There shall be a perpetual and exclusive minimum 10-foot roadway, drainage, and utility easement granted to the Highway District on each side of the right-of-way in addition to the right-of-way widths required in Sections 303.01 through and including 303.04.

304. Alignment

304.01. The following table is intended to show the minimum and maximum values for various parameters used in roadway design for the three classes of roads. Design centerline and super elevation rates shall comply with AASHTO, A Policy on Geometric Design of Highways and Streets based on agency designated classification and speed of roadway. The centerline profile of roads shall also be designed above the surrounding ground in flat and rolling terrain as defined in these Standards.

Design Parameters	Arterial	Collector	Local
Vertical Grades	Min. 0.5% Max. 6%	Min. 0.5% Max. 6%	Min. 0.5% Max 6% Max 2% Cul-de-sac
Horizontal Curvature On Centerline	7˚ max. Min. Radius 830’	11.5˚ max. Min. Radius 510’	25˚ max. Min. Radius 200’
Design Speed	35-55 mph	35-55 mph	35-45 mph
Superelevation	Max 0.06-ft/ft	Max. 0.06-ft/ft	Max 0.06-foot per foot
Minimum Runoff	150-feet	120-feet	110-feet
Angles of Intersection	80-90˚	80-90˚	80-90˚
Turn Lanes	Paved Width = 14' all locations, Length and Taper = per ITD Design Manual, designed by P.E. Refer to Section 306.06.		

304.02 Where development occurs within an Area of City Impact, the District will defer to City Roadway Design Standards.

305. Stopping and Passing Sight Distance

305.01. The stopping and passing sight distances shall be at least the minimum shown in the following table for the design speed used on the roadway.

Minimum Sight Distances in Feet

Design Speed, MPH	20	25	30	35	40	50	60
Stopping Sight Distance:							
Stopping Distance, ft.	115	155	200	250	305	425	570
K Value for:							
Crest Vertical Curve	7	12	19	29	44	84	151
Sag Vertical Curve	17	26	37	49	64	96	136
Passing Sight Distance:							
Passing Distance, ft. 2 lane	710	900	1090	1280	1470	1835	2135
K Value for:							
Crest Vertical Curve	180	289	424	585	772	1203	1628

Notes:

1. K value is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve, which will provide minimum sight distance.
2. According to AASHTO's Policy on Geometric Design of Highways and Streets (latest edition), the following values are assumed in sight distance design:
   a. Driver's eye height: 3.50 feet for computation of stopping sight distance and passing sight distance.
   b. Object height: 3.50 feet for computation of passing sight distance and 2.00 feet for computation of stopping sight distance.
   c. Perception/reaction time: assumed equal to 2.5 sec(s) for stopping sight distance.

306. Roadway Cross Section

306.01. The Roadway Standard Drawing sheets (SD-1 and SD-2) in the **Appendix** depict the cross section characteristics for arterial, collector, and local residential roads. The pavement width is exclusive of the pavement requirements for bike/pedestrians, for paved shoulders or widening on corners. The pavement width for the class of road will be set

by the individual Highway District. The individual Highway District may also require bike/pedestrian paths, paved shoulders and/or pavement widening on corners (on narrow roads, on tight radius curves, or on roads with 5 percent or greater truck traffic.

306.02. Local residential roads are intended to provide access to local properties and provide connectivity or alternative access to nearby subdivisions or parcels of land. The Highway District will determine the paved surface width based on the following criteria:

1. A 22-foot paved surface width may be allowed if:
    - Topographical constraints limit construction of a 28 foot paved surface width or the local residential road serves a subdivision of less than 30-lots and there is no potential for future connectivity to adjacent parcels.
2. A 24-foot paved surface width may be allowed if:
    - Topographical constraints limit construction of a 28 foot paved surface width or the local residential road within a subdivision or travel shed has no potential to be classified as a collector.
3. A 28-foot paved surface width will be required if:
    - Local residential road functions as a collector and is funneling traffic to main roadways and existing collectors or serves a travel shed that warrants a wider roadway.

The applicant must meet with the Highway District early in the project development process to discuss the paved surface width for local residential roads. The pavement width determination will be at the sole discretion of the Highway District Board of Commissioners.

306.03. Collector roads are intended to link neighborhoods or areas of homogeneous land use with the arterial roadway system. These roadways not only serve traffic movements between arterials and local roads, but also serve through traffic within local areas.

The Highway District will determine the paved surface width for collector roads based on the following criteria:

1. A 24-foot paved surface width may be allowed if:
    - Topographical constraints limit construction of a 28-foot paved surface width, and the Highway District determines that the roadway alignment and cross section proposed are consistent with the anticipated traffic volume and composition.
2. A 28-foot paved surface is the standard width for a rural collector within the Associated Highway Districts' jurisdiction.
3. A pavement width greater than 28-feet may be required at the Highway Districts' discretion to provide an acceptable level of service to accommodate the anticipated

traffic volume and composition, considering the area topography, roadway alignment, and other design factors.

306.04. The typical curb and gutter section shown on the Roadway Standard Drawing SD-2 may be required on subdivisions with a density equal to or greater than one home per acre. Individual Highway Districts shall make that determination at the time of Plat Review by the Highway District.

306.05. Approaches shall be in conformance with the Local Highway Technical Assistance Council, "Manual for Use of Public Right-of-Way Standard Approach Policy," latest edition with the following exceptions. All approaches serving primarily truck traffic shall use a "curb return approach" in accordance with Fig. IV, C (SD-6). The radii shall be adequate to accommodate the truck turning movements and the maximum approach width shall be 40-feet. See Figure IV, C in the **Appendix** SD-6.

306.06. Turn lane, traffic signals, and other traffic control features in new developments shall be designed by a licensed Professional Engineer registered in Idaho.

306.06.1 For Safety, turn lanes shall be installed at all new or modified approaches based on the following traffic volumes:

Right-Turn Lanes[1]		Left-Turn By-Pass Lane[2]		Left Turn Lane[2]	
Through Volume, vph[3]	Turn Volume[4]	Opposing Through Volume, vph	Turn Volume	Opposing Through Volume, vph	Turn Volume
200	5	50	5	200	5
				100	5<19
				50	20 or more

1. Source, NCHRP Report 279, Table 4-7 (Idaho)
2. Source, NCHRP Report 745, Table 1
3. 10% of the Average Daily Traffic Volume.
4. 10% of the total estimated Home-Based Trips

Approach trip generation shall be based on Trip Generation Estimates from the 2005 Spokane and Kootenai County Regional Travel Survey, estimating Home Based Trips of 5 per residential unit, Source KMPO

306.07. Bicycle and pedestrian paths, new and extensions, may be required by the Highway District for new developments and on major roadway reconstruction projects in accordance with Highway District, Kootenai Metropolitan Planning Organization, Idaho Transportation Department, and local City Master Plans.

Bicycle and pedestrian facility classes to be considered should be consistent with these facility descriptions:

- Class I: A Class I bicycle facility is a separated multiple use path 10 to 14 feet wide. The path is physically separated from motor vehicle traffic by a 10-foot minimum open space or barrier of 4.5 feet.
- Class II: A Class II bicycle facility has a 4- to 6-foot portion of the roadway designated for preferential use by bicyclists.
- Class III: A Class III bicycle facility is a shared facility where bicyclists and motorists share the same travel lane. The travel lane should be 14 feet in width.

All bike and pedestrian projects should be designed to meet Americans with Disabilities Act (ADA) accessibility standards and American Association of State Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (Green Book) guidelines whenever possible.

307. Drainage

307.01. All drainage for the development shall be designed by a Professional Engineer licensed in Idaho. Drainage plans shall be reviewed and approved by the Highway District in conjunction with the roadway plans. The minimum design flood for culvert sizing will be the 50-year flood event unless otherwise directed by the District. Any disruption of the normal drainage pattern of the area to be developed must have special consideration to facilitate future drainage of this area. It shall be the responsibility of the Developer to secure a Grading Permit from Kootenai County and to comply with the following requirements from the Highway Districts:

307.01.a. Approach Permit: Contractors shall have a valid permit from Kootenai County (or other local jurisdiction) for site and stormwater. This may include, but not be limited to, the following:

- A requirement that contractors have a US EPA Construction General Permit (CGP)
- A Notice of Intent (NOI) has been filed with US EPA, where applicable
- Permittees should be SEEP certified; a SEEP-certified foreman shall be on the project

The Kootenai County permit shall be documented in the Approach Permit.

307.01.b. A standard stabilized construction entrance and the requirement that Best Management Practices (BMP) are in place to protect the Highway District rights-of-way from stormwater, sedimentation, and erosion from construction zones. Site Plans should show stormwater drainage direction pre- and post-construction. Additionally, erosion and sedimentation controls, culvert locations, sheet flow direction, and conveyances should be clearly noted and provided to the Highway District with jurisdiction as part of the Approach Permit.

307.01.c. Permittees shall cover the cost for monitoring any/all stormwater discharge.

307.02. Culverts used for drainage purposes shall be corrugated steel or corrugated high-density polyethylene pipe (HDPE) Type C or Type S with approval from the Highway District. Steel culvert material thickness and cover over the top of the pipe to the road finish grade shall be in conformance with the following table and as approved by the Highway District. HDPE pipe specifications must be submitted with bury and cover details to the Highway District for approval.

Diameter (in.)	Steel Thickness (in.)	Minimum Cover Required (in.)	Apron Required
12	0.064	12	NO
15	0.064	12	NO
18	0.064	12	Yes
21	0.064	12	Yes
24	0.064	12	Yes
30	0.064	24	Yes
36	0.064	24	Yes

Corrugated metal pipe shall have 2⅔-inch x ½-inch corrugations. Culverts or multiplate installations larger than 36 inches in diameter or any structure under fills greater than 5 feet in height shall be designed by a Professional Engineer licensed in the State of Idaho.

All culvert installations shall be in accordance with the manufacturer's requirements. The installer shall provide a copy of the installation requirements to the Highway District prior to installing culvert. Special ditch grading may be required for culverts over 12 inches in diameter and for polyethylene culverts to maintain the cover and the flow line.

307.03. Culverts under all roadways shall be a minimum of 18 inches in diameter until a length of 70-feet is reached. All culverts over 70-feet in length shall be 24-inches or more in diameter as required to accommodate the design flow. Culverts under driveway approaches shall have a minimum diameter of 12 inches and a minimum length of 40 feet (or as directed by the Highway District), meeting the requirements of 307.02.

307.04. All necessary drainage easements for maintenance of drainage paths and structures shall be shown and recorded on the plat as a part of the approved plat. Drainage easements necessary for draining stormwater across private property shall be shown on the plat with language requiring the underlying property owner to maintain said easement in a manner that will not impede or change the water velocity.

307.05. Disruption of natural drainage ditches and subsequent use of the roadway ditch to convey the natural drainage will not be acceptable.

307.06. Drywells may be used in special circumstances where all other possibilities of taking care of storm drainage water have been explored and there is no feasible alternate to drywell installation. Should drywells be necessary they will be constructed to the standards as shown in the **Appendix**. It shall be the responsibility of the Developer to secure all permits and pay all fees for installation of the drywells.

307.07. When a curb and gutter roadway section is proposed, a complete storm sewer system must be designed and constructed under the supervision of a Professional Engineer licensed in the State of Idaho.

307.08. The increase in runoff rate generated by developments shall comply with any and all applicable Kootenai County ordinances. The developer shall be responsible for obtaining all necessary permits. Copies of all permits must be submitted with improvement plans for review by the Highway District. Perpetual maintenance of the stormwater by the development must be on file at the Highway District before a development or a final plat can be formally reviewed and/or accepted.

308. Structures

308.01. Bridge structures, structures 20 feet in length or longer, shall be designed in accordance with 1) "Standard Specifications for Highway Bridges", latest edition, with supplements thereto prepared by the American Association of State Highway and Transportation Officials and 2) Idaho Transportation Development's Bridge Design LRFD Manual, latest edition. The minimum width of a bridge structure from the face-to-face of curb or the face-to-face of the guardrail or bridgerail should match the width of the approach roadway guardrail. The vertical clearance above waterways should be 2 feet above the design flood surface and 16 feet over other roadway surfaces. Only structures of steel or reinforced concrete shall be used.

308.02. Retaining walls shall be reinforced concrete, bin walls, or concrete crib walls or other approved retaining wall system. All retaining wall structures shall be designed by a Professional Engineer licensed in the State of Idaho and shall be approved by the applicable Highway District prior to construction.

309. Signing, Traffic Control, and Construction

309.01. All traffic control signing shall be included in the design plans, shall be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, and be installed by the developer in accordance with the MUTCD.

309.02. All construction signing and permanent signing shall conform to the MUTCD, latest edition.

309.03. Sign-posts shall be metal square tubing type E-1 with type E-1 anchor post sleeve or 4 x 4 treated wood to be decided by each Highway District. See **Appendix** for standard drawing.

309.04. Special signing requested by other agencies or adjacent landowners shall meet MUTCD standards and shall be approved by the Highway District. Signs and posts placed within the clear zone shall not be constructed in a manner that creates a safety hazard.

310. Guardrail

310.01. Guardrail may be necessary in certain areas depending upon the warrants for protecting the traveling public. The Highway District reserves the right to determine the need for guardrail under each separate circumstance. The warrants for determining the need for guardrail shall be made using the Idaho Transportation Department Design Manual or using the American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide for Selecting, Locating, and Designing Traffic Barriers, latest edition.

310.02. The type of guardrail to be installed shall be approved by each individual Highway District as the location dictates.

311. Striping or Pavement Markings

311.01. Each Highway District will determine where pavement markings will be required. Should centerline striping or other pavement markings be required, they will be constructed in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition. The spacing, location, and width of markings will be determined on an individual basis by the appropriate Highway District. Paint quality shall be the same as that used by the Idaho Transportation Department for their pavement marking.

312. Bicycle and Pedestrian Pathways

312.01. Alternative forms of transportation, including walking, bicycle riding, and bus transportation are encouraged. Each Highway District will consider each of these forms of transportation when reviewing a new development or road improvement project. Improvements to extend routes or provide additional linkages or safety will be evaluated as necessary to meet adjacent City Master Plans or Kootenai Metropolitan Planning Organization's (KMPO) Regional Transportation Master Plan.