

# HIGHWAY STANDARDS & DEVELOPMENT POLICY

PRESENTED BY:

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# HIGHWAY STANDARDS

AND

## ROADWAY DEVELOPMENT PROCEDURES

FOR

### ONEIDA COUNTY

MALAD CITY, IDAHO

JUNE 2021

Updated August 2021



PREPARED BY:



# HIGHWAY STANDARDS

AND

## ROADWAY DEVELOPMENT PROCEDURES

FOR

### POWER COUNTY HIGHWAY DISTRICT

POWER COUNTY, IDAHO

MARCH 2009

UPDATED JANUARY 2022

TO INCLUDE 2020 ISPWC UPDATES

PREPARED BY:



# HOW DO YOU USE YOUR HSDP?

## STANDARDS FOR WORK:

1. Completed by agency employees
2. Completed by public works contractors
3. Completed by developers in LHJ ROW or to be accepted into LHJ system (requirements may be more restrictive than work by LHJ to limit the burden on LHJ budget—though need to treat all developers equally)



## IDAHO CODE

54-1218: Subdivisions of the State must have plans and specifications prepared by PE for public works construction.

Including, construction, re-construction, maintenance, and repair work.

Adopted in 1939 and most recently updated in 2015.

### Exceptions:

- A. Repair & Maintenance of Ditches under IC 42-12: Irrigation & Drainage, or
- B. Insignificant (i.e., cost under \$10,000), and
- C. Work Performed by Agency Employees, and
- D. Use Standards certified by PE (e.g., ISPWC w-supplements), and
- E. PE determines does not represent a material risk to public health and safety
  - 1. No Alignment Changes & Minor Elevation changes to profile (+/- 1.0-ft)
  - 2. Minor Lane Widening and Slope Adjustments (stay w/i existing ROW)
  - 3. No Safety Issues (no crash history & no obstructions in CZ)

## ROADWAY DESIGN STANDARDS AND SPECIFICATIONS

The design policies and standards serve as the basic LHJ guide in design and construction.

The standards represent minimum values and are not a substitute for engineering knowledge, experience, or judgment.



# ROADWAY DESIGN STANDARDS

Roadway planning and design for the public road system shall conform to the following guidelines and referenced specifications:

A. American Association Of State Highway Transportation Officials Policy On Geometric Design Of Highways And Streets (AASHTO Greenbook).

B. AASHTO Geometric Design Of Very Low Volume Local Roads (ADT  $\leq$  400).

C. AASHTO Roadside Design Guide.

D. Idaho Transportation Department Standard Drawings, Specifications, And Current Supplemental (Only Where Applicable).

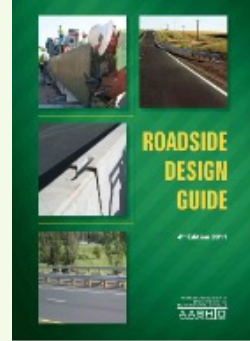
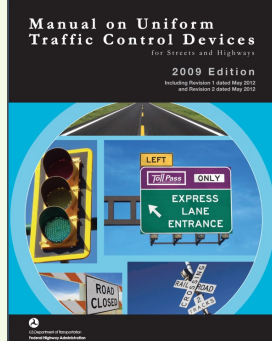
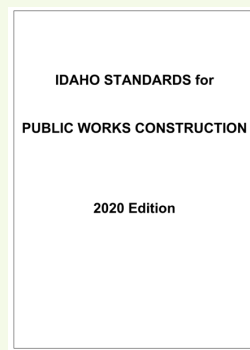
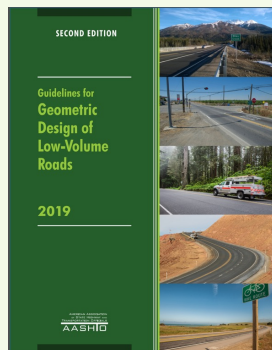
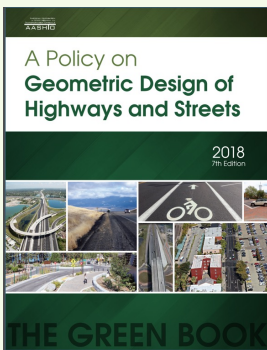
E. Idaho Standards For Public Works Construction (ISPWC), 2020 Edition.

F. AASHTO Materials Testing And Sampling Methods.

G. American Society For Testing And Materials (ASTM) Specifications.

H. Traffic Engineering Handbook From Institute Of Transportation Engineers.

I. Manual On Uniform Traffic Control Devices (MUTCD), As Adopted By The State Of Idaho.





# BRIDGE DESIGN STANDARDS

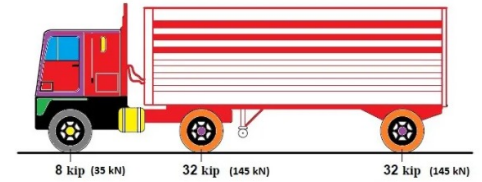
## A. AASHTO Bridge Design

## B. ITD Standard Drawings, Specifications, And Current Supplemental (Only Where Applicable)

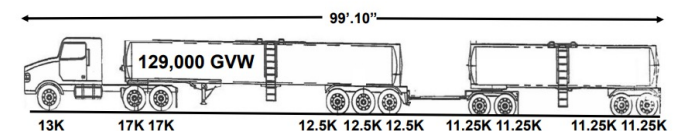
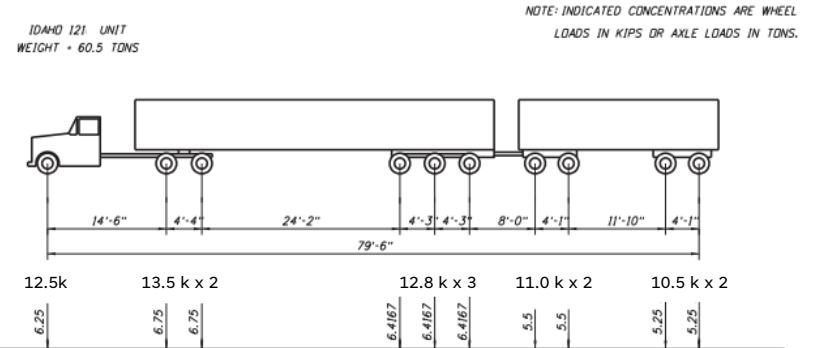
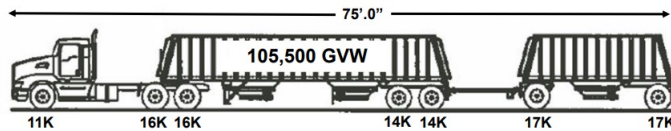
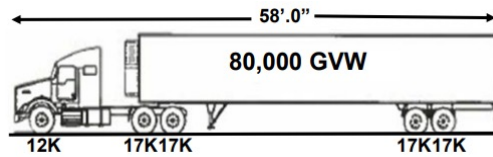
## C. Idaho Transportation Department Bridge Design LRFD Manual

### HL-93 Design Truck

Design Truck consists of three axles, front and two rear axles with front axle weighing 8kip (35 kN) and two rear axles weighing 32kip (145 kN). The distance between front and rear axle is 14' (4.3m) and that of two rear axles can be varied between 14' (4.3m) to 30' (9.0m) to obtain the worst design force. The tyre to tyre distance in any axle is 6' (1.8m).



HL-93 Design Truck AASHTO



# SELECTING STANDARDS

Why can't I just adopt the standards listed?

Choices:

Functional Class

Traffic Volumes

Setting(Rural/Urban)

- ROW
- Design Speed
- Alignment Horizontal & Vertical
- Roadway Section (geometry & Ballast)
- Fore/back-slopes
- Intersection spacing
- Utilities
- Drainage
- Structures
- Signing
- Other (Guardrail, Cattleguards, Striping)

Traffic Impacts

Connectivity

Sight Distance

Special Loads (129,000 k)

Table 3-7. Minimum Radius Using Limiting Values of e and f

U.S. Customary					
Design Speed (mph)	Maximum e (%)	Maximum f	Total (e/100 + f)	Calculated Radius (ft)	Round-ed Radius (ft)
10	4.0	0.38	0.42	15.9	16
15	4.0	0.32	0.36	41.7	42
20	4.0	0.27	0.31	86.0	86
25	4.0	0.23	0.27	154.3	154
30	4.0	0.20	0.24	250.0	250
35	4.0	0.18	0.22	371.2	371
40	4.0	0.16	0.20	533.3	533
45	4.0	0.15	0.19	710.5	711
50	4.0	0.14	0.18	925.9	926
55	4.0	0.13	0.17	1186.3	1190
60	4.0	0.12	0.16	1500.0	1500

10	6.0	0.38	0.44	15.2	15
15	6.0	0.32	0.38	39.5	39
20	6.0	0.27	0.33	80.8	81
25	6.0	0.23	0.29	143.7	144
30	6.0	0.20	0.26	230.8	231
35	6.0	0.18	0.24	340.3	340
40	6.0	0.16	0.22	484.8	485
45	6.0	0.15	0.21	642.9	643
50	6.0	0.14	0.20	833.3	833
55	6.0	0.13	0.19	1061.4	1060
60	6.0	0.12	0.18	1333.3	1330
65	6.0	0.11	0.17	1656.9	1660
70	6.0	0.10	0.16	2041.7	2040
75	6.0	0.09	0.15	2500.0	2500
80	6.0	0.08	0.14	3047.6	3050

10	8.0	0.38	0.46	14.5	14
15	8.0	0.32	0.40	37.5	38
20	8.0	0.27	0.35	76.2	76
25	8.0	0.23	0.31	134.4	134
30	8.0	0.20	0.28	214.3	214
35	8.0	0.18	0.26	314.1	314
40	8.0	0.16	0.24	444.4	444
45	8.0	0.15	0.23	587.0	587
50	8.0	0.14	0.22	757.6	758
55	8.0	0.13	0.21	960.3	960
60	8.0	0.12	0.20	1200.0	1200
65	8.0	0.11	0.19	1482.5	1480
70	8.0	0.10	0.18	1814.8	1810
75	8.0	0.09	0.17	2205.9	2210
80	8.0	0.08	0.16	2666.7	2670

Table 4-1. Guidelines for Total Roadway Width for New Construction of Low-Volume Roads in Rural Areas

U.S. Customary								
Total Roadway Width (ft) by Functional Subclass <sup>1</sup>								
Design Speed (mph)	Major Access Road by Design Volume Level (veh/day)			Minor Access Road	Recreational and Scenic Road	Industrial/ Commercial Access Road	Resource Recovery Road	Agricultural Access Road
	400 or Less	401 to 2,000						
15	18.0	23.0 <sup>2</sup>		18.0	18.0	20.0	20.0	22.0
20	18.0	23.0 <sup>2</sup>		18.0	18.0	20.0	20.0	24.0
25	18.0	23.0 <sup>2</sup>		18.0	18.0	21.0	21.0	24.0
30	18.0	23.0 <sup>2</sup>		18.0	18.0	22.5	22.5	24.0
35	18.0	23.0 <sup>2</sup>		18.0	18.0	22.5	22.5	24.0
40	18.0	23.0 <sup>2</sup>		18.0	20.0	22.5	—	24.0
45	20.0	25.0		20.0	20.0	23.0	—	26.0
50	20.0	25.0		20.0	20.0	24.5	—	—
55	22.0	25.0		—	22.0	—	—	—
60	22.0	25.0		—	—	—	—	—

ROAD STRUCTURE SCHEDULE									
Class Of Road	Design Speed (mph)			Shoulder Width (ft.)	Right-Of-Way Width (ft.)	TI	Minimum Thickness (in.)		
	Lane Width (ft.)						Pavement	Base	Subbase
Collector Over 2,000 ADT		20–65mph	11' (b)	6	100	(d)	(d)	(d)	(d)
Collector 400 To 2,000 ADT	≤30mph		≥35mph	4	80	9	4"	6"	21"
Collector Under 400 ADT	10'		11'	3	80	8	3"	6"	21"
Local Road Over 2,000 ADT		15–65mph	11' (b)	6	80	(d)	(d)	(d)	(d)
Local Road 400 To 2,000 ADT	≤40mph		≥45mph	3	60	8	3"	6"	15"
Local Road Under 400 ADT	10' (c)		11'	3	60	6(e)	3"(e)	6"	12"
	≤40mph	45–50mph	≥55mph	3	60	6(e)	3"(e)	6"	12"
	9'	10'	11'						

(a) 20–40mph, 9' minimum width may be used (with RBD approval) for roadways with design volumes under 250 veh/day.

(b) 55–65mph, 12' minimum width may be required where substantial truck volumes are present or agricultural equipment frequently uses road.

(c) Roads in mountainous terrain with design volume of 400–600 veh/day, a 9' minimum lane width may be used (with RBD approval).

(d) Determined By RBD.

(e) For Local Roads ADT ≤ 250, TI may be reduced to 5.7 and asphalt depth may be reduced to 2.5".



A. Rural Roadways:

Classification	Design Speed	Maximum Superelevation	Minimum Curve Radii w/o Superel.
Collectors	45-55 mph*	6%	6480'-9410'
Local Roads	35 mph	6%	4100'
Low Volume Local Roads	25 mph	6% (Note 1)	2290' (Note 1)

\*As determined by RBD

B. Urban/Suburban Roadways:

Classification	Design Speed	Maximum Superelevation	Minimum Curve Radii w/o Superel.
Collectors	35-45 mph*	4%	510'-1039'
Local Roads	35 mph	4%	510'
Low Volume Local Roads	25 mph	4%	200' (Note 1)

\*As determined by RBD

Note 1: May be modified according to AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT $\leq$ 400)

Table 3-1. Stopping Sight Distance on Level Roadways

U.S. Customary				
Design Speed (mph)	Brake Reaction Distance (ft)	Braking Distance on Level (ft)	Stopping Sight Distance	
			Calculated (ft)	Design (ft)
15	55.1	21.6	76.7	80
20	73.5	38.4	111.9	115
25	91.9	60.0	151.9	155
30	110.3	86.4	196.7	200
35	128.6	117.6	246.2	250
40	147.0	153.6	300.6	305
45	165.4	194.4	359.8	360
50	183.8	240.0	423.8	425
55	202.1	290.3	492.4	495
60	220.5	345.5	566.0	570
65	238.9	405.5	644.4	645
70	257.3	470.3	727.6	730
75	275.6	539.9	815.5	820
80	294.0	614.3	908.3	910
85	313.5	693.5	1007.0	1010

Table 3-2. Stopping Sight Distance on Grades

U.S. Customary						
Design Speed (mph)	Stopping Sight Distance (ft)					
	Downgrades			Upgrades		
	3%	6%	9%	3%	6%	9%
15	80	82	85	75	74	73
20	116	120	126	109	107	104
25	158	165	173	147	143	140
30	205	215	227	200	184	179
35	257	271	287	237	229	222
40	315	333	354	289	278	269
45	378	400	427	344	331	320
50	446	474	507	405	388	375
55	520	553	593	469	450	433
60	598	638	686	538	515	495
65	682	728	785	612	584	561
70	771	825	891	690	658	631
75	866	927	1003	772	736	704
80	965	1035	1121	859	817	782
85	1070	1149	1246	949	902	862

Table 3-4. Passing Sight Distance

U.S. Customary			
Design Speed (mph)	Assumed Speeds (mph)		Passing Sight Distance (ft)
	Passed Vehicle	Passing Vehicle	
20	8	20	400
25	13	25	450
30	18	30	500
35	23	35	550
40	28	40	600
45	33	45	700
50	38	50	800
55	43	55	900
60	48	60	1000
65	53	65	1100
70	58	70	1200
75	63	75	1300
80	68	80	1400

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 11.2 ft/s<sup>2</sup> [3.4 m/s<sup>2</sup>] used to determine calculated sight distance.

A. Rural Roadway Spacing (see spacing diagram above):

<b>Through Roadway (see diagram)</b>	<b>Branch Roadway (see diagram)</b>	<b>Minimum Spacing Branch on same side of Through Roadway</b>	<b>Minimum Spacing Branch on opposite side of Through Roadway</b>
Major Collector	Collector	1/4 mile	1/8 mile
	Local Road	1/8 mile	1/16 mile
	Private Road	No New Direct Access	No New Direct Access
Minor Collector	Collector	1/4 mile	1/8 mile
	Local Road	1/8 mile	1/16 mile
	Private Road	1/8 mile	1/16 mile
Local Roads	Local Road	1/8 mile	1/16 mile
	Private Road	1/8 mile	1/16 mile

B. Urban Roadway Spacing (see spacing diagram above):

Through Roadway (see diagram)	Branch Roadway (see diagram)	Minimum Spacing Branch on same side of Through Roadway	Minimum Spacing Branch on opposite side of Through Roadway
Major Collector	Collector	1300 feet	1300 feet
	Local Road	500 feet	250 feet
	Private Road	No New Direct Access	No New Direct Access
Minor Collector	Collector	1300 feet	500 feet
	Local Road	500 feet	250 feet
	Private Road	500 feet	250 feet
Local Roads	Local Road	250 feet	125 feet
	Private Road	250 feet	125 feet



Spacing used in most manuals appears to be for subdivision roads.

County/Highway District Roads need to be based on classifications, volume, & design speed.

### A. Rural Roadway Driveway Spacing:

Roadway Classification	Minimum Driveway Spacing (in feet)		
	Minimum <u>Use</u> <sup>a</sup>	Minor <u>Generator</u> <sup>b</sup>	Major <u>Generator</u> <sup>c</sup>
Major Collector	No New Direct Access	No New Direct Access	No New Direct Access
Minor Collector	180	315	405
Local Road	140	270	360
Low Volume Local <u>Road</u> <sup>d</sup>	75	125	150

<sup>a</sup> less than 50 vehicle trips per day or 5 trips in the peak hour (two-way total).

<sup>b</sup> 51 to 2,000 vehicle trips per day or less than 500 trips in the peak hour (two-way total).

<sup>c</sup> over 2,000 vehicle trips per day or over 500 trips in the peak hour (two-way total).

<sup>d</sup> or County minimum (whichever is more restrictive).



Roadway Classifications	TI*	Minimum Thickness (in)			Maximum R Value		
		Pavement	Base	Subbase**	Base	Subbase	Subgrade***
Collector (over 2,000 ADT)	Determined by RBD	Determined by RBD	Determined by RBD	Determined by RBD	75	60	Determined by RBD
Collector (400 to 2,000 ADT)	9	4"	6"	21"	75	60	15
Collector (400 ADT & under)	8	3"	6"	21"	75	60	15
Local Road (over 2,000 ADT)	Determined by RBD	Determined by RBD	Determined by RBD	Determined by RBD	75	60	Determined by RBD
Local Road (400 to 2,000 ADT)	8	3"	6"	15"	75	60	15
Low Volume Local Road (250 to 400 ADT)*	6	3"	6"	12"	75	60	15
Low Volume Local Road (250 ADT & under)*	5.7	2.5"	6"	12"	75	60	15

\*Twenty-year minimum design life - may be adjusted based on a traffic study.

\*\* Or a minimum of 2 times the nominal maximum aggregate size, whichever requires the greatest thickness.

\*\*\* May be adjusted by a site-specific geotechnical report; however, in no case shall the R-value exceed 45. Additionally, the subbase substitution value shall be 0.75:1 unless documentation is provided demonstrating that the subbase R-value exceeds 60.

B. Urban Roadway Driveway Spacing:

Roadway Classification	Minimum Driveway Spacing (in feet)		
	Minimum Use <sup>a</sup>	Minor Generator <sup>b</sup>	Major Generator <sup>c</sup>
Major Collector	No New Direct Access	No New Direct Access	No New Direct Access
Minor Collector	105	175	210
Local Road	50	100	125
Low Volume Local Road <sup>d</sup>	30	60	75

<sup>a</sup> less than 50 vehicle trips per day or 5 trips in the peak hour (two-way total).

<sup>b</sup> 51 to 2,000 vehicle trips per day or less than 500 trips in the peak hour (two-way total).

<sup>c</sup> over 2,000 vehicle trips per day or over 500 trips in the peak hour (two-way total).

<sup>d</sup> or County minimum (whichever is more restrictive).



CONSTRUCTION STANDARDS  
Modifications to ISPWC  
Materials  
Workmanship  
Testing  
Acceptance Criteria



# SELECTING ASPHALT

Asphalt Grades (1-day temp)

PG xx-28 (-18 F) Zone 1

PG xx-34 (-27 F) Zone 2 some areas in Zone 3

PG xx-40 (-40 F) some areas in Zone 3 & all of Zone 4

Asphalt Grades (3-day temp)

PG 58-xx (136 F) Rd under














TI-9; Intersection under TI-8

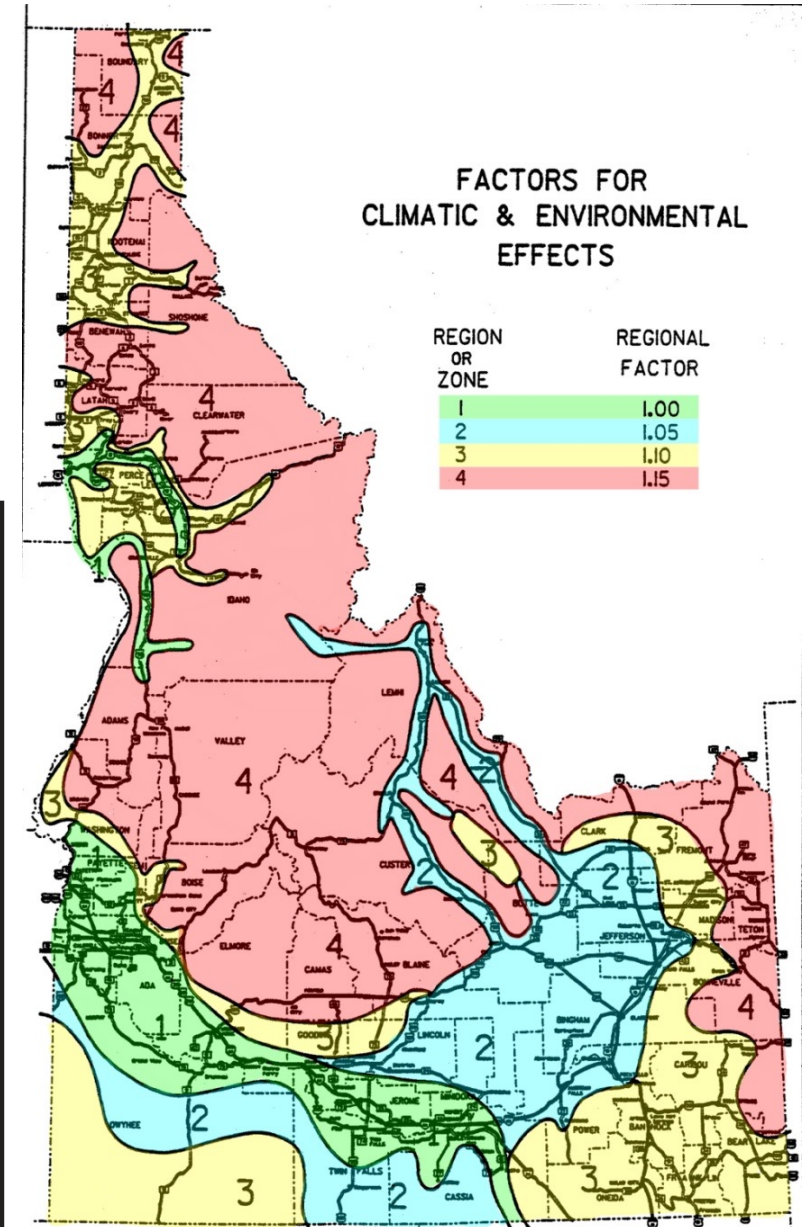
PG 64-xx (147 F) Rd over TI-

9 & under TI-11; Intersection over TI-8 & under TI-10

PG 70-xx (158 F) Rd TI-11 &

greater, Intersection TI-10 & greater

FHWA Vehicle Classifications			
<b>1. Motorcycles</b> 2 axles, 2 or 3 tires 	<b>2. Passenger Cars</b> 2 axles, can have 1- or 2-axle trailers 	<b>3. Pickups, Panels, Vans</b> 2 axles, 4-tire single units Can have 1 or 2 axle trailers 	<b>4. Buses</b> 2 or 3 axles, full length 
<b>5. Single Unit 2-Axle Trucks</b> 2 axles, 6 tires (dual rear tires), single-unit 	<b>6. Single Unit 3-Axle Trucks</b> 3 axles, single unit 	<b>7. Single Unit 4 or More-Axle Trucks</b> 4 or more axles, single unit 	<b>8. Single Trailer 3- or 4-Axle Trucks</b> 3 or 4 axles, single trailer 
<b>9. Single Trailer 5-Axle Trucks</b> 5 axles, single trailer 		<b>10. Single Trailer 6 or More-Axle Trucks</b> 6 or more axles, single trailer 	
<b>11. Multi-Trailer 5 or Less-Axle Trucks</b> 5 or less axles, multiple trailers 		<b>12. Multi-Trailer 6-Axle Trucks</b> 6 axles, multiple trailers 	
<b>13. Multi-Trailer 7 or More-Axle Trucks</b> 7 or more axles, multiple trailers 			



# CRUSHED AGGREGATE & PLANTMIX AGGREGATE

TABLE 1  
CRUSHED AGGREGATE FOR BASE GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVES

SIEVE SIZE	NOMINAL MAXIMUM SIZE					
	3/8 in (Type I)	1/2 in (Type II)	1/2 in (Type II-a)** For Surfacing	3/4 in (Type III)	3/4 in (Type III-a)** For Surfacing	1 in (Type IV)
1-1/2 in						100
1 in				100	100	90-100*
3/4 in		100	100	90-100*	95-100*	
1/2 in	100	90-100*	90-100*			60-80
3/8 in	85-100*		75-95		50-90	
No. 4	55-75	50-70*	45-75*	40-65*	35-70*	35-60*
No. 8	40-60*	35-55	30-60	30-50	15-55	25-50
No. 30	20-40	12-30	15-35			10-30
No. 200	3.0-9.0*	3.0-9.0*	8.0-15.0*	3.0-9.0*	8.0-15.0*	2-9.0*

Note: \* Denotes the sieves used for consistency checks  
\*\*Use by approval of the RBD.

Base:  
FF-75% minimum  
F&E-8% maximum  
FAA-40 minimum  
Type -a aggregate  
LL-30 maximum,  
PI-4 to 12

Variation:  
1-1/2" thru 1/2" ± 6%.  
3/8" thru No. 8 ± 4%.  
No. 8 and under ± 2.0%.

TABLE 2

PLANT MIX AGGREGATE GRADATIONS (CL-III/SP-2 AND IV)

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVES

SIEVE SIZE	NOMINAL MAXIMUM SIZE		
	3/8 in	1/2 in	3/4 in
1 in			100
3/4 in		100	95-100*
1/2 in	100	95-100*	75-90
3/8 in	90-100*	75-90	60-85*
No. 4	60-85	50-75	40-65
No. 8	40-65*	35-60*	25-50*
No. 30	20-40*	15-35*	14-30*
No. 50	12-28	10-25	9-21
No. 200	5.0-7.0*	4.0-7.0*	3.0-6.0*

Note: \*denotes the sieves used for consistency checks

SE 40  
FAA 45 CL-II & III, 40 CL-I  
Consistency; No. 8 and Greater +/-5.0%  
No. 8-No. 50, +/-3.0%,  
and No.200 +/-1.5%

# PLANTMIX

Require 0.5% anti-strip  
 Take samples from behind paver  
 Require 2-hr cure time  
 Include breakdown in JMF  
 Require WAQTC certification and PE Stamp

Table 5  
 Tolerances from the Asphalt Mix Design Target Values

Quality Characteristic	CL-III/SP-2	CL-II/SP-3	CL-I/SP-5
3/8" Sieve	±5.0%		
No. 8 Sieve	±4.0%		
No. 200 Sieve	±1.5%		
Asphalt Cement Content	see 810.3.5.C		
Air Voids (%)		3.0-5.0	3.0-5.0
VMA		810.2.1.A min -0.05	810.2.1.A min -0.05
VFA		810.2.1.A values ± 5	810.2.1.A values ± 5
Dust/AC		810.2.1.A values ± 0.1	810.2.1.A values ± 0.1

810.2.1

Hot Mix Asphalt Design; delete subparagraphs A through D (including Tables 1, 2 & 3) and replace with the following:

- A. Perform plant mix pavement design to conform to the Gyrotory Compactor Mix Design (i.e. Superpave) requirements shown in Table 1 and target these values throughout construction.

Table 1

Pavement	Nominal Maximum Size	No. of Gyations	VMA (min.)	Dust/AC	Manufactured Sand/Natural Sand (min.)	VFA	Min. Immersion Compression %
Class I/SP-5	3/4" 1/2"	100	13.3% 14.3%	0.6-1.2	2:1	65-75	85
Class II/SP-3	3/4" 1/2"	75	13.3% 14.3%	0.6-1.2	1:2	65-75	85
Class III/SP-2	3/4" 1/2" 3/8"	50	13.3% 14.3% 15.3%	0.6-1.2	1:2	65-78	85
Class IV	Not for use in Permanent Work.						

NOTE: Minimum film thickness shall be 6 microns for all classes of pavement.

1. Mixes with other than 3/4" nominal maximum size for Class I & II (i.e., SP-5 & SP-3) pavement and mixes with other than 3/4" and 1/2" nominal maximum for Class III (i.e., SP-2) pavement shall require approval by the RBD prior to use.
2. All classes of plant mix must have a Los Angeles Wear showing less than 30% loss, a Sand Equivalent greater than 40, and a maximum 2.0% absorption. For Class I and II plant mix aggregates, greater than 90% by weight of the aggregate particles retained on the No. 4 sieve shall have at least one fractured face and greater than 75% by weight of the aggregate particles retained on the No. 4 sieve shall have at least two fractured faces. For Class III plant mix aggregates, greater than 75% by weight of the aggregate particles retained on the No. 4 sieve shall have at least one fractured face and greater than 60% by weight of the aggregate particles retained on the No. 4 sieve shall have at least two fractured faces.
- Aggregates produced from rock quarry sources shall have a minimum of 90% retention when tested with Ethylene Glycol, in accordance with Idaho T-116.
3. Substitution of a higher-class mix for a lower-class mix will only be allowed upon approval of the engineer and the RBD.



## VARIANCES

Why They should be limited.



THANK YOU

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