

- j. Vegetation Establishment: 400% minimum according to ASTM D 7322.
- k. Moisture Content: 10% minimum and 40% maximum according to ASTM D 2974.
- l. Use with a tackifier that is either applied separately within 24 hours of the organic material, or is premixed according to the manufacture's recommendations. Tackifier shall meet the following requirements:
 - Safe to the applicator, adjacent workers, and the environment when properly applied according to EPA and other regulatory agencies.
 - Nontoxic to plants, fish and other wildlife and 100% biodegradable.

4169.10, Special Ditch Control, Turf Reinforcement Mat, Slope Protection, and Outlet or Channel Scour Protection (Transition Mat).

Replace the title:

SPECIAL DITCH CONTROL, TURF REINFORCEMENT MAT, SLOPE PROTECTION, AND OUTLET OR CHANNEL SCOUR PROTECTION (TRANSITION MAT).

4169.10, A, Wire Staples.

Replace the Article:

Meet the following requirements for wire staples ~~for holding special ditch control wood excelsior mat and special ditch control jute mesh over sod:~~

1. U-shaped wire staples.
2. Each leg a minimum of 6 inches long for special ditch control and slope protection and 10 inches long for turf reinforcement mat. In sandy soil conditions the Engineer may require the length of each leg to be a minimum of 12 inches.
3. No. 11 diameter wire.
4. Staples of sufficient hardness to facilitate installation without bending.

4169.10, F, Outlet or Channel Scour Protection (Transition Mat).

Replace the title:

Outlet or Channel Scour Protection (Transition Mat).

4169.12, Perimeter and Slope Sediment Control Device.

Replace the Article:

A. General.

Interstate and Primary highway projects shall use sediment logs only.

1. Provide wattles, sediment logs, and filter socks consisting of ~~wood products (including wood mulch), cereal grain straw, or native grass straw~~ the following materials contained in a tube of photo degradable fabric or synthetic netting:
 - a. Wattles: Cereal straw or native grass straw certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations as Certified Noxious Weed Seed Free Mulch. Wattles with observed seed heads will not be accepted.
 - b. Sediment logs: Wood excelsior fibers with 80% of the wood excelsior fibers being 6 inches long or longer.
 - c. Filter socks: Compost (from an approved source meeting Article 4169.08) wood chips, or mulch.
2. Fill wattles, sediment logs, and filter socks using a mechanical device. Hand filling of wattles, sediment logs, and filter socks will not be allowed.
3. Ensure wattles, sediment logs, and filter socks do not contain:
 - A visible admixture of refuse or other physical contaminants,
 - Germination or growth inhibiting factors, or
 - Material toxic to plant growth.

4. Ensure wattles, sediment logs, and filter socks have waterproof identification tags printed using permanent ink and containing manufacturer's name and address. For wattles and sediment logs, tags shall be attached to the inside of the netting of each wattle or sediment log. For filter socks, tags shall be attached to the outside of each sock.
5. Approved ~~perimeter and slope sediment control devices~~ sediment logs are listed in Materials I.M. 469.10, Appendix E. Wattles and filter socks will be accepted based on the manufacturer's certification.

B. Wattles and Sediment Logs.

- ~~1. Ensure cereal grain straw for wattles or sediment logs is Certified Noxious Weed Seed Free Mulch certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations.~~
- ~~2. Wattles or sediment logs with observed unharvested seed heads will not be accepted.~~
- ~~3. For wood excelsior sediment logs and straw wattles, mMeet the following minimum weight requirements:~~
 - 20 inch sediment logs and straw wattles: 3 pounds per foot with tolerance of 0.25 pounds per foot.
 - 12 inch sediment logs and straw wattles: 2 pounds per foot with tolerance of 0.25 pounds per foot.
 - 9 inch sediment logs and straw wattles: 1 pound per foot with a tolerance of 0.1 pounds per foot.
 - ~~6 inch sediment logs and straw wattles: 0.5 pounds per foot with a tolerance of 0.1 pounds per foot.~~

C. Filter Socks.

Provide filter socks with a maximum 3/8 inch opening ~~and filled with a compost/wood blend filter material consisting of compost from an approved source meeting Article 4169.08.~~

Section 4171

4171.04, Cast Iron Detectable Warning Panels.

Delete the second bullet:

- ~~Wear resistance—ASTM C 501 greater than 8500.~~

4171.05, Steel Detectable Warning Panels.

Delete the second bullet:

- ~~Wear resistance—ASTM C 501 greater than 8500.~~

Section 4185

4185.02, A, 3.

Replace the third sentence:

~~Ensure the structural design of the light pole is based on the~~ Comply with AASHTO 2013 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

4185.02, A, 4.

Replace the first sentence:

The assembled lighting unit, consisting of the pole and all attachments including mastarms, luminaires, and breakaway base or slip base, as specified, complete and in place in the footing anchor bolts, is required to withstand ~~wind loading equal~~ a wind load corresponding to a 90 mph basic wind speed (3 second gust) ~~of 80 mph~~ without fracture or apparent deformation of components.

4185.02, B, Anchor Bolt and Slip-Base Plate Fasteners for Lighting Poles.

Replace Articles 2 through 7:

~~2. Furnish anchor bolts that:~~

- ~~• Meet the requirements of ASTM F 1554, Grade 105~~
- ~~• Are full-length galvanized according to ASTM F 2329, and~~
- ~~• Are Unified Coarse Thread Series with Class 2A tolerance.~~

2. Anchor Bolts, Nuts, and Washers.

Furnish each anchor bolt with one leveling nut, one anchoring nut, and one jam nut (if required) on the exposed end and one of the following on the embedded end: nut, nut and plate, or nut and anchor bolt assembly ring plate. Use anchor bolts, nuts, and washers that comply with Materials I.M. 453.08. Meet the following requirements:

a. Anchor Bolts.

- 1) Use straight full-length galvanized bolts.
- 2) Comply with ASTM F 1554, Grade 105, S4 (-20°F).
- 3) Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
- 4) The end of each anchor bolt intended to project from the concrete is to be color coded to identify the grade.
- 5) Do not bend or weld anchor bolts.

b. Nuts.

- 1) Comply with ASTM A 563, Grade DH or ASTM A 194, Grade 2H.
- 2) Use heavy hex.
- 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- 4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.
- 5) Refer to Articles 2522.03, H, 2, b through h for tightening procedure and requirements.

c. Washers.

Comply with ASTM F 436 Type 1.

d. Galvanizing.

Galvanize entire anchor bolt assembly consisting of anchor bolts, nuts, and washers (and plates or anchor bolt assembly ring plate, if used) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F. Galvanize entire assembly by the same zinc-coating process with no mixed processes in a lot of fastener assemblies.

~~3. Color code the end of each anchor bolt intended to project from the concrete in red to identify the grade.~~

~~4 3. If slip bases are furnished, furnish 1 inch by 4 1/2 inch bolts that:~~

- ~~• Are high-strength bolts meeting the requirements of ASTM A 325, and~~
- ~~• Are fully mechanically galvanized to ASTM B 695, Class 55, Type I.~~

~~5 4. Furnish washers that: comply with ASTM F 436 Type 1.~~

- ~~• Meet the requirements of ASTM F 436, and~~
- ~~• Are galvanized~~

~~6 5. Furnish nuts that meet the following requirements:~~

- ~~• Meet the requirements of ASTM A 563,~~
- ~~• Are grade DH,~~
- ~~• Are heavy hex, and~~
- ~~• Are galvanized according to the requirements of ASTM F 2329, or ASTM B 695, Class 55, Type I.~~
- Comply with ASTM A 563, Grade DH or ASTM A 194, Grade 2H.
- Use heavy hex.
- Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- Nuts may be over-tapped according to the allowance requirements of ASTM A 563.
- Refer to Articles 2522.03, H, 2, b through h for tightening procedure and requirements.

6. Galvanizing.

Galvanize hardware according to the requirements of ADTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F. Galvanize entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

- ~~7. Nuts may be over tapped according to the allowance requirements of ASTM A 563. Nuts may be tapped oversize only enough to provide a finger free fit.~~

4185.02, D, 2.

Replace the Article:

Designed according to AASHTO 2013 Standards and Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

Section 4186

4186.09, A, 4, b.

Replace the Article:

Washers shall be 3/8 inch I.D. by ~~4-3/8~~ 1 1/2 inch O.D. by 0.125 inch.

4186.09, B, Type B Signs.

Replace the Article:

Ensure the fittings described in the paragraphs below, when combined with the aluminum sections and posts, form a complete, assembled sign unit that will meet the specified strength requirements. ~~Though aluminum hardware is specified, equivalent hardware may be furnished in stainless steel or galvanized steel as approved by the Department. Galvanizing is to meet the requirements of ASTM F 2329, or ASTM B 633, Fe/Zn 25.~~

1. Stainless Steel Bolts.

Use the minor thread diameter in determining stress area.

- a. ~~Use post clip bolts and panel bolts made from aluminum wire or rod meeting the requirements of ASTM B 211, Alloy 2024-T4. Comply with ASTM A 320 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.~~
 - **Post clip bolts:** 3/8 inch in diameter and 1 3/4 inches in length, square or rectangular head, manufactured according to the dimensions and details shown in the contract documents.
 - **Panel bolts:** 3/8 inch in diameter and 3/4 inch in length with hexagonal head.
- b. Thread fit is to conform with ANSI, Class 2A.

2. Stainless Steel Nuts.

~~For Type B signs, use nuts manufactured from any aluminum alloy listed in ASTM B 211 or from stainless steel and meeting the following requirements: Comply with ASTM A 194 Grade 8, 8A, 8C, 8CA, 8M, 8MA, 8T, or 8TA; or ASTM F 594 Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2 Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified.~~

a. Post clip nuts:

- Finished, finished thick, regular, or heavy hexagonal, self locking nuts for 3/8 inch bolts, but all nuts to be of the same type.
- Able to withstand a proof load, at room temperature, of 4,730 pounds.

b. Self locking nuts: comply with Article 4186.09, A, 3.

c. Panel bolt nuts:

- Finished hexagonal nuts for 3/8 inch bolts. Able to stand a proof load of 4,200 pounds.
- Thread fit is to conform with ANSI, Class 2B.

3. Stainless Steel Washers.

- a. ~~Use washers made of a quality of material approved by the Engineer. Comply with ANSI B18.22.1 for the bolts specified.~~
- b. Meet requirements of ASTM A 240. Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified.
- ~~b c.~~ Post clip washers and panel bolt washers are to be flat 7/16 inch I.D. by 1 inch O.D. by 0.078 inch.
- ~~c d.~~ A thickness tolerance of ± 0.006 inch is allowed.

4. Post Clips.

- a. Use aluminum castings manufactured according to the contract documents.
- b. Ensure clips are able to withstand the load requirements of the bolt specified.

5. Edge Trim Molding.

Meet the following requirements:

- a. Molding is attached to the signs by means of self tapping, 300 series, stainless steel, machine screws, Size 8-32.
- b. Pan head, binding head, or truss head screw is used.
- c. A screw is installed 1/2 inch from the end of each section of molding. Intermediate screws are installed no more than 12 inches apart.

4186.09, C, Delineators, Milepost Markers, and 6 Inch by 6 Inch (150 mm by 150 mm) Route Markers.

Replace the title:

Delineators, Milepost Markers Reference Location Signs, and 6 Inch by 6 Inch (150 mm by 150 mm) Route Markers.

4186.09, C, 2.

Replace the Article:

Fasten milepost markers reference location signs and 6 inch by 6 inch route markers to the post as shown in the contract documents.

4186.10, C, Posts for Delineators, Milepost Markers, and 6 Inch by 6 Inch Route Markers.

Replace the title:

Posts for Delineators, Milepost Markers Reference Location Signs, and 6 Inch by 6 Inch Route Markers.

Section 4187

4187.01, C, 3, Anchor Bolts, Nuts, and Washers.

Replace the Article:

~~Meet the following requirements:~~ Furnish each anchor bolt with one leveling nut, one anchoring nut, and one jam nut on the exposed end and one of the following on the embedded end if the anchor bolt is straight: nut, nut and plate, or nut and anchor bolt assembly ring plate. Use anchor bolts, nuts, and washers that comply with Materials I.M. 453.08. Meet the following requirements:

a. Anchor Bolts.

- 1) Use full-length galvanized bolts.
- 2) Comply with either ASTM F 1554, Grade 55, S1; or Grade 105, S5 S4 (-20°F).
- 3) Grade 55 anchor bolts may be straight or include a 90 degree bend.
- 4) Grade 105 anchor bolts shall be straight.
- ~~3~~ 5) Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
- ~~4~~ 6) The end of each anchor bolt intended to project from the concrete is to be color coded to identify the grade.
- ~~5~~ 7) Do not bend or weld anchor bolts.

b. Nuts.

- 1) Comply with ASTM A 563, Grade DH or ASTM A 194,
- 2) Use heavy hex.
- 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- 4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.
- 5) Refer to Articles 2522.03, H, 2, b through h for tightening procedure and requirements.

c. Washers.

Comply with ASTM F 436 Type 1.

d. Galvanizing.

Galvanize entire anchor bolt assembly (~~anchor bolt, nuts and washers~~) consisting of anchor bolts, nuts, and washers (and plates or anchor bolt assembly ring plate, if used) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F. Galvanize

entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

Section 4188

4188, Traffic Control Devices.

Add the Article:

4188.08 TEMPORARY PORTABLE RUMBLE STRIPS.

Furnish temporary portable rumble strips to be used in traffic control zones. Ensure temporary portable rumble strips meet requirements of MUTCD and the following:

A. Properties.

1. Rated for posted speed limits up to 70 mph.
2. Installation without using nails or adhesive.
3. Provides auditory and tactile warnings for all vehicles.
4. Minimal lateral displacement under traffic loading.
5. Installation and removal of rumble strips in less than 5 minutes.
6. Reusable within manufacturer's recommended life of the product.

B. Acceptance.

Comply with Materials I.M. 488.07 for inspection and acceptance of temporary portable rumble strips.

Section 4189

4189.04, A, 2, c.

Replace the first sentence:

Police door with auto/flash switch, manual/stop time switch, and on/off power switch for signal heads only.

4189.05, Poles, Heads, and Signs.

Replace Article A and renumber Articles A and B:

A C. Traffic Signal Poles and Mast Arms.

1. General.

- a. Use Mast arm length and vertical pole height as specified in the contract documents.
- b. Ensure the mast arms, poles, and supporting bases are galvanized ~~inside and out~~ on both interior and exterior surfaces according to ASTM A 123.
- c. Use ~~C~~continuously tapered, round steel poles of the transformer base type. Fabricated poles from low carbon (maximum carbon 0.30%) steel of U.S. standard gauge.
- d. When a transformer base is not specified, provide a 6 inch by 16 inch handhole in the pole shaft for cable access. Provide a cover for the handhole. Secure the cover to the base with simple tools. ~~Hardware to be~~ Use corrosion resistant hardware.
- e. Ensure minimum yield strength of 48,000 psi after manufacture. Supply base and flange plates of structural steel complying with ~~AASHTO M 183~~ ASTM A 36 and cast steel complying with ASTM A 27, Grade 65-35 or better.
- f. Where a combination street lighting/signal pole is specified in the contract documents, ensure the luminaire arm is ~~to be~~ mounted in the same vertical plane as the signal arm unless otherwise specified. Use a luminaire arm of the single member tapered type ~~arm for the luminaire arm type.~~
Equip Fabricate the pole with a minimum 4 inch by 6 inch handhole and cover located opposite the signal mast arm.
- g. If allowed by the Engineer, poles and mast arms may be fabricated by shop welding two sections together, resulting in a smooth joint ~~and factory weld~~ as follows:

- 1) Ensure a minimum of 60% penetration for longitudinal butt welds in plates 3/8 inch and less in thickness for longitudinal butt welds, except within 1 foot of a transverse butt-welded joint. Ensure a minimum of 80% penetration for longitudinal butt welds in plates over 3/8 inch in thickness.
 - 2) Ensure 100% penetration for longitudinal butt welds in poles and arms within 1 foot of a transverse butt-welded joint.
 - 3) Ensure 100% penetration, achieved by for transverse butt welds by using a back-up ring or bar, for transverse butt welds for connecting to connect the sections.
 - 4) Examine 100% the full length of all transverse butt welds and 100% penetration longitudinal butt welds by ultrasonic inspection according to the requirements of ANSI/AWS D1.1-80.AH.
 - 5) Comply with ~~Structural Welding Code AWS D1-180, as modified by AASHTO 1981 Standard Specifications for Welding of Structural Steel Highway Bridges and by Supplemental Specifications No. 969~~ ANSI/AWS D1.1 except as modified by Article 2408.03, B.
- h. Provide non-shrink grout (complying with Materials I.M. 491.13) or a rodent guard (complying with Materials I.M. 443.01) for placement between the pole base and the foundation.
- 2. Pole Design.**
- a. Comply with AASHTO 1994 2013 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Use a 90 mph basic wind speed (3 second gust) with a 50 year mean recurrence interval for strength design. Use Category II for fatigue design. Apply only natural wind gust loads (i.e., do not apply galloping loads, vortex shedding loads, or truck-induced gust loads) for fatigue design. Install vibration mitigation devices on all traffic signal pole mast arms over 60 feet in length as shown in the standard details.
 - ~~b. Designed to support the loading necessary for all traffic control equipment. Capable of withstanding winds up to 80 mph with a 1.3 gust factor without failure.~~
- 3. Hardware.**
- ~~a. Equipped poles and mast arms with all necessary hardware and anchor bolts to provide for a complete installation without additional parts.~~
 - ~~b. Use A anchor bolts complying with ASTM F 1554 Grade 105 S5 Class 2A,; hot dip galvanized, and threaded to a minimum of 6 inches at one end; and having a 4 inch long, 90 degree bend at the other end.~~
 - ~~c. Use W washers complying with ASTM F 436 Type 1.~~
 - ~~d. Use H heavy hex nuts complying with ASTM A 563 Grade DH Class 2B.~~
 - ~~e. Ensure A all hardware is made of steel, and is hot dipped galvanized complying with according to ASTM F 2329, with a zinc bath temperature limited to 850 F or mechanically galvanized according to ASTM B 695, Class 50 55, Type 1, or electrodeposited coated of the same coating thickness and designed for this purpose.~~
- 4. Anchor Bolts, Nuts, and Washers.**
- Furnish each anchor bolt with one leveling nut, one anchoring nut, and one jam nut (if required) on the exposed end and one of the following on the embedded end: nut, nut and plate, or nut and anchor bolt assembly ring plate. Use anchor bolts, nuts, and washers that comply with Materials I.M. 453.08. Meet the following requirements:
- a. **Anchor Bolts.**
 - 1) Use straight full-length galvanized bolts.
 - 2) Comply with ASTM F 1554, Grade 105, S4 (-20°F).
 - 3) Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
 - 4) The end of each anchor bolt intended to project from the concrete is to be color coded to identify the grade.
 - 5) Do not bend or weld anchor bolts.
 - b. **Nuts.**
 - 1) Comply with ASTM A 563, Grade DH or ASTM A 194, Grade 2H.
 - 2) Use heavy hex.
 - 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
 - 4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.
 - 5) Refer to Articles 2522.03, H, 2, b through h for tightening procedure and requirements.
 - c. **Washers.**
Comply with ASTM F 436 Type 1.
 - d. **Galvanizing.**

Galvanize entire anchor bolt assembly consisting of anchor bolts, nuts, and washers (and plates or anchor bolt assembly ring plate, if used) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F. Galvanize entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

B D. Traffic Signal Pedestal Poles.

4189.05, D, 2.

Replace the Article:

Anchor Bolts: Four 3/4 inch by 15 inch steel, hot dip galvanized anchor bolts complying with ASTM F 1554, Grade 36, with right angle bend at the bottom end, complete with all hardware required for installation.

Section 4196

4196.01, B, 2, Subsurface Drainage.

Replace Table 4196.01-2:

Table 4196.01-2: Fabric for use in Subsurface Drains

Property	Value	Test Method
Grab strength, dry, minimum average value in either principal direction	90 lbs.	ASTM D 4632
Elongation, dry, minimum average value in either principal direction	20%	ASTM D 4632
Permittivity, minimum	0.02 0.30 0.1 sec ⁻¹	ASTM D 4491
Apparent Opening Size, maximum	US Sieve No. 40	ASTM D 4751

4196.01, B, 3, Embankment Erosion Control.

Replace Table 4196.01-3:

Table 4196.01-3: Fabric for use as Embankment Erosion Control

Property	Value	Test Method
Grab strength, dry, minimum average value in either principal direction	150 lbs.	ASTM D 4632
Elongation, dry, minimum average value in either principal direction	20%	ASTM D 4632
Permittivity, minimum	0.02 0.30 0.1 sec ⁻¹	ASTM D 4491
Apparent Opening Size, maximum	US Sieve No. 40	ASTM D 4751

4196.01, B, 5, a.

Replace the second bullet:

Has the properties listed in Table 4196.01-5 ~~for the type specified for use in the contract documents.~~

4196.01, B, 6, Bridge Abutment Backfill Fabric.

Replace Table 4196.01-6:

Table 4196.01-6: Fabric for use in Bridge Abutment Backfill

Property	Value	Test Method
Tensile Strength (at 5% Strain), minimum	1356 lbs/ft	ASTM D 4595
Apparent opening size (AOS), maximum	US Sieve #40	ASTM D 4751
UV resistance (at 500 hours)	70% retained strength	ASTM D 4355
Flow Rate, maximum minimum	48 20 10 gal./min./ft ²	ASTM D 4491

Appendix.

Appendix.

Replace the Aggregate Gradation Table:

AGGREGATE GRADATION TABLE															
Grad. No.	Section No.	Std. Sieve Sz.	1 1/2"	1.00"	3/4"	1/2"	3/8"	4	8	30	50	100	200	Notes	
		Intended Use	Percent Passing												
1	4110, 4125, 4133, 4134	PCC FA, Cover Agg.					100	90-100	70-100	10-60			0-1.5	1	
2	4112	PCC Intermediate				95-100			0-10						
3	4115 (57, 2-8), 4118	PCC CA	100	95-100		25-60		0-10	0-5				0-1.5	2, 10	
4	4115 (2-8)	PCC CA	100	50-100	30-100	20-75	5-55	0-10	0-5				0-1.5	10	
5	4115 (67, 2-8)	PCC CA		100	90-100		20-55	0-10	0-5				0-1.5	10	
6	4115.06 (Repair & Overlay)	PCC CA			100	90-100	40-90	0-30					0-1.5	10	
7	4117 (Class V)	PCC FA & CA	100					80-92	60-75	20-40					
8	4117.03 (Class V)	Fine Limestone					100	90-100					0-30		
10	4119, 4120.02, 4120.03 (C gravel)	Granular Surface			100			50-80	25-60					3, 11	
11	4119, 4120.02, 4120.04, 4120.05, 4120.07, (A, B Cr. St.)	Granular Surface & Shoulder		100	95-100	70-90		30-55	15-40				6-16	4, 5, 11	
12a	4121 (Cr. St.)	Granular Subbase	100			40-80			5-25				0-6	6, 11	
12b	4121 (Cr. Gravel)	Granular Subbase	100			50-80			10-30		5-15		3-7	7, 11	
13	4122.02 (Cr. St.)	Macadam St. Base	3" nominal maximum size screened over 3/4" or 1.00" screen.												
14	4123	Modified Subbase	100		70-90				10-40				3-10	5, 7, 11	
19	4125 (1/2") Cr. Gr. or Cr. St.)	Cover Aggregate			100	97-100	40-90	0-30	0-15				0-1.5	11	
20	4125 (1/2" Scr. Gr.)	Cover Aggregate			100	95-100	40-80	0-15	0-7				0-1.5	11	
21	4125 (3/8")	Cover Aggregate				100	90-100	10-55	0-20	0-7			0-1.5	11	
22	4124	Fine Slurry Mixture					100	85-100	40-95	20-60	14-35	10-25	5-25	9, 11	
23	4124 (Cr. St.)	Coarse Slurry Mixture					100	70-90	40-70	19-42			5-15	11	
29	4131	Porous Backfill			100	95-100	50-100	0-50	0-8					11	
30	4132.02 (Cr. St.)	Special Backfill	100						10-40				0-10	5, 11	
31	4132.03 (Gravel)	Special Backfill		100	90-100	75-100			30-55				3-7	11	
32	4133 (Sand/Gr./Cr. St.)	Granular Backfill	100% passing the 3" screen								10-100			0-10	8, 11
35	4134 (Natural Sand/Gr.)	Floodable Backfill	100						20-90				0-4	11	
36	4134 (Natural Sand)	Floodable Backfill						100					0-2	11	
37	2320 (Quartzite/Granite/Slag)	Polymer-Modified Microsurfacing					100	90-100	65-90	30-50	18-30	10-21	5-15	12, 13	
38	2320 (limestone/Dolomite)	Polymer-Modified Microsurfacing					100	70-90	45-70	15-35	10-25	5-20	5-15	12, 13	

Notes: (Gradations No. 9, 15, 16, 17, 18, 24, 25, 26, 27, 28, 33, and 34 have been deleted)

1. For Section 4110, when the fine aggregate is sieved through the following numbered sieves - 4, 8, 16, 30, 50, and 100 - no more than 40% shall pass one sieve and be retained on the sieve with the next higher number.
2. When used in precast and prestressed concrete bridge beams, 100% shall pass the 1.00" sieve. When used for pipe bedding the No. 200 restriction does not apply.
3. When compaction of material is a specification requirement, the minimum percent passing the No. 200 sieve is 6%.
4. See specifications for combination of gravel and limestone.
5. Unwashed air dried samples of crushed composite material shall be tested for gradation compliance except that no gradation determination will be made for material passing the No. 200 sieve.
6. The gradation requirement for the No. 8 sieve shall be 5% to 20% when recycled material is supplied.
7. For Section 4121 gravel, one fractured face on 30% or more of the particles retained on the 3/8 inch sieve. For Section 4123 gravel, one fractured face on 75% or more of the particles retained on the 3/8 inch sieve.
8. Crushed stone shall have 100% passing the 1½" sieve.
9. Gradation limitations for the 30, 50, and 100 sieves shall not apply when slurry mixture is applied by hand lutes, such as for slurry leveling.
10. Maximum of 2.5% passing the No. 200 sieve allowed if for crushed limestone or dolomite when documented production is 1% or less.
11. When Producer gradation test results are used for acceptance, test results representing at least 90% of the material being produced shall be within the gradation limits and the average of all gradation results shall be within the gradations limits. Stockpiled material not meeting the criteria may, at the District Materials Engineer's discretion, be resampled using Materials I.M. 301 procedures. One hundred percent of the stockpile quality control and verification test results shall be within the gradation limits.
12. For Quartzite/Granite/Slag: 45% to 70% passing No. 16 Sieve; for Dolomite/Limestone: 25% to 50% passing No. 16 Sieve.
13. Percent passing shall not go from the high end to the low end of the range for any two consecutive screen.