

TABLE 7 – CHANGES TO THE TRAIL CLASS MATRIX

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
<p>Tread & Traffic Flow</p>	<ul style="list-style-type: none"> ♦ Tread intermittent and often indistinct ♦ May require route finding ♦ <i>Single lane, with no allowances constructed for passing</i> ♦ <i>Predominantly</i> native materials only 	<ul style="list-style-type: none"> ♦ Tread <i>continuous and</i> discernible, and continuous, but narrow and rough ♦ <i>Single lane, with minor</i> Few or no allowances constructed for passing ♦ <i>Typically</i> native materials 	<ul style="list-style-type: none"> ♦ Tread <i>continuous and</i> obvious and continuous ♦ <i>Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass</i> Width accommodates unhindered one-lane travel with occasional constructed passing sections ♦ Typically Native <i>or imported</i> materials 	<ul style="list-style-type: none"> ♦ Tread wide and relatively smooth with few irregularities ♦ <i>Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass</i> Width may consistently accommodate two-lane travel ♦ <i>Double lane where traffic volume is high and passing is frequent</i> ♦ Native or imported materials ♦ May be hardened 	<ul style="list-style-type: none"> ♦ <i>Tread wide, firm, stable, and generally uniform</i> ♦ <i>Single lane, with frequent turnouts where traffic volume is low to moderate</i> Width generally accommodates two-lane and two-directional travel, or provides frequent passing turnouts ♦ <i>Double lane where traffic volume is moderate to high</i> ♦ Commonly hardened with asphalt or other imported material
<p>Obstacles</p>	<ul style="list-style-type: none"> ♦ Obstacles common, <i>naturally occurring, often substantial, and intended to provide increased challenge</i> ♦ Narrow passages; brush, steep grades, rocks and logs present 	<ul style="list-style-type: none"> ♦ Obstacles occasionally present <i>may be common, substantial, and intended to provide increased challenge</i> ♦ Blockages cleared to define route and protect resources ♦ Vegetation may encroach into trailway 	<ul style="list-style-type: none"> ♦ Obstacles infrequent <i>may be common, but not substantial or intended to provide challenge</i> ♦ Vegetation cleared outside of trailway 	<ul style="list-style-type: none"> ♦ <i>Obstacles infrequent and insubstantial</i> Few or no obstacles exist ♦ Grades typically < 12% ♦ Vegetation cleared outside of trailway 	<ul style="list-style-type: none"> ♦ <i>Obstacles not present</i> No obstacles present ♦ Grades typically < 8%

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Constructed Features & Trail Elements	<ul style="list-style-type: none"> ◆ <i>Structures</i> minimal to non-existent ◆ Drainage is functional <i>typically accomplished without structures</i> ◆ <i>Natural fords</i> ◆ <i>Typically no bridges</i> No constructed bridges or foot crossings 	<ul style="list-style-type: none"> ◆ Structures of limited size, scale, and number <i>quantity</i>; <i>typically constructed of native materials</i> ◆ Drainage is functional ◆ Structures adequate to protect trail infrastructure and resources ◆ <i>Natural fords</i> Primitive foot crossings and fords ◆ <i>Bridges as needed for resource protection and appropriate access</i> 	<ul style="list-style-type: none"> ◆ Structures (walls, steps, drainage, raised trail) may be common and substantial; <i>constructed of imported or native materials</i> ◆ <i>Natural or constructed fords</i> ◆ Bridges as needed for resource protection and appropriate access ◆ Generally native materials used in Wilderness 	<ul style="list-style-type: none"> ◆ Structures frequent and substantial; <i>typically constructed of imported materials</i> ◆ <i>Constructed or natural fords</i> ◆ <i>Bridges as needed for resource protection and user convenience</i> Substantial bridges are appropriate at water crossings ◆ Trailside amenities may be present 	<ul style="list-style-type: none"> ◆ Structures frequent or continuous <i>and typically constructed of imported materials</i> ◆ May include bridges, boardwalks, curbs, handrails, trailside amenities, <i>and similar features</i> ◆ Drainage structures frequent; may include culverts and road-like drainages
Signs²	<ul style="list-style-type: none"> ◆ Minimum required ◆ <i>Route identification signing limited to junctions</i> ◆ <i>Route markers present when trail location is not evident</i> ◆ <i>Regulatory and resource protection signing infrequent</i> Generally limited to regulation and resource protection ◆ <i>Destination signing, unless required, generally not present</i> No destination signs present ◆ <i>Information and interpretive signing generally not present</i> 	<ul style="list-style-type: none"> ◆ Minimum required for basic direction ◆ <i>Route identification signing limited to junctions</i> ◆ <i>Route markers present when trail location is not evident</i> ◆ <i>Regulatory and resource protection signing infrequent</i> Generally limited to regulation and resource protection ◆ <i>Destination signing typically infrequent outside wilderness areas; generally not present in wilderness areas</i> Typically very few or no destination signs present ◆ <i>Information and interpretive signing uncommon</i> 	<ul style="list-style-type: none"> ◆ Regulation, resource protection, user reassurance ◆ <i>Route identification signing at junctions and as needed for user reassurance</i> ◆ <i>Route markers as needed for user reassurance</i> Directional signs at junctions, or when confusion is likely ◆ <i>Regulatory and resource protection signing may be common</i> ◆ <i>Destination signing likely outside wilderness areas; generally not present in wilderness</i> Destination signs typically present ◆ Information and interpretive signs may be present outside of wilderness 	<ul style="list-style-type: none"> ◆ Wide variety of signs likely present ◆ <i>Route identification signing at junctions and as needed for user reassurance</i> ◆ <i>Route markers as needed for user reassurance</i> ◆ <i>Regulatory and resource protection signing common</i> ◆ <i>Destination signing common outside of wilderness areas; generally not present in wilderness areas</i> ◆ <i>Information and interpretive signs may be common outside wilderness areas</i> Informational signs likely (outside of Wilderness). ◆ Interpretive signs possible (outside of Wilderness) ◆ Trail Universal Access <i>Accessibility</i> information likely displayed at trailhead 	<ul style="list-style-type: none"> ◆ Wide variety of signage is present ◆ <i>Route identification signing at junctions and for user reassurance</i> ◆ <i>Route markers as needed for user reassurance</i> ◆ <i>Regulatory and resource protection signing common</i> ◆ <i>Destination signing common</i> ◆ Information and interpretive signs <i>common</i> likely ◆ Trail Universal Access <i>Accessibility</i> information likely displayed at trailhead

Trail Attributes	Trail Class 1 Minimally Developed	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Typical Recreation Environments & Experience ³	<ul style="list-style-type: none"> Natural, unmodified ROS: <i>Typically Primitive to Roaded Natural</i> Often Primitive setting, but may occur in other ROS settings WROS: <i>Typically Primitive to Semi-Primitive</i> Primitive 	<ul style="list-style-type: none"> Natural, essentially unmodified ROS: Typically <i>Primitive to Roaded Natural</i> Primitive to Semi-Primitive setting WROS: <i>Typically</i> Primitive to Semi-Primitive 	<ul style="list-style-type: none"> Natural, primarily unmodified ROS: Typically <i>Primitive to Roaded Natural</i> Semi-Primitive to Roaded Natural setting WROS: <i>Typically</i> Semi-Primitive to Transition 	<ul style="list-style-type: none"> May be modified ROS: Typically Roaded Natural <i>Semi-Primitive</i> to Rural WROS: <i>Typically Portal or Transition</i> (rarely present in Wilderness) 	<ul style="list-style-type: none"> Can <i>May</i> be highly modified Commonly associated with visitor centers or high-use recreation sites ROS: Typically <i>Roaded Natural to Urban</i> Rural Roaded Natural to Urban <i>Generally</i> not present in Wilderness

¹ For *the National Quality Standards for Trails, Potential Appropriateness of Trail Classes for Managed Uses* Trail Class and Managed Use Application Guide, Design Parameters, and other related guidance, refer to FSM 2353, FSH 2309.18, and other applicable agency references. The National Quality Standards are posted under the Trails link at www.fs.fed.us/r3/measures.

² For standards and guidelines for the use of signs and posters on trails, refer to the *Sign and Poster Guidelines for the Forest Service (EM-7100-15)*.

³ These Trail Class and ROS/WROS setting combinations represent commonly occurring combinations, although trails in all Trail Classes may and do occur in all settings. For guidance on the application of the Recreation Opportunity Spectrum and Wilderness Recreation Opportunity Spectrum, refer to FSM 2310 and 2353 and FSH 2309.18.

b. Changes To The Design Parameters

The Forest Service is replacing the trail guides in the FSH with the Design Parameters. These interim final directives include Design Parameters for Hiker/Pedestrian, Pack and Saddle, Bicycle, ATV, Motorcycle, Cross-Country Ski, and Snowmobile. The Barrier-Free Trail Guide has additionally been made obsolete by adoption of the FTAG. To enhance consistency, the agency has defined the factors in the Design Parameters, including Design Tread Width, Design Surface, Design Grade, Design Cross Slope, Design Clearing Width and Height, and Design Turns (FSH 2309.18, sec. 05).

The Forest Service has made several revisions to the Design Parameters in the interim final directives, as shown in Tables 8 through 14. Tables 8 through 14 do not include the Design Parameters for Four-Wheel Drive Vehicle Greater Than 50 Inches in Width or the Design Parameters for Snowshoe, which are both new sets of Design Parameters and are included in the interim final directives under FSH 2309.18, sections 23.23, exhibit 01, and 23.32, exhibit 01. The following summarizes the key substantive changes common to each set of Design Parameters. New text in Tables 8 through 14 is shown in italicized font, and deleted text is shown with ~~strikeout~~.

Design Tread Width

To provide improved guidance for trails where it is determined that a double-lane tread width is needed, the agency has validated, revised, or identified double-lane tread widths for each set of Design Parameters. These double-lane tread widths reflect the desired level of challenge and recreation experience for each Trail Class. In addition, the double-lane tread widths provide for unhindered passage for the Designed

Use without special maneuvering when passing or traveling side by side.

The agency has added a subcategory for Design Tread Width called, “Structures (Minimum Width),” to each set of Design Parameters to provide better guidance regarding the minimum usable tread width on trail structures such as bridges, puncheon, and turnpike.

Design Surface

The agency has revised the discussion of Design Surface Type to provide guidance for all Trail Classes regarding when to construct the design surface of native or imported material and regarding the roughness of the trail surface.

Under Design Surface, the row previously labeled “Obstacles” included guidance on surface obstacles and protrusions. In the interim final directives, the agency has split this row into two rows labeled, “Protrusions” and “Obstacles (Maximum Height),” to provide increased design flexibility and enhance clarity and consistency in application of the guidelines regarding protrusions and obstacles. The guidance regarding protrusions includes a “less than or equal to” value for the height of surface protrusions and indicates whether they are common or continuous. The guidance regarding obstacles identifies a maximum height for surface obstacles.

Design Grade

The agency has revised the values for Design Target Grade to present them as a range of values for all Trail Classes (rather than a range of values in some Design Parameters and a “less than or equal to” value in others). In addition, the agency has revised the values for Design Target Grade in most Trail Classes to identify a minimum percentage for the lower limit of the range, since trails with a 0 percent grade typically

do not provide adequate drainage. For trails in Trail Classes 4 and 5, the minimum value is 2 percent and 0 percent, respectively, because these Trail Classes typically have harder, more durable surfaces that can more readily provide adequate drainage on flatter grades than trails with a native surface, which is more typically encountered on trails in Trail Classes 1 through 3. The lower value in the range varies somewhat among uses because some are more likely to trigger erosion than others.

In addition, the agency has increased the tolerances for Maximum Pitch Density to reflect more accurately the desired levels of challenge for each Trail Class and the actual maximum grade tolerances of many NFS trails. The upper limit for Maximum Pitch Density depends upon the applicable trail grade and factors concerning sustainability of the trail, as discussed in one of the footnotes to each set of Design Parameters.

Design Clearing

The agency has revised the values for Design Clearing Width for each Trail Class to reflect the entire clearing width (that is, the tread width, plus the distance from the edge of the trail tread needed to accommodate the Designed Use), rather than the entire clearing width for some Trail Classes and merely the distance from the edge of the trail tread for others, as in the proposed directives. This standard approach to Design Clearing Width is consistent with the revised definition for that term and improves clarity and consistency in application of the Design Parameters. In addition, the agency has verified the Design Clearing Limits across each set of Design Parameters against a hypothetical doorway to ensure that the minimum clearing widths provide adequate clearance for the Designed Use in each Trail Class.

The agency has added a new category called “Shoulder Clearance,” defined as “the minimum horizontal and vertical clearance of obstructions (for example, removal of bicycle pedal or motorcycle peg bumpers) immediately adjacent to the trail tread that is determined to be appropriate for accommodating the Managed Uses of the trail” (FSH 2309.18, sec. 05). This attribute will provide useful guidance and latitude in situations where a manager determines it is appropriate or necessary to leave logs or other obstacles on the ground within the design clearing limits for the trail (e.g., to keep users on the trail tread or to keep other users off the trail).

Design Turn

In the interim final directives, the agency has defined “Design Turn Radius” as “the minimum horizontal radius required for a Managed Use to negotiate a curve (e.g., a switchback, climbing turn, or horizontal turn) in a single maneuver” (FSH 2309.18, sec. 05).

TABLE 8 – CHANGES TO THE HIKER/PEDESTRIAN DESIGN PARAMETERS

Designed Use HIKER/PEDESTRIAN		Trail Class 1	Trail Class 2	Trail Class 3 ^{1 2}	Trail Class 4 ^{1 2}	Trail Class 5 ^{1 2}
Design Tread Width	Wilderness <i>(Single Lane)</i>	0" – 12"	6" – 18"	12" – 24" Exception: May be 36" – 48" at switchbacks, turnpikes, fords and steep side slopes	18" – 24" 24" Exception: May be 36" – 48" at switchbacks, turnpikes, fords and steep side slopes	Not applicable
	Non-Wilderness <i>(Single Lane)</i>	0" – 12"	6" – 18"	18" – 36" 18" – 48"	24" – 60" 32" – 96"	36" – 72" 36" – 120"
	Non-Wilderness <i>(Double Lane)</i>	36"	36"	36" – 60"	48" – 72"	72" – 120"
	Structures <i>(Minimum Width)</i>	18"	18"	18"	36"	36"
Design Surface ³	Type	Native, un-graded <i>May be continuously rough</i> Intermittent, rough	Native, limited grading <i>May be continuously rough</i> Continuous, rough	Native with some onsite borrow or imported material <i>where needed for stabilization and occasional grading</i> <i>Intermittently rough</i>	<i>Native, with improved sections of borrow or imported material and routine grading</i> <i>Minor roughness</i> Imported materials or hardening is common	<i>Imported material likely and routine grading</i> Uniform, firm, and stable
	Protrusions	≤ 24" <i>Likely common and continuous</i>	≤ 6" <i>May be common and continuous</i>	≤ 3" <i>May be common, but not continuous</i>	≤ 3" <i>Uncommon and not continuous</i>	<i>No protrusions</i>
	Obstacles <i>(Maximum Height)</i>	24" Roots, rocks, logs, steps to 24"	14" Roots, rocks, and log protrusions to 6"; steps to 14"	10" Generally clear; Protrusions to 3"; steps to 10"	8" Smooth, few obstacles; Protrusions 2" – 3"; steps to 8"	<i>No obstacles</i> Smooth, no obstacles; Protrusions <2"
Design Grade ^{2 3}	Target Grade ³⁻ (≥90% of Trail)	5% – 25% ≤ 25%	5% – 18% ≤ 18%	3% – 12% ≤ 12%	2% – 10% ≤ 10%	2% – 5% ≤ 5%
	Short Pitch Maximum ⁴⁻ (Up to 200' lengths)	40%	35%	25%	15%	5% ≤ 10% FSTAG: 5% – 12%
	Maximum Pitch Density ⁵⁻	20% – 40% of trail ≤ 10% of trail	20% – 30% of trail ≤ 5% of trail	10% – 20% of trail ≤ 5% of trail	5% – 20% of trail ≤ 3% of trail	0% – 5% of trail ≤ 3% of trail

TABLE 8 – CHANGES TO THE HIKER/PEDESTRIAN DESIGN PARAMETERS (CONTINUED)

Designed Use HIKER/PEDESTRIAN		Trail Class 1	Trail Class 2	Trail Class 3 ^{1 2}	Trail Class 4 ^{1 2}	Trail Class 5 ^{1 2}
Design Cross Slope	Target Range <i>Cross Slope</i>	<i>Natural side slope</i> Not applicable	5% – 20%	5% – 10%	3% – 7%	2% – 3% (or crowned)
	Maximum <i>Cross Slope</i>	Up to Natural side-slope	<i>25%</i> Up to natural side-slope	15%	10%	3%
Design Clearing	Height	6'	6' – 7'	<i>7' – 8'</i> 8'	<i>8' – 10'</i> 8'	<i>8' – 10'</i> 8' – 10'
	Width	≥ 24" <i>Some vegetation may encroach into clearing area</i> Sufficient to define trail corridor	<i>24" – 48"</i> <i>Some light vegetation may encroach into clearing area</i> 24" – 36", with some encroachment into clearing area	<i>36" – 60"</i> 12" – 18" outside of tread edge	<i>48" – 72"</i> 12" – 18" outside of tread edge	<i>60" – 72"</i> 12" – 24" outside of tread edge
	<i>Shoulder Clearance</i>	3" – 6"	6" – 12"	12" – 18"	12" – 18"	12" – 24"
Design Turn	Radius	No minimum	2' – 3'	3' – 6'	4' – 8'	<i>6' – 8'</i> 6' – 12'

In addition to the footnotes common to all set of Design Parameters (listed above), the following footnote appears on the Hiker/Pedestrian Design Parameters:

Footnote referencing Trail Classes 3, 4 and 5: “Trail Classes 3, ~~Trail Class 4,~~ and ~~Trail Class 5,~~ in particular, have the potential to be accessible. If assessing or designing trails for accessibility, refer to the Forest Service Trail Accessibility Guidelines (FSTAG) for more specific technical provisions and tolerances (*FSM 2350*).”

TABLE 9 – CHANGES TO THE PACK AND SADDLE DESIGN PARAMETERS

Designed Use PACK AND SADDLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	Wilderness <i>(Single Lane)</i>	Typically not designed or actively managed for equestrians, although use may be allowed	12" – 18" <i>May be up to 48" along steep side slopes</i> <i>48" – 60" or greater along precipices</i> Exception: May be to 48" at switchbacks, turn-pikes, fords and steep side slopes	18" – 24" 42" – 24" <i>May be up to 48" along steep side slopes</i> <i>48" – 60" or greater along precipices</i> Exception: May be to 48" at switchbacks, turn-pikes, fords and steep side slopes; up to 60" along precipices	24" <i>May be up to 48" along steep side slopes</i> <i>48" – 60" or greater along precipices</i> Exception: May be to 48" at switchbacks, turn-pikes, fords and steep side slopes; up to 60" along precipices	Typically not designed or actively managed for equestrians, although use may be allowed
	Non-Wilderness <i>(Single Lane)</i>		12" – 24" <i>May be up to 48" along steep side slopes</i> <i>48" – 60" or greater along precipices</i> (with above exceptions)	18" – 48" <i>48" – 60" or greater along precipices</i> (with above exceptions)	24" – 96" 36" – 96" <i>48" – 60" or greater along precipices</i>	
	Non-Wilderness <i>(Double Lane)</i>		60"	60" – 84"	84" – 120"	
	Structures <i>(Minimum Width)</i>		<i>Other than bridges: 36"</i> <i>Bridges without Handrails: 60"</i> <i>Bridges with Handrails: 84" clear width</i>	<i>Other than bridges: 36"</i> <i>Bridges without Handrails: 60"</i> <i>Bridges with Handrails: 84" clear width</i>	<i>Other than bridges: 36"</i> <i>Bridges without Handrails: 60"</i> <i>Bridges with Handrails: 84" clear width</i>	
Design Surface²	Type	Native, limited grading <i>May be frequently rough</i>	Native with some onsite borrow or imported material <i>where needed for stabilization and occasional grading</i> <i>Intermittently rough</i>	<i>Native, with improved sections of borrow or imported material and routine grading</i> <i>Minor roughness</i> Native with some imported materials or stabilization		
	Protrusions	< = 6" <i>May be common and continuous</i>	< = 3" <i>May be common, but not continuous</i>	< = 3" <i>Uncommon and not continuous</i>		
	Obstacles <i>(Maximum Height)</i>	12" Roots, rocks, logs to 12"	6" Generally clear; Occasional protrusions to 6"	3" Smooth, few obstacles; Occasional protrusions 2" – 3"		

TABLE 9 – CHANGES TO THE PACK AND SADDLE DESIGN PARAMETERS (CONTINUED)

Designed Use PACK AND SADDLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade ^{1, 2}	Target Grade ²⁻ (≥90% of Trail)		5% – 20% ≤ 20%	3% – 12% ≤ 12%	2% – 10% ≤ 10%	
	Short Pitch Maximum ³⁻ (Up to 200' lengths)		30%	20%	15%	
	Maximum Pitch Density ⁴⁻		15% – 20% of trail ≤ 5% of trail	5% – 15% of trail ≤ 5% of trail	5% – 10% of trail ≤ 3% of trail	
Design Cross Slope	Target Range <i>Cross Slope</i>		5% – 10%	3% – 5% 5%	0% – 5% 5%	
	Maximum <i>Cross Slope</i>		10% Natural side slope	8% 10%	5% 10%	
Design Clearing	Height		8' – 10'	10'	10' - 12'	
	Width		72" 36" – 48" <i>Some light vegetation may encroach into clearing area</i>	72" – 96" 60" – 78"	96" 72" – 96"	
	Shoulder Clearance		6" – 12" Pack Clearance: 36" x 36"	12" – 18" Pack Clearance: 36" x 36"	12" – 18" Pack Clearance: 36" x 36"	
Design Turn	Radius		4' – 5'	5' – 8' 5' – 6'	6' – 10'	

TABLE 10 – CHANGES TO THE BICYCLE DESIGN PARAMETERS

Designed Use BICYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	<i>Single Lane One-Lane</i>	6" – 12"	12" – 24"	18" – 36" 48" – 30"	24" – 48"	36" – 60"
	<i>Double Lane Two-Lane</i>	36" – 48" Not applicable	36" – 48" Not applicable	36" – 48" 48" – 60" Accommodate two-lane travel with passing lanes	48" – 84" 60" – 84"	72" – 120"
	<i>Structures (Minimum Width)</i>	18"	18"	36"	48"	60"
Design Surface ²	Type	Native <i>and ungraded</i> <i>May be continuously rough</i> <i>Sections of soft or unstable tread on grades < 5% may be common and continuous</i> Rough, unstable or soft tread	Native, limited grading <i>May be continuously rough</i> <i>Sections of soft or unstable tread on grades < 5% may be common</i> Unstable or soft sections likely	Native with some onsite borrow or imported material <i>where needed for stabilization and occasional grading</i> <i>Intermittently rough</i> <i>Sections of soft or unstable tread on grades < 5% may be present, but not common</i> Some soft areas	<i>Native, with improved sections of borrow or imported materials and routine grading</i> <i>Stable with minor roughness</i> Likely imported or stabilized tread; Few, if any, loose or soft surfaces	<i>Imported material likely, with routine grading</i> <i>Uniform, firm, and stable</i> Firm, hardened surface
	<i>Protrusions</i>	< = 24" <i>Likely common and continuous</i>	< = 6" <i>May be common and continuous</i>	< = 3" <i>May be common, not continuous</i>	< = 3" <i>Uncommon, not continuous</i>	<i>No protrusions</i>
	<i>Obstacles (Maximum Height)</i>	24" Rocks, logs and roots up to 6 – 12" common; Forced portages likely	12" Embedded rock, protrusions to 6"; Some portages may be needed	10" Generally smooth with few protrusions exceeding 3"	8" Smooth, few obstacles; 1 – 2" protrusions	No obstacles to wheeled transport
Design Grade ^{1 2}	Target Grade ² (≥90% of Trail)	5% – 20% 45% – 18%	5% – 12% ≤/ = 12%	3% – 10% ≤/ = 10%	2% – 8% ≤/ = 8%	2% – 5% ≤/ = 5%
	Short Pitch Maximum ³ (Up to 200' lengths)	30% 50% on downhill-only travel	25% 35% on downhill-only travel	15%	10%	8%
	Maximum Pitch Density ⁴	20% – 30% of trail ≤ 10% of trail	10% – 30% of trail ≤ 5% of trail	10% – 20% of trail ≤ 5% of trail	5% – 10% of trail ≤ 3% of trail	0% – 5% of trail ≤ 3% of trail

TABLE 10 – CHANGES TO THE BICYCLE DESIGN PARAMETERS (CONTINUED)

Designed Use BICYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Cross Slope	Target Range <i>Cross Slope</i>	5% – 10%	5% – 10% 5% – 8%	3% – 8%	3% – 5%	2% – 3% 2% – 3%
	Maximum <i>Cross Slope</i>	10%	10%	8%	5%	5%
Design Clearing	Height	6' 6' – 7'	6' – 8' 7' – 8'	8'	8' - 9'	8' - 9'
	Width	24" – 36" Some vegetation may encroach into clearing area	36" – 48" Some light vegetation may encroach into clearing area	60" – 72" 42" – 48" outside of tread edge	72" – 96" 42" – 48" outside of tread edge	72" – 96" 48" – 24" outside of tread edge
	<i>Shoulder Clearance</i>	0' – 12"	6" – 12"	6" – 12"	6" – 18"	12" – 18"
Design Turn	Radius	2' – 3' 3' – 4'	3' – 6' 4' – 6'	4' – 8' 6' – 8'	8' – 10'	8' - 12'

TABLE 11 – CHANGES TO THE MOTORCYCLE DESIGN PARAMETERS

Designed Use MOTORCYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width (If side-slope > 50%, increase widths by 6" – 18")	Single Lane One Lane	Typically not designed or actively managed for motorcycles, although use may be allowed	8" – 24" At switchbacks, 36" – 48"	18" – 36" At switchbacks, >/= 48"	24" – 48" 30" – 48" At switchbacks, >/= 48"	Typically not designed or actively managed for motorcycles, although use may be allowed
	Double Lane Two Lane		48" Typically not designed for two-lane travel; Passing areas (uncommon) up to 60"	48" – 60" Occasional passing lanes to 72"	60" – 72"	
	Structures (Minimum Width)		36"	48"	48"	
Design Surface²	Type		<i>Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous Native, with limited or no grading; Commonly unstable and soft</i>	<i>Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present Native with some on-site borrow, pavers, or imported materials; Some loose or soft areas</i>	<i>Native, with imported materials for tread stabilization common and routine grading Minor roughness Sections of soft tread not common Gravel, pavers or other imported materials possible; Relatively firm, stable surface</i>	
	Protrusions		< = 6" May be common and continuous	< = 3" May be common, not continuous	< = 3" Uncommon, not continuous	
	Obstacles (Maximum Height)		18" May be common or placed for increased challenge Soft sand and embedded rock, steps and protrusions up to 12"	12" Common and left for increased challenge Generally smooth with few protrusions exceeding 6"	3" Uncommon Smooth, few obstacles; Few 2" – 4" protrusions	

TABLE 11 – CHANGES TO THE MOTORCYCLE DESIGN PARAMETERS (CONTINUED)

Designed Use MOTORCYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade ²	Target Grade ²⁻ (≥90% of Trail)		10% – 25% ≤/ = 25%	5% – 20% ≤/ = 15%	3% – 10% ≤/ = 10%	
	Short Pitch Maximum ³⁻ (Up to 200' lengths)		40% Rarely to 50% on downhill-only travel	25%	15%	
	Maximum Pitch Density ⁴⁻		20% – 40% of trail ≤ 10% of trail	15% – 30% of trail ≤ 10% of trail	10% – 20% of trail ≤ 5% of trail	
Design Cross Slope	Target Range Cross Slope		5% – 10%	5% – 8% 5%	3% – 5%	
	Maximum Cross Slope		15%	10%	10%	
Design Clearing	Height		6' – 7' 7' – 8'	6' – 8' 8'	8' – 10' 8' – 9'	
	Width (On steep side-hills, increase clearing on uphill side by 6" – 12")		36" – 48" Some light vegetation may encroach into clearing area	48" – 60" 12" – 18" outside of tread edge	60" – 72" > 18" outside of tread edge	
	Shoulder Clearance		6" – 12"	12" – 18"	12" – 24"	
Design Turn	Radius		3' – 4' 4' – 5'	4' – 6' 5' – 6'	5' – 8' 6' – 8'	

TABLE 12 – CHANGES TO THE ATV DESIGN PARAMETERS

Designed Use ALL-TERRAIN VEHICLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width [If sideslopes are >50%, increase widths by 6" – 18"]	Single Lane One Lane	Typically not designed or actively managed for ATVs, although use may be allowed	48" – 60" 30" – 48" At switchbacks, > = 48"	60" 42" – 60" At switchbacks, > = 60"	60" – 72" 54" – 72" At switchbacks, > = 60"	Typically not designed or actively managed for ATVs, although use may be allowed
	Double Lane Two Lane		96" Typically not designed for two-lane travel; Passing areas (uncommon) – 60"	96" – 108" 60" and/or accommodate with passing areas 60" – 78"	96" – 120" 72" – 96"	
	Structures (Minimum Width)		60"	60"	60"	
Design Surface² Type			Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous Native with limited or no grading; commonly soft and unstable	Native with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present some loose or soft sections	Native, with imported materials for tread stabilization common and routine grading Minor roughness Sections of soft tread not common Relatively firm and stable; gravel, pavers or other imported materials possible	
	Protrusions		≤ 6" May be common and continuous	≤ 3" May be common, but not continuous	≤ 3" Uncommon and not continuous	
	Obstacles (Maximum Height)		12" May be common or placed for increased challenge Embedded rock, steps, waterbars, holes and protrusions to 6"	6" May be common and left for increased challenge Generally smooth, with few protrusions exceeding 4"; drain dips and low waterbars	3" Uncommon Smooth, few obstacles; 1" – 3" protrusion; drain dips or waterbars with low-angle approach	

TABLE 12 – CHANGES TO THE ATV DESIGN PARAMETERS (CONTINUED)

Designed Use ALL-TERRAIN VEHICLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade ^{1, 2}	Target Grade ²⁻ (> 90% of Trail)		10% – 25% <= 25%	5% – 15% <= 15%	3% – 10% <= 10%	
	Short Pitch Maximum ³⁻ (Up to 200' lengths)		35%	25%	15%	
	Maximum Pitch Density ⁴⁻		20% – 40% of trail < 10% of trail	15% – 30% of trail < 5% of trail	10% – 20% of trail < 5% of trail	
Design Cross Slope	Target Range Cross Slope		5% – 10%	3% – 8% 3% – 5%	3% – 5%	
	Maximum Cross Slope		15%	10%	8%	
Design Clearing	Height		6' – 7' 5' – 6'	6' – 8' 6' – 7'	8' – 10' 8'	
	Width (On steep side hills, increase clearing on uphill side by 6" – 12")		60" 36" – 48" Some <i>light</i> vegetation may encroach into clearing area	60" – 72" 8" – 12" outside of tread edge	72" – 96" >=12" outside of tread edge	
	Shoulder Clearance		0" – 6"	6" – 12"	12" – 18"	
Design Turn	Radius (Use climbing turns versus switchbacks for ATVs whenever possible)		6' – 8'	8' – 10'	8' – 12' >= 10'	

TABLE 13 – CHANGES TO THE CROSS-COUNTRY SKI DESIGN PARAMETERS

Designed Use CROSS-COUNTRY SKI		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Groomed Width	<i>Single Lane</i> One Lane	Typically not designed or actively managed for cross-country skiing, although use may be allowed	2' – 4' 3' – 4' <i>Typically not groomed</i> If groomed, width of grooming equipment	6' – 8' (or minimum width of grooming equipment)	8' – 10" <i>(or width of grooming equipment)</i> (but typically managed to accommodate two-way passage)	Typically not designed or actively managed for cross-country skiing, although use may be allowed
	<i>Double Lane</i> Two Lane		6' – 8' Typically not designed for two-lane travel, except in steep sections accommodate passing areas	8' – 12' >/=8' (or min width of grooming equipment) and/or accommodate with passing areas 8' – 12' wide	12' – 16' 12' – 14'	
	<i>Structures</i> (Minimum Width)		36"	36"	36"	
Design Grooming and Surface²	Type		<i>Generally no machine grooming</i> Coarse compaction; Occasional or no grooming (may be ski-packed); over-snow vehicle packing sufficient Tracklayer optional	<i>May receive occasional machine grooming for snow compaction and track setting</i> Groomed or compacted using implements or tracklayer when packed surface is snow-covered, drifted, melted or skied out	<i>Regular machine grooming for snow compaction and track setting</i> Well-groomed with tiller or other implements; Groomed frequently, and when groomed surface becomes degraded or buried	
	<i>Protrusions</i> Obstacles (Maximum Height)		<i>No protrusions</i> 12" <i>Uncommon</i> Dips, bumps, or ruts to 12" common and may be tightly spaced; Surface obstacles may occasionally require off-trail bypass	<i>No protrusions</i> 8" <i>Uncommon (no obstacles if machine groomed)</i> Generally smooth; Dips, bumps, or ruts to 8" uncommon and widely spaced; Surface obstructions not present	<i>No protrusions</i> <i>No obstacles</i> Consistently smooth; Small, rolling bumps, dips and rises; Surface obstructions not present	

TABLE 13 – CHANGES TO THE CROSS-COUNTRY SKI DESIGN PARAMETERS (CONTINUED)

Designed Use CROSS-COUNTRY SKI		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade ^{1, 2}	Target Grade ²⁻ ($\geq 90\%$ of Trail)		5% – 15% $\leq 15\%$	2% – 10% $\leq 10\%$	0% – 8% $\leq 8\%$	
	Short Pitch ³⁻ Maximum (Up to 200' lengths)		25%	20%	12%	
	Maximum Pitch Density ⁴⁻		10% – 20% of trail $\leq 10\%$ of trail	5% – 15% of trail $\leq 5\%$ of trail	0% – 10% of trail $\leq 5\%$ of trail	
Design Cross Slope	Target Range-Cross Slope		0% – 10% $\leq 10\%$	0% – 5% $\leq 5\%$	0% – 5% $\leq 5\%$	
	Maximum Cross Slope (For up to 50')		20%	15%	10%	
Design Clearing	Height (Above normal maximum snow level)		6' – 8' $\geq 6' - 8'$ (or height of grooming machinery if used)	8' $\geq 8'$ (or height of grooming machinery)	8' – 10' 10'	
	Width		24" – 60" 4' – 6' (or minimum width of grooming equipment, if larger); Light vegetation may encroach into clearing area	72" – 120" $\geq 1'$ outside of groomed edge; Light vegetation may encroach slightly into clearing area	96" – 168" $\geq 2'$ outside of tread edge; Widen clearing at turns or if increased sight distance needed	
	Shoulder Clearance		0" – 6"	0" – 12"	0" – 24"	
Design Turn	Radius		8' – 10' if not snowcat-groomed (provide sufficient radius for grooming equipment if used)	15' – 20' (provide sufficient radius for or width of grooming equipment)	$\geq 25'$	

TABLE 14 – CHANGES TO THE SNOWMOBILE DESIGN PARAMETERS

Designed Use SNOWMOBILE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	<i>Single Lane</i> One Lane	Typically not designed or actively managed for snowmobiles, although use may be allowed	4' – 6' Typically not groomed but commonly signed. If groomed, 4' – 6' (or minimum width of grooming equipment)	6' – 8' (or minimum width of grooming equipment). On tight-radius turns, increase groomed width to > = 10'	8' – 10' (or width of grooming equipment) On tight-radius turns, increase groomed width to > = 12'	Typically not designed or actively managed for snowmobiles, although use may be allowed
	<i>Double Lane</i> Two Lane		10' Typically not groomed but commonly signed. If groomed, >=8' groomed width	10' – 12' >=11' and/or accommodate with passing areas 12' – 14' wide	12' – 20' 12' – 16' On tight-radius turns, increase groomed width to >=14'	
	<i>Structures</i> (Minimum Width)		6'	12'	18'	
Design Surface²	Type		<i>Generally no machine grooming</i> <i>Commonly rough and bumpy</i> Occasional or no grooming or user-packed. Coarse compaction with eat or snowmobile; Use of implements optional	<i>May receive occasional machine grooming for snow compaction and conditioning</i> <i>Frequently rough and bumpy</i> Groomed or compacted after significant snow accumulations or when moguled/rutted; Use of implements likely	<i>Regular machine grooming for snow compaction and conditioning</i> <i>Commonly smooth</i> Well-groomed with tiller or other implements; Groomed frequently, soon after significant snow accumulations and before surface is degraded	
	<i>Protrusions</i>		<i>No protrusions</i>	<i>No protrusions</i>	<i>No protrusions</i>	
	Obstacles (Maximum Height)		12" <i>Uncommon</i> Dips/bumps/ruts to 24" common and may be tightly spaced; Obstacles may occasionally require off-trail bypass	6" <i>Uncommon (no obstacles if machine groomed)</i> Generally smooth; Dips, bumps, ruts to 12" infrequent and widely spaced. Surface obstacles not present	No obstacles Consistently smooth. Small, rolling bumps, dips and rises. Surface obstacles not present	

TABLE 14 – CHANGES TO THE SNOWMOBILE DESIGN PARAMETERS (CONTINUED)

Designed Use SNOWMOBILE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade ²	Target Grade ²⁺ ($\leq 90\%$ of Trail)		0% – 12% $\leq 20\%$	0% – 10% $\leq 15\%$	0% – 8% $\leq 10\%$	
	Short Pitch Maximum ³⁺ (Up to 200' lengths)		35%	25%	20%	
	Maximum Pitch Density ⁴⁺		15% – 30% of trail $\leq 10\%$ of trail	10% – 20% of trail $\leq 5\%$ of trail	5% – 10% of trail $\leq 5\%$ of trail	
Design Cross Slope	Target Range <i>Cross Slope</i>		0% – 10% $\leq 15\%$	0% – 5% $\leq 10\%$	0% $\leq 5\%$	
	Maximum <i>Cross Slope</i>		15% 25%	10% 15%	5% 10%	
Design Clearing	Height (Above normal maximum snow level)		6' $\geq 6'$ (provide sufficient clearance for grooming equipment if used)	6' – 8' $\geq 7'$ (provide sufficient clearance for grooming equipment)	8' – 12' 40' (provide sufficient clearance for grooming equipment)	
	Width		6' – 12' 4' – 6' (or minimum width of grooming equipment if used); Some <i>light</i> vegetation may encroach into clearing area	8' – 14' $\geq 1'$ outside of groomed trail edge; Light vegetation may encroach into clearing area	10' – 22' $\geq 2'$ outside of groomed trail edge Widen clearing at turns or if increased sight distance needed	
	<i>Shoulder Clearance</i>		6" – 12"	12" – 18"	12" – 24"	
Design Turn	Radius		8' – 10' if not groomed. (provide sufficient radius for grooming equipment if used, typically 15' – 20')	15' – 20' (provide <i>or</i> sufficient radius for grooming equipment)	25' – 50' $\geq 25'$	

