SECTION 703 - AGGREGATES

Make the following amendments to said Section:

(I) Amend **703.01 Fine Aggregate for Concrete** by revising the second paragraph to read as follows:

"When using a combination of calcareous sand and lava rock crusher screenings, the absolute volume of calcareous sand shall be less than 50% of the absolute volume of the combined fine aggregate. The Contractor may increase the usage of calcareous sand to 70% of the absolute volume of the fine aggregate provided that the fine aggregate meets a minimum insoluble residue of 30% and the processing or manufacturing of calcareous sand removes deleterious coatings and unsound materials. Insoluble residue content shall be determined according to ASTM D 3042 - Insoluble Residues in Carbonate Aggregates."

(II) Amend **703.02 Coarse Aggregate for Portland Cement Concrete** by revising the fourth paragraph to read as follows::

"The coarse aggregate shall not contain deleterious substances over the following limits:

Test	Test Method	Requirement
Clay Lumps and Friable Particles	AASHTO T 112	2.0%
Materials Passing the No. 200 Sieve	AASHTO T 11	1.5%
Coal and Lignite	AASHTO T 113 using liquid of 2.0 specific gravity. Consider only brownish-black or black material as coal or lignite. Do not class coke as coal or lignite	0.5%"

(III) Add the following:

"703.04 Aggregate for Permeable Base. Furnish the aggregate for permeable base in the fractions specified herein:

(A) Coarse Aggregate. Manufacture the coarse aggregate by crushing and screening hard, tough, durable rock of uniform quality. The coarse aggregate shall be free from soft or disintegrated pieces, clay, dirt, or other deleterious substances.

When manufacturing the coarse aggregate from gravel, use only gravel particles retained on a grizzly or screen having five-inch openings in the manufacturing process.

When tested according to the designated methods, the coarse aggregate shall conform to the requirements as set forth herein.\

Test	Test Method	Requirement
Los Angeles Abrasion	ASTM C 535	40% Maximum
Grading	AASHTO T 27	Refer to Table 703-IIIA

(B) Filler. The filler includes that portion of the material crushed from the coarse aggregate. The filler shall pass a 0.5-screen. When not producing sufficient filler in the manufacture of the coarse aggregate, the deficiency may be supplied by the addition of other suitable materials having the same properties to that of the crushed product.

The filler may also be manufactured separately from the manufacture of the coarse aggregate. Material for separately manufactured filler shall also be of a suitable material having the same properties as that of the filler produced from the manufacture of the coarse aggregate.

When tested according to AASHTO T 27, the filler shall meet the grading requirements shown in Table 703-IIIA.

TABLE 703-IIIA - GRADING REQUIREMENTS		
Screen Size	**Coarse Aggregate (% Passing By Weight)**	**Filler, Size 8 (% Passing By Weight)**
2 inch	100	-
1.5 inch	75 – 100	-
1 inch	15 – 55	-
0.75 inch	0 – 15	-
0.5 inch	--	100
0.375 inch	0 – 5	85 – 100
No. 4	-	10 – 30
No.8	-	0 – 30
No. 16	-	0 – 5

(IV) Delete **703.05 Aggregate for Waterbound Macadam Base** in its entirety.

(V) Amend **703.06 Aggregate for Untreated Base** to read as follows:

"**703.06 Aggregate for Untreated Base.** Aggregate for untreated base includes a crushed product of stone or coral. The aggregate shall be free of vegetable matter and other deleterious substances. The aggregate shall be of such nature that the aggregate can readily be compacted under watering and rolling to form a firm, stable base.

When the mineral aggregate does not contain sufficient natural cementing material, add to and mix a binder material including rock screenings or other accepted cementaceous material uniformly into the aggregate before compaction.

Regulate the crushing so that at least 80% by weight of the material retained on the No. 4 sieve is crushed. A crushed particle is one having at least one mechanically fractured face.

When tested according to the designated methods, the aggregate base in combination with the binder material, if used, shall meet the requirements below.

Test	Test Method	Requirement
Los Angeles Abrasion	AASHTO T 96	40% Maximum
Sand Equivalent	AASHTO T 176	35% Minimum
Plasticity Index	AASHTO T 90	6 Maximum
Grading	AASHTO T 27	Refer to Table 703-IV

TABLE 703-IV - GRADING REQUIREMENTS

Screen Size	% Passing by Weight		
	2.5" Maximum	1.5" Maximum	0.75" Maximum
3 inch	100	-	-
2.5 inch	90 - 100	-	-
2 inch	-	100	-
1.5 inch	65 - 90	90 - 100	-
1 inch	-	-	100
0.75 inch	45 - 70	50 - 90	90 - 100
No.4	25 - 45	25 - 50	35 - 55
No. 200	3 - 9	3 - 9	3 - 9

When the portion passing the No. 4 sieve consists entirely of crushed coralline limestone, the SE requirement shall be 20% or more and the grading requirement on the No. 200 sieve shall be 3% to 12% instead of that specified in Table 703-IV.

Furnish 1.5 inch maximum size aggregate."

(VI) Amend **703.09 Aggregate for Hot Plant Mix Bituminous Pavement** to read as follows:

"703.09 Aggregate for Hot Plant Mix Bituminous Pavement. Make mineral aggregate by crushing and screening hard, tough, durable stone of uniform quality. The crushed aggregate shall be free from soft or disintegrated pieces, clay, dirt, or other deleterious substances.

Coarse aggregate shall be that portion of the mineral aggregate retained on a No. 4 sieve. Fine aggregate shall be that portion of the mineral aggregate passing a No 4 sieve.

At least 90% by weight of the material retained on the No. 4 sieve shall consist of crushed particles. At least 70% of the material passing the No. 4 sieve and retained on the No. 8 sieve shall consist of crushed particles. A crushed particle is one having at least one mechanically fractured face.

When tested according to the designated methods, the combined mineral aggregate including blending sand or filler, if any, shall meet the requirements below.

Test	Test Method	Requirement
Sand Equivalent	AASHTO T 176	50% Minimum
Los Angeles Abrasion	AASHTO T 96	30% Maximum
Stripping	AASHTO T 182	Above 95%
K-factor	AASHTO T 270	Kc-2.0 Maximum Km-1.7 Maximum
Flat and elongated pieces (Length to width or width to thickness ratio of 3)	ASTM D 4791 (By Weight)	25% Maximum
Grading	AASHTO T 27	Job-mix formula based on Table 703-V
Soundness	AASHTO T 104 (5 cycles using sodium sulfate)	9% Maximum
Absorption	AASHTO T84 and T85	5% Maximum

The Contractor may use aggregates not meeting the requirements of the stripping test for bituminous pavement provided a chemical additive is use resulting in bituminous film retention above 95%.

TABLE 703-V - GRADING COMPOSITION				
MIX NO.	**II**	**III**	**IV**	**V**
Sieve Sizes	**Combined Aggregate % Passing by Weight**			
1.25 Inch	100	-	-	
1 Inch	85 - 100	100	-	
0.75 Inch	-	90 – 100	100	
0.5 Inch	60 - 85	70 – 90	85 - 100	100
0.375 Inch	-	-	72 - 88	80 - 100
No. 4	36 - 55	40 – 57	48 - 66	55 - 75
No. 8	26 - 41	30 – 47	32 - 48	35 - 52
No. 16	17 - 32	20 – 36	21 - 37	22 - 38
No. 30	12 - 25	16 – 28	15 - 27	14 - 26
No. 50	8 - 18	10 – 22	9 - 21	8 - 20
No. 100	5 - 14	8 – 17	6 - 16	6 - 15
No. 200	1 - 8	4 – 10	4 - 10	4 - 10

With prior acceptance by the Engineer, the Contractor may lower the sand equivalent requirement from 50% to 40% minimum provided the material finer than the No. 200 sieve does not exceed 8% and the ratio of dust (minus No. 200 sieve material) to asphalt cement is between 1.2 and 0.6."

(VII) Amend **703.12 Aggregate for Roadway Construction** by revising the second paragraph to read as follows:

"When tested according to the designated methods, the aggregate shall meet the requirements below:

Test	Test Method	Requirement
Flat and elongated pieces (Length to width to width to thickness ratio of 3)	ASTM D 4791 (By Weight)	25% Maximum
Los Angeles Abrasion	AASHTO T 96	40% Maximum
Stripping	AASHTO T 182	Above 95%
Grading	AASHTO T 27	AASHTO M 43"

(VIII) Amend **703.16 Bed Course Material** to read as follows:

"703.16 Bed Course Material.

(A) Bed Course Material for Sidewalks and Curbing. Bed course material for sidewalks and curbing includes 1-1/2 inch maximum size untreated base material conforming to Subsection 703.06 - Aggregate for Untreated Base.

(B) Bed Course Material for Pipe. Bed course material for pipe foundation includes 1-1/2 inch maximum size untreated base material conforming to Subsection 703.06 - Aggregate for Untreated Base.

If used as a foundation for pipe culvert and tested according to Hawaii Test Method HDOT TM 4, the material shall have a field resistivity and pH value resulting in a service life of 50 years or more.

If used as a foundation for aluminum pipe and tested according to Hawaii Test Method HDOT TM 4, the material shall have a field resistivity of more than 500 ohm-centimeters and pH value within the range of 5.5 and 9.0

(C) Bed Course Material for Crushed Rock Cradle. Bed course material for crushed rock cradle shall be crushed durable lava rock. The bed course material shall be free from vegetable matter and other deleterious substances. The wear shall not exceed 40 percent at 500 revolutions if tested under AASHTO T 96.

Bed course material shall be coarse aggregate size No. 67 and the percent composition by weight shall fall within the limits shown in Table 1 of AASHTO M 43."

(IX) Amend **703.20 Structure Backfill Material** to read as follows:

"703.20 Structure Backfill Material. Structure backfill material shall be free of vegetable matter and other deleterious substance and shall conform to the grading requirements in Table 703-VII.

(A) Structure Backfill Material A. When tested according to AASHTO T 176, the sand equivalent value shall be 20 or greater.

(B) Structure Backfill Material B. When tested according to AASHTO T 176, the sand equivalent value of the backfill material shall be equal to or greater than the surrounding soil.

Structure fill or backfill material placed behind bridge abutments, wingwalls and retaining walls shall be structure backfill material A. The contract shall show the other areas requiring material with a sand equivalent value of 20 or greater.

TABLE 703-VII - GRADING REQUIREMENTS		
Sieve Size	% Passing by Weight	
	Structural Backfill Mat'l A	Structural Backfill Mat'l B
3"	100	100
#4	20 - 75	20 – 100
#200	0-15	--

(X) Amend **703.21 Trench Backfill Material** to read as follows:

"**703.21 Trench Backfill Material.** Trench backfill material shall be black sand-soil mixture, finely graded coral or sandy materials. The trench backfill material shall pass a one inch square mesh screen or crusher screening S4C that shall pass a 0.5 inch square mesh screen. The material shall be free from deleterious substances. For water system trench backfill, do not use crusher screening S4C in areas where the invert of the pipe is at or lower than the four-foot elevation, USGS Datum, or in swampy area or in area where the ground is continuously wet.

(A) Trench Backfill Material A. When tested according to AASHTO T 176, the sand equivalent value shall be 20 or greater.

(B) Trench Backfill Material B. When tested according to AASHTO T 176, the sand equivalent value of the backfill material shall be equal to or greater than the surrounding soil.

Prepare the sand equivalent test sample according to Hawaii Test Method HDOT TM 5 when the in-situ moisture content of the sample is greater than 40%.

When tested according to Hawaii Test Method HDOT TM 4, the trench backfill material placed against metal pipe shall have a field resistivity and pH value that shall result in a service life of 50 years or more.

When tested according to the Hawaii Test Method HDOT TM 4, the trench backfill material placed against aluminum pipe shall have a field resistivity of more than 500 ohm-centimeters and pH value within the range of 5.5 and 9.0."

END OF SECTION