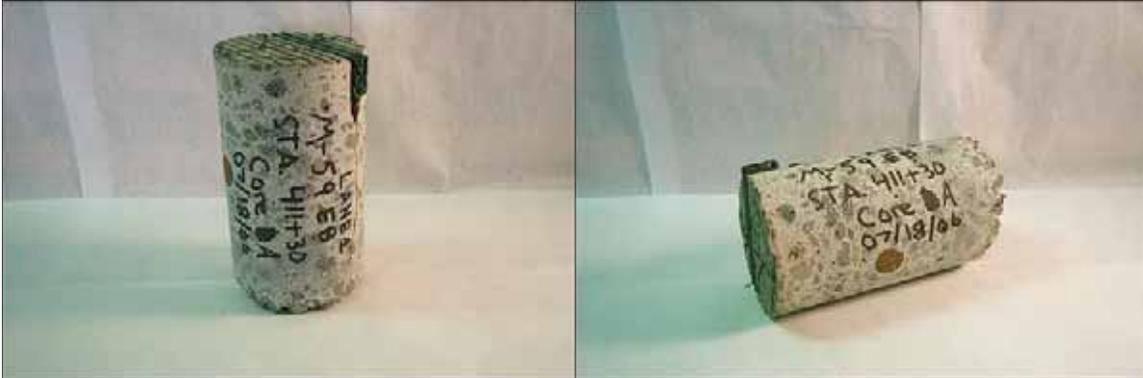


Appendix C
M-59 Core Site



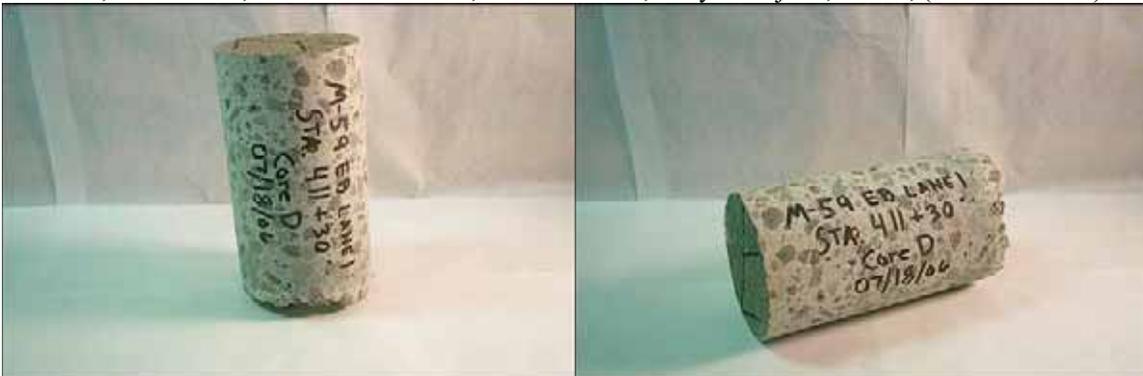
EB M-59, outside lane, constructed 1997/98, station 411+30, at joint, core A, (MTU ID 59-01).



EB M-59, outside lane, constructed 1997/98, station 411+30, at joint, core B, (MTU ID 59-06).



EB M-59, outside lane, constructed 1997/98, station 411+30, away from joint, core C, (MTU ID 59-02).



EB M-59, outside lane, constructed 1997/98, station 411+30, away from joint, core D, (MTU ID 59-03).

Appendix C
M-59 Core Site



EB M-59, shoulder, constructed 1997/98, station 411+30, at joint, core A, (MTU ID 59-05).

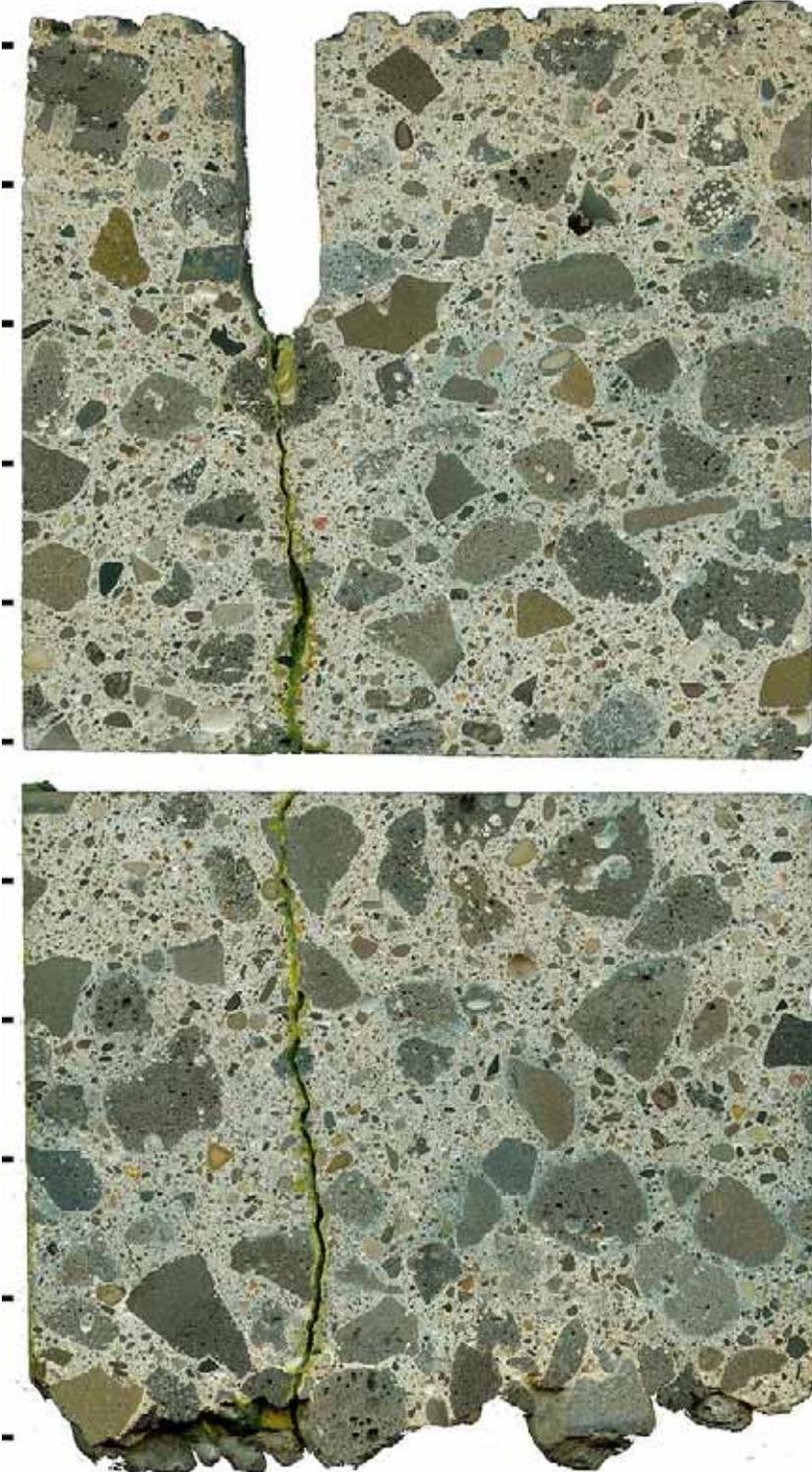


EB M-59, shoulder, constructed 1997/98, station 411+30, near joint?, core B, (MTU ID 59-04).



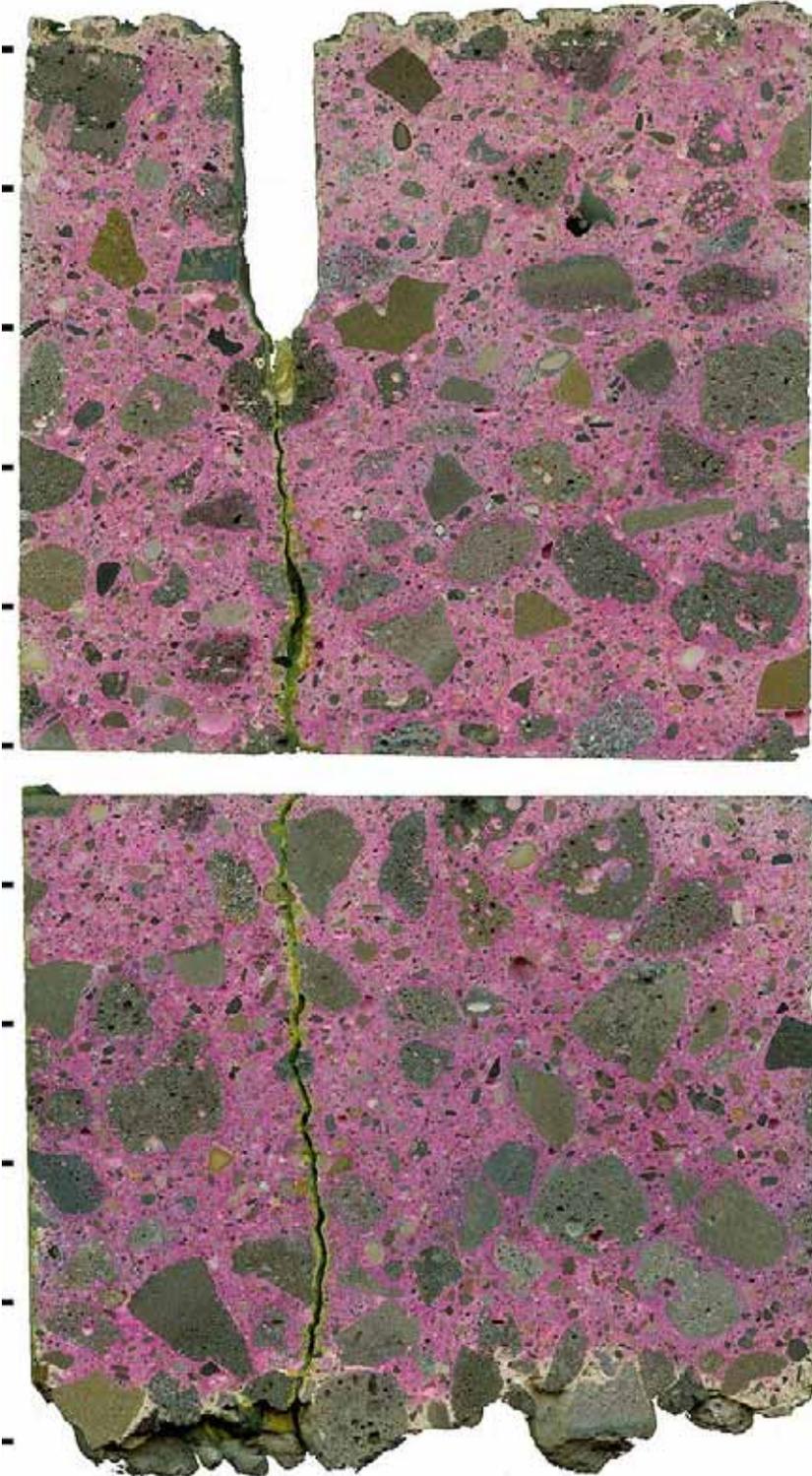
EB M-59, middle lane, constructed 1997/98, station 411+30, near joint?, core E, (MTU ID 59-07).

Appendix C
M-59 Core Site



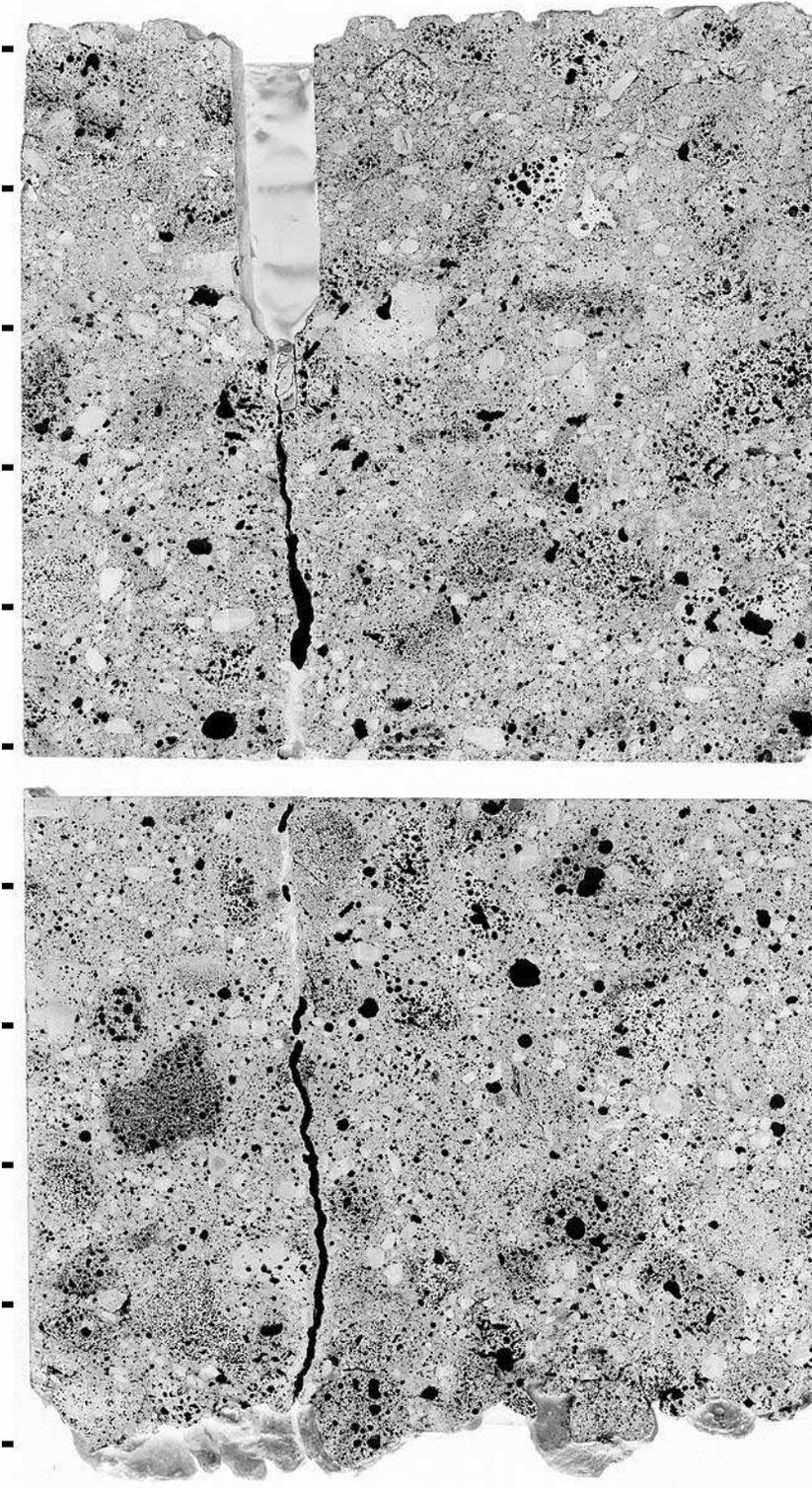
Slabs representing full cross section through pavement, as polished, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every inch.

Appendix C
M-59 Core Site



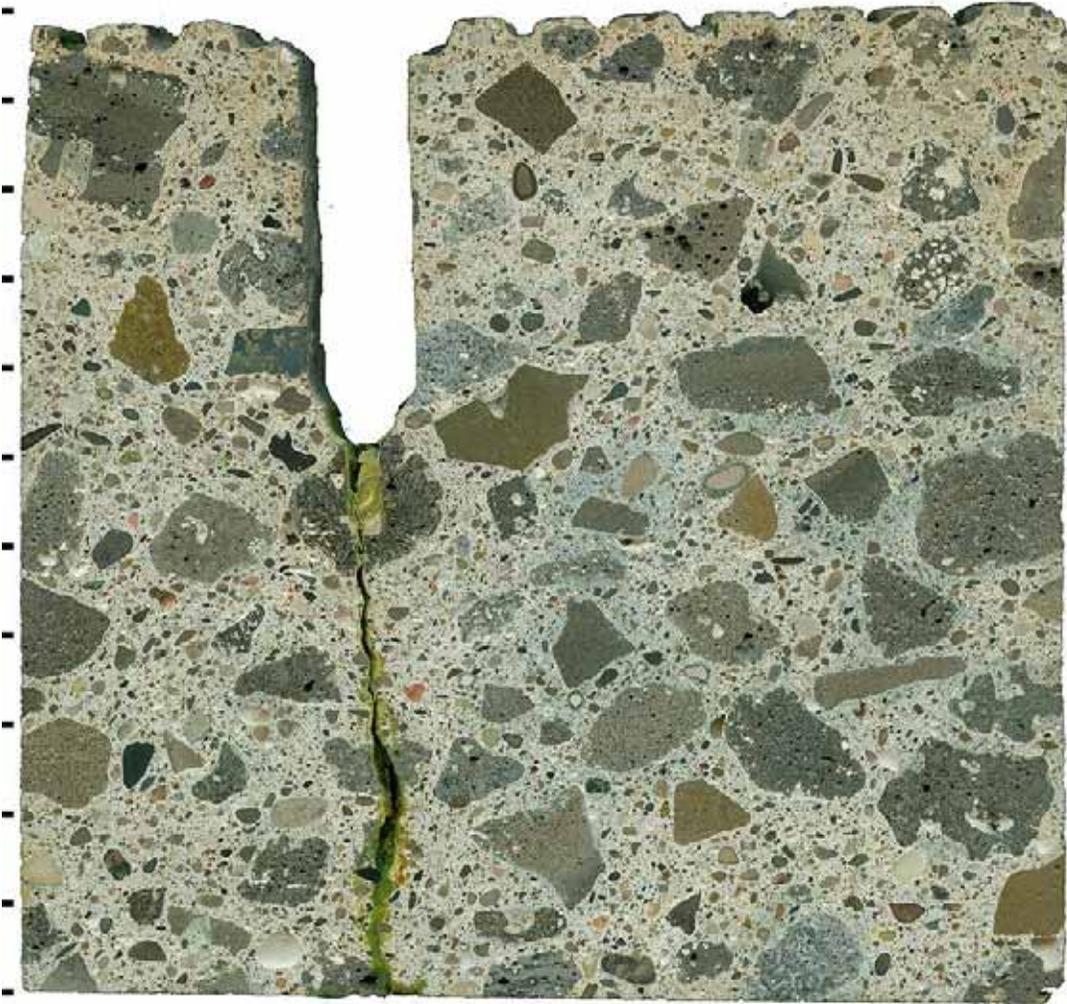
Slabs representing full cross section through pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every inch.

Appendix C
M-59 Core Site



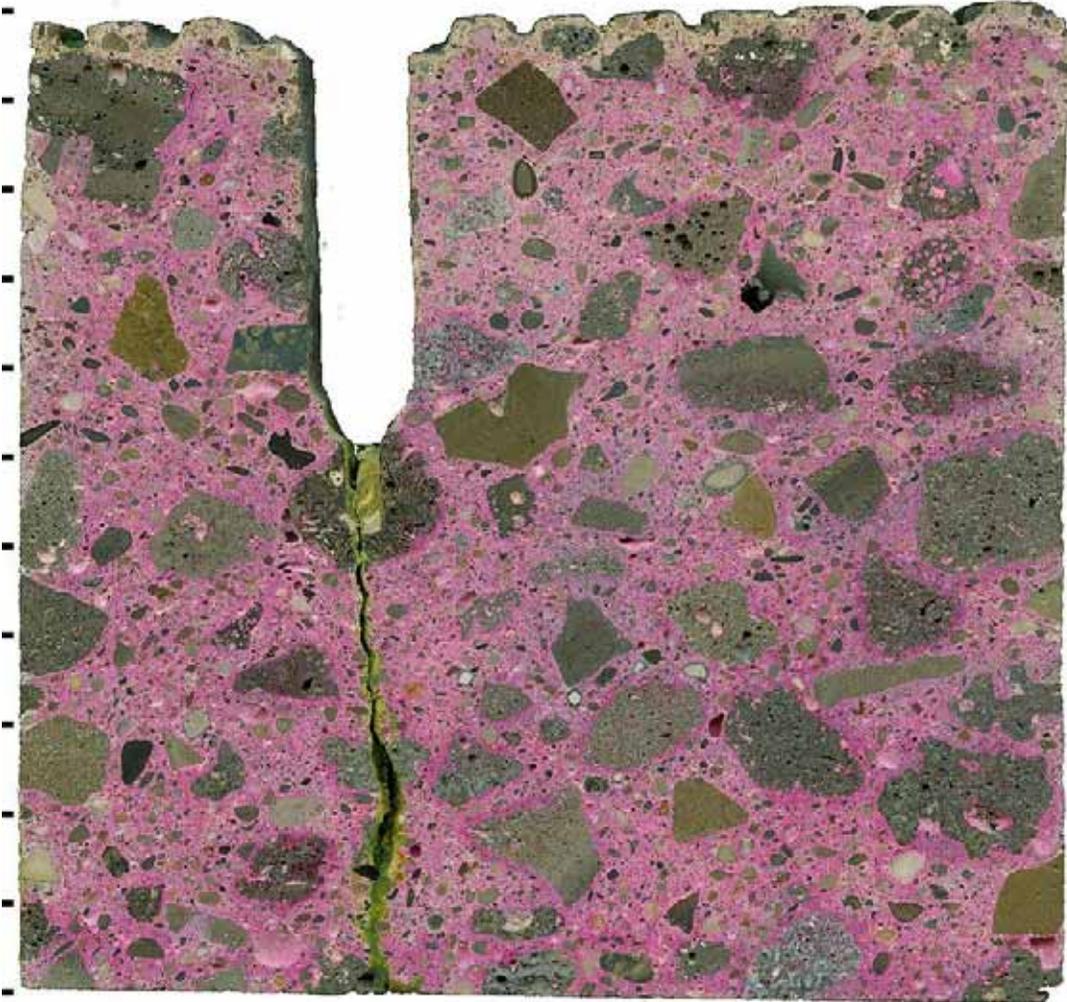
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every inch.

Appendix C
M-59 Core Site



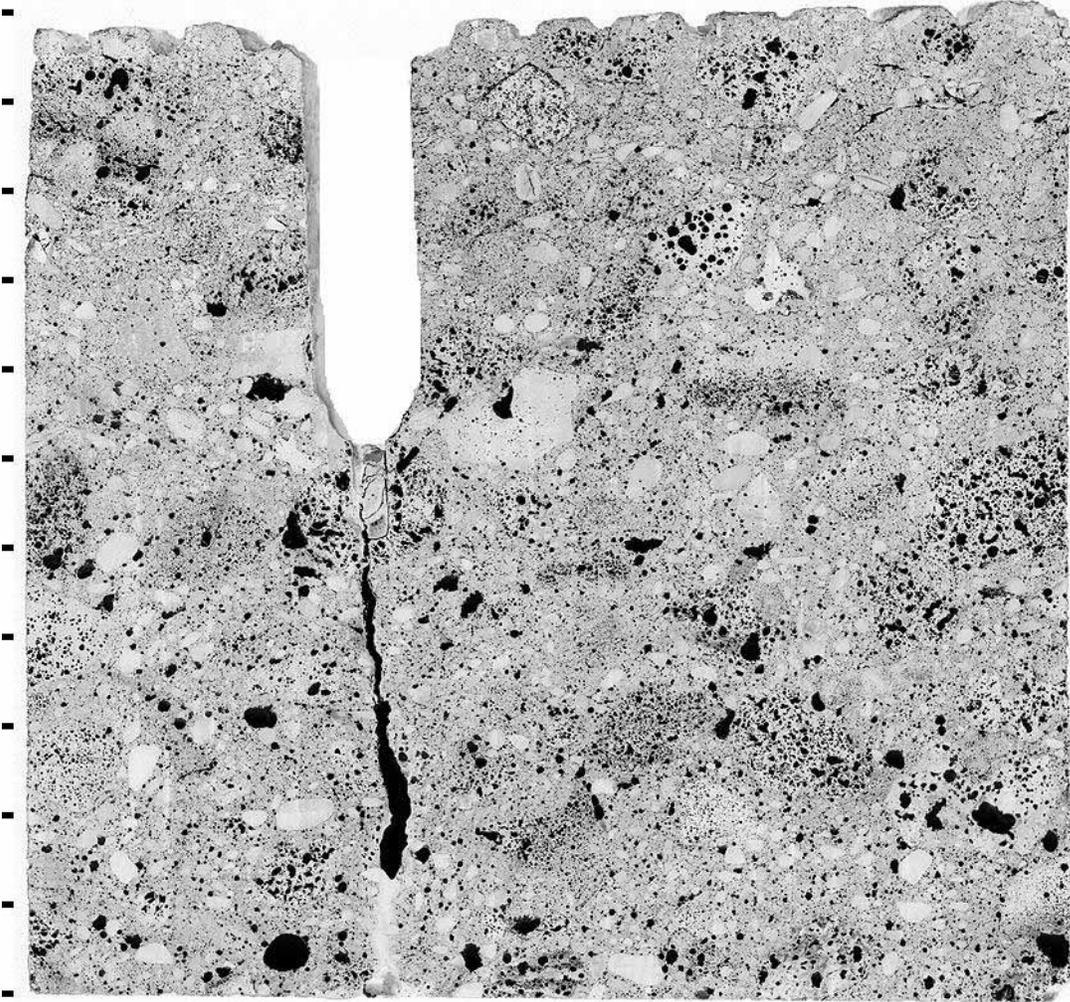
Slab representing cross section through top half of pavement, as polished, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



Slab representing cross section through top half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



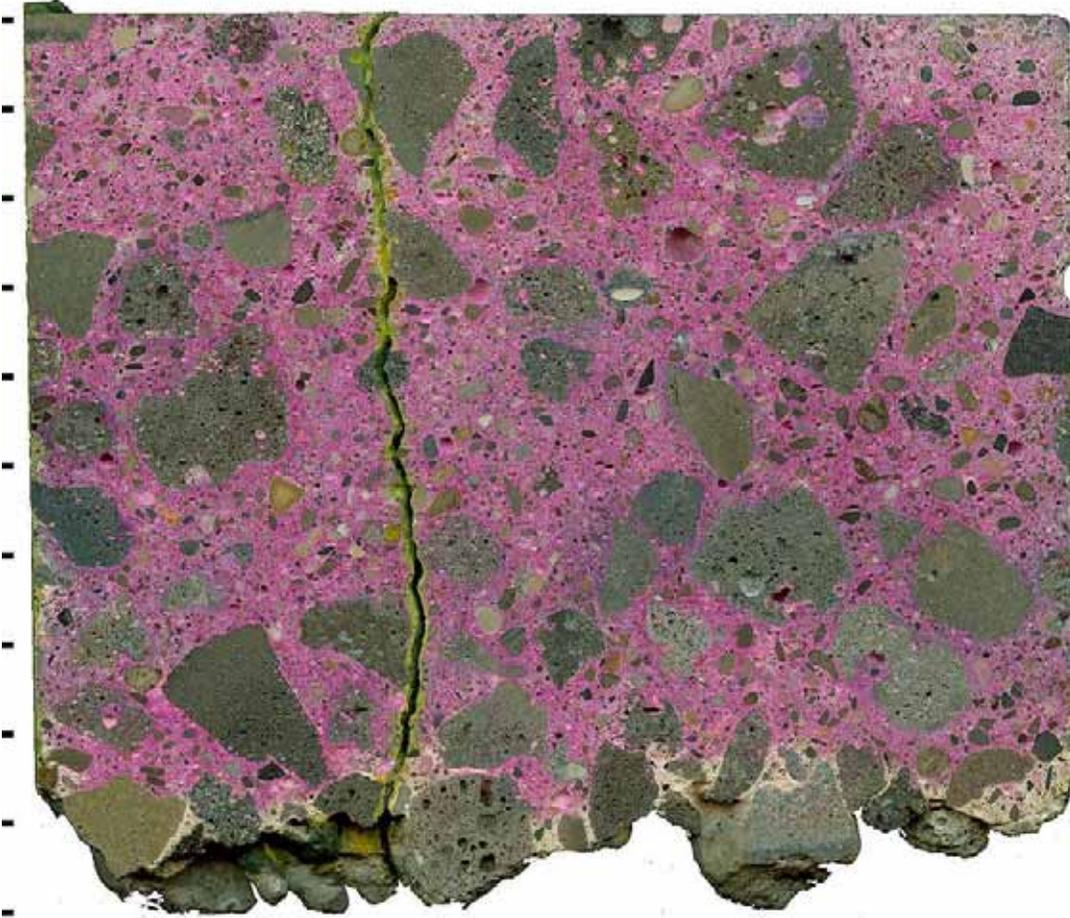
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



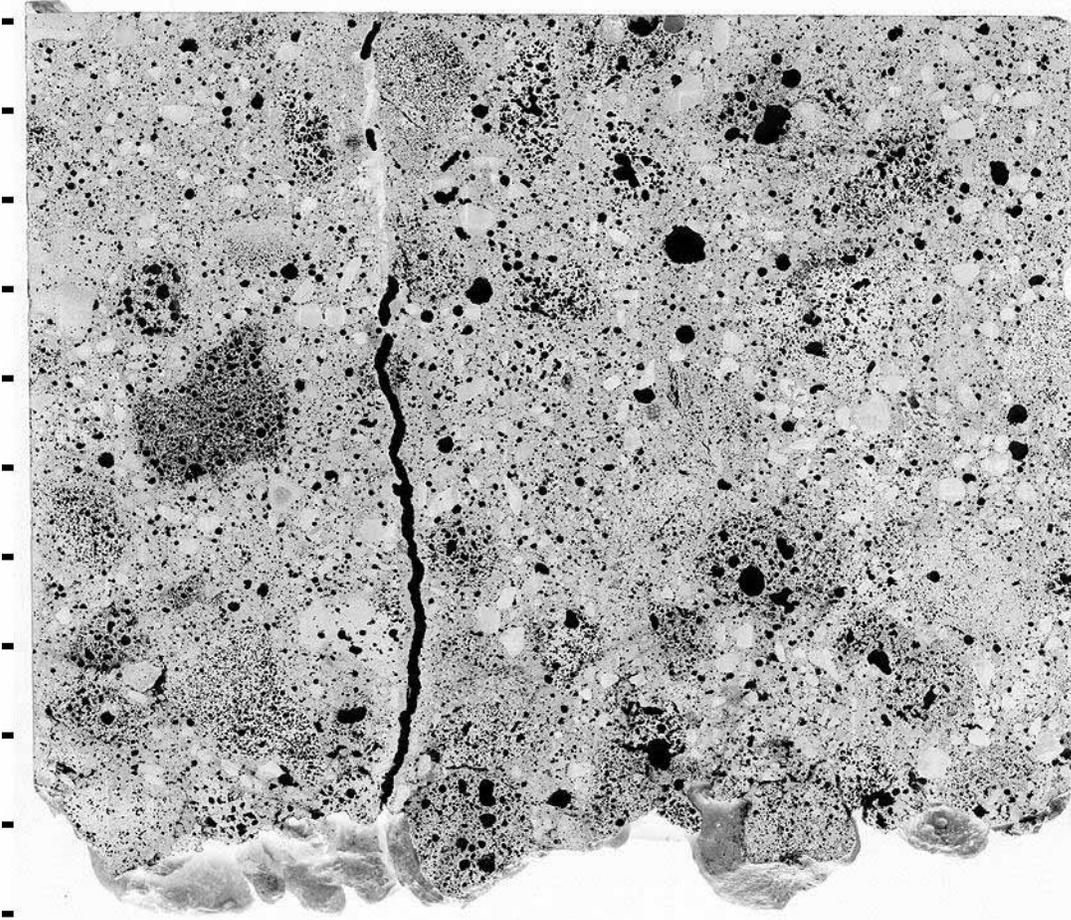
Slab representing cross section through bottom half of pavement, as polished, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



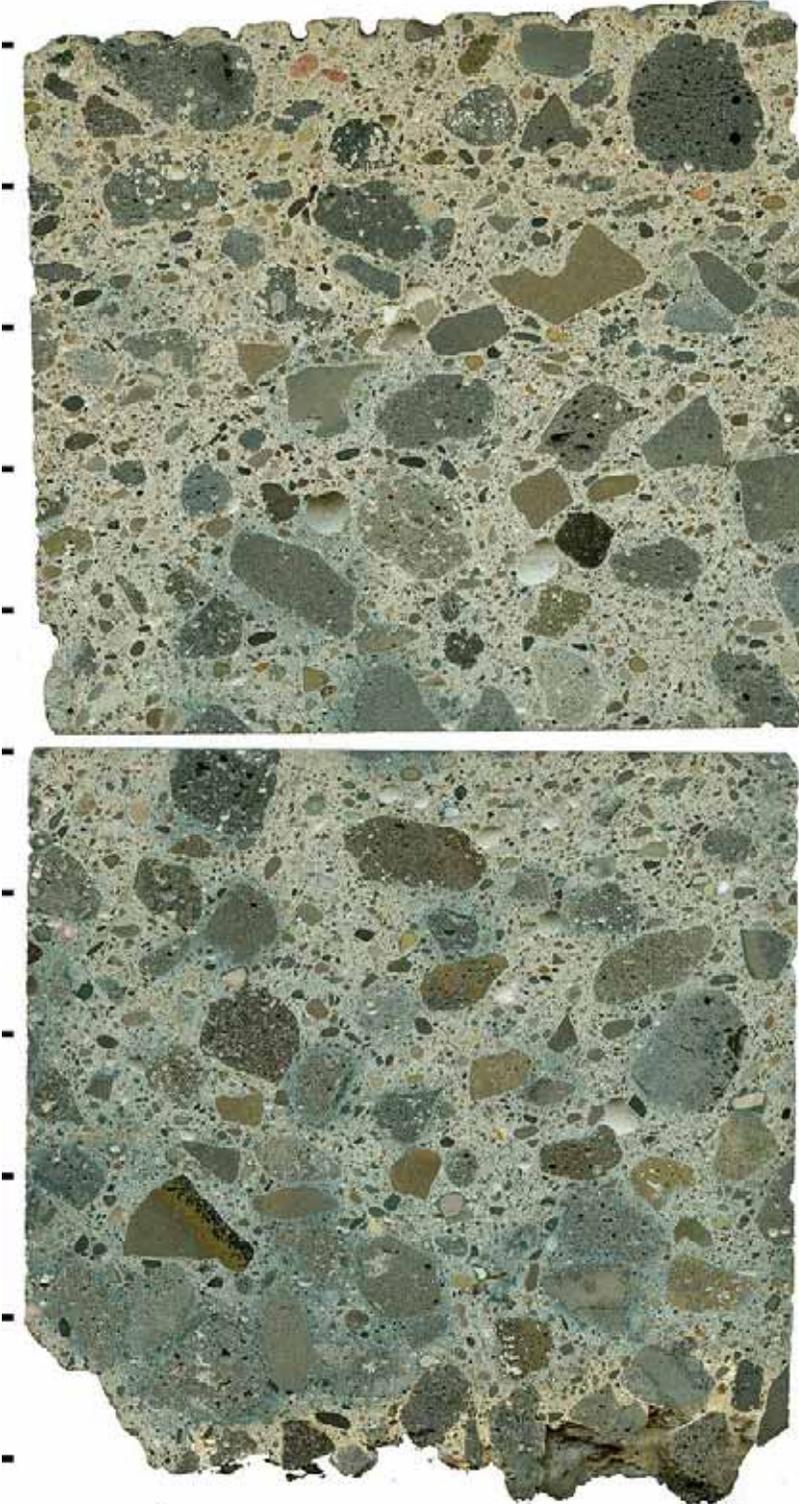
Slab representing cross section through top half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



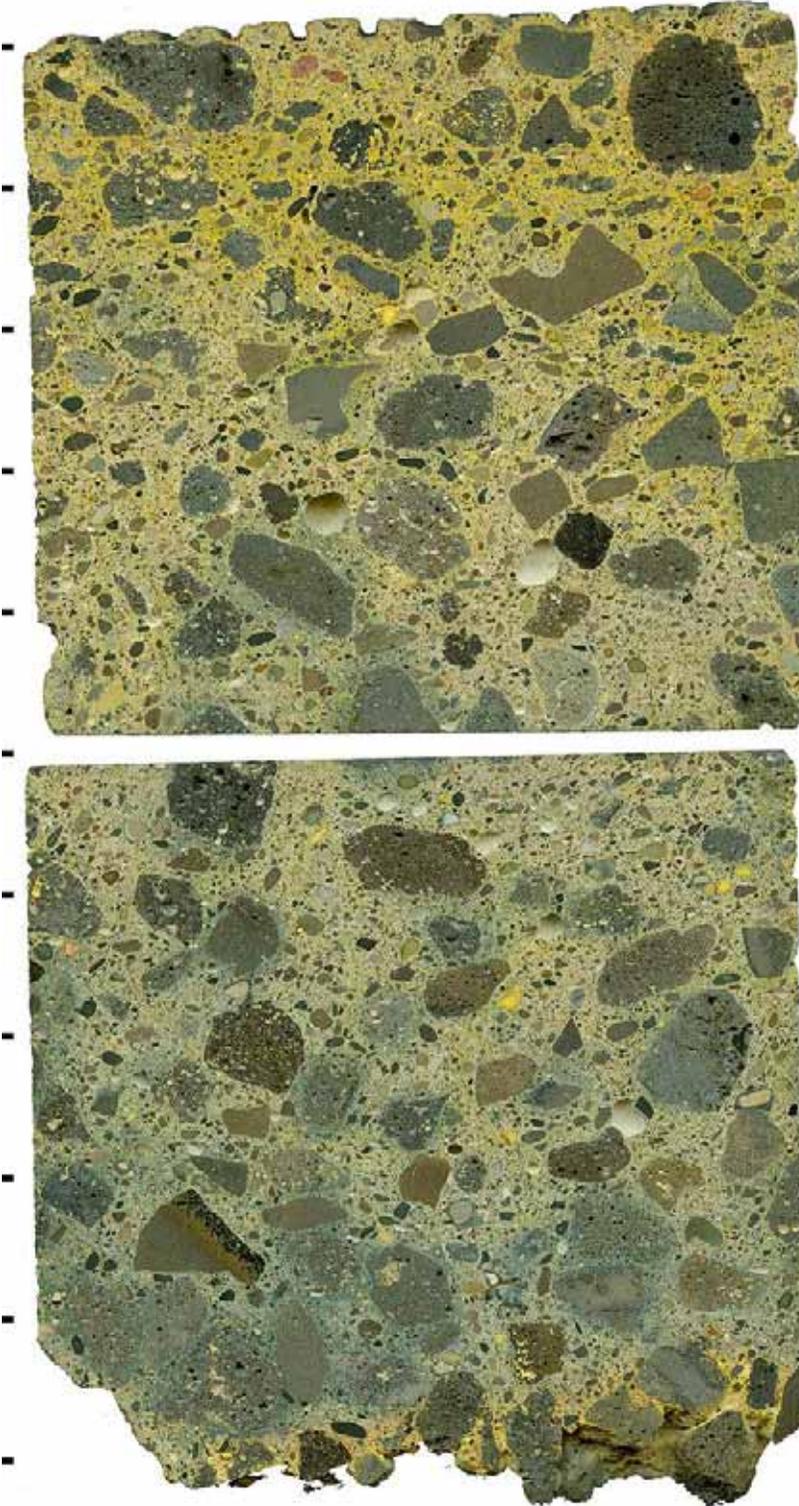
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, at transverse joint, core A, MTU ID M59-01, tic marks every half inch.

Appendix C
M-59 Core Site



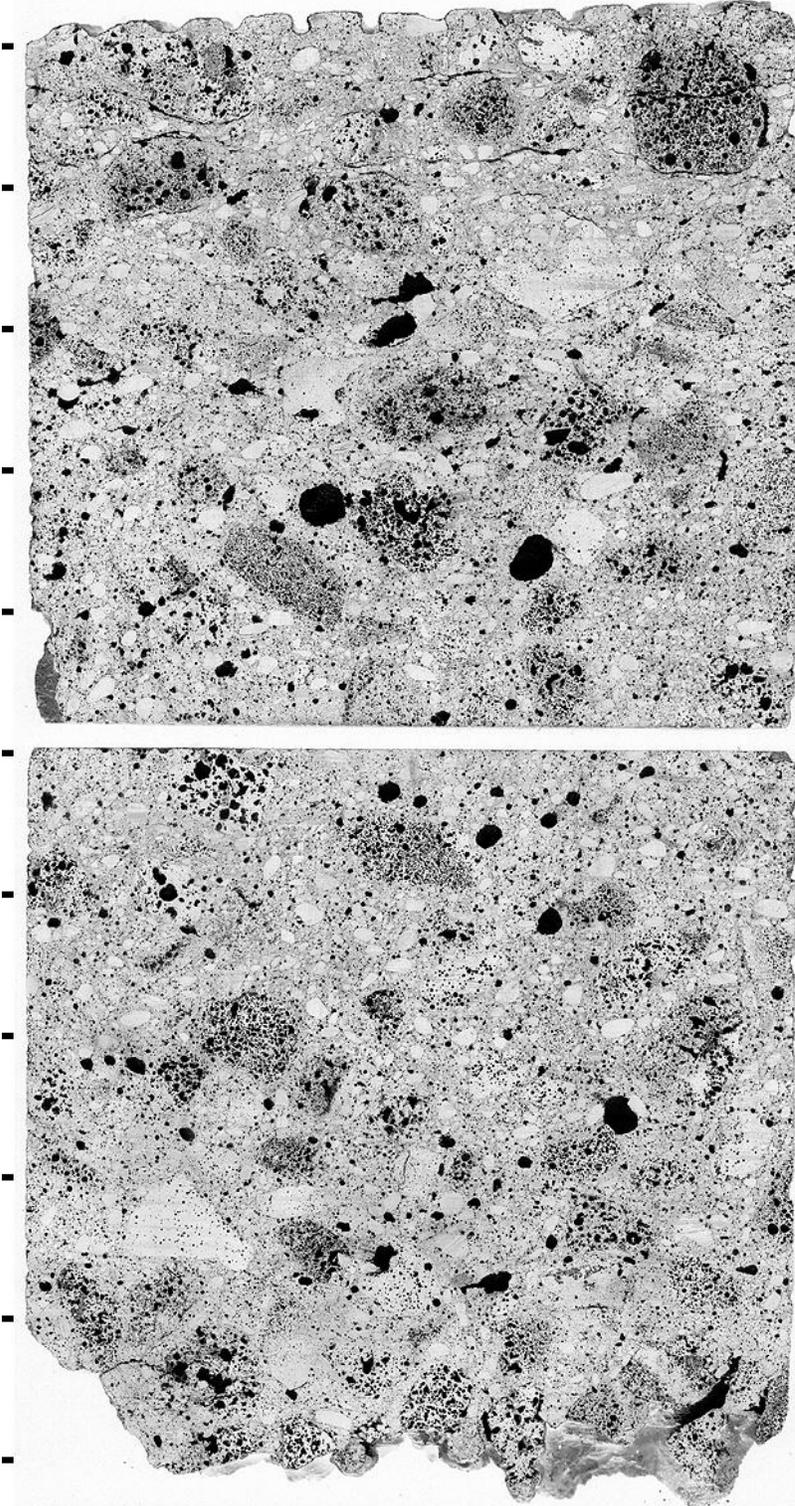
Slabs representing full cross section through pavement, as polished, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every inch.

Appendix C
M-59 Core Site



Slabs representing full cross section through pavement, after sodium cobaltinitrite stain, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every inch.

Appendix C
M-59 Core Site



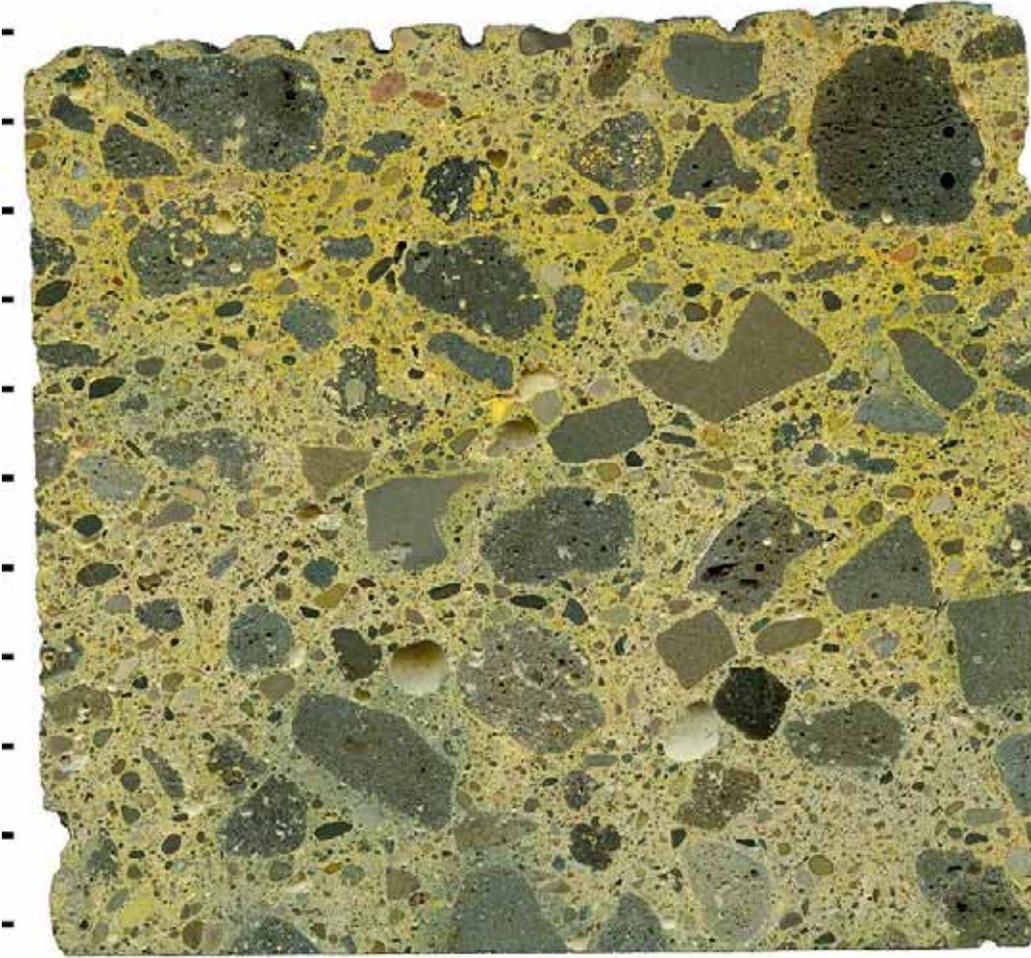
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every inch.

Appendix C
M-59 Core Site



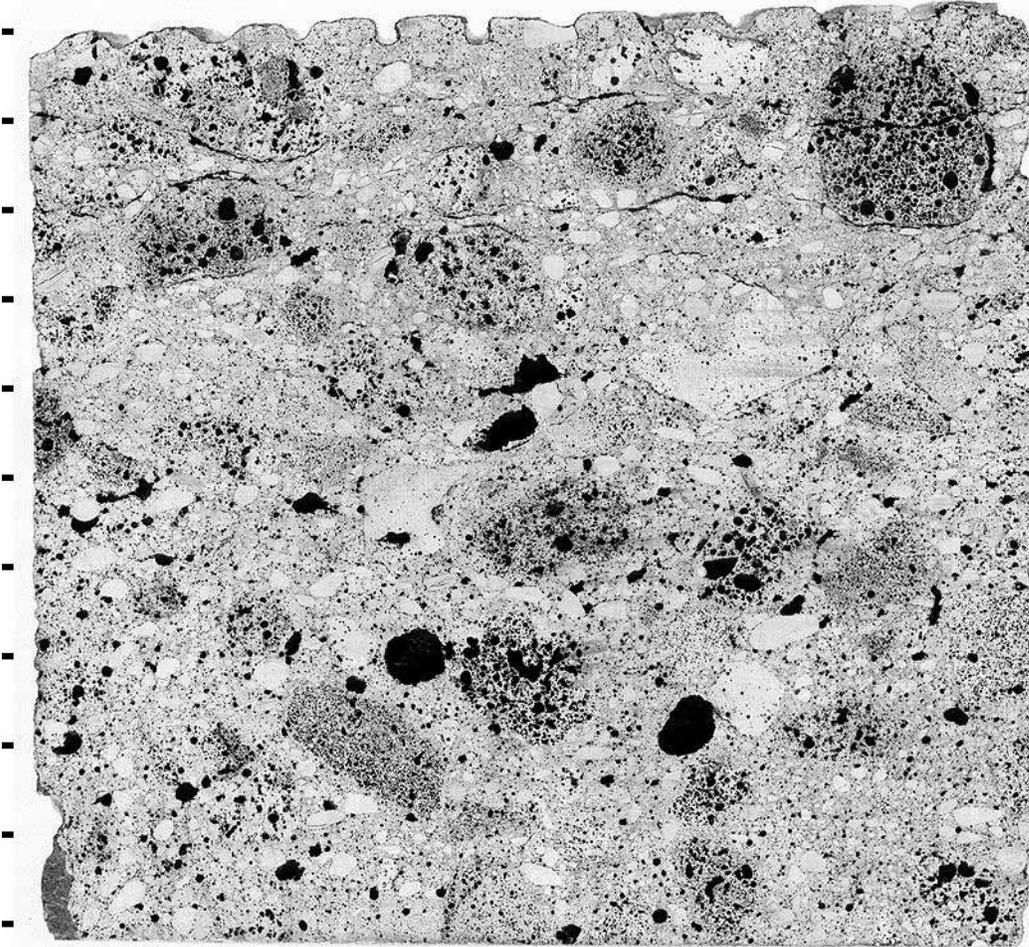
Slab representing cross section through top half of pavement, as polished, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



Slab representing cross section through top half of pavement, after sodium cobaltinitrite stain, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



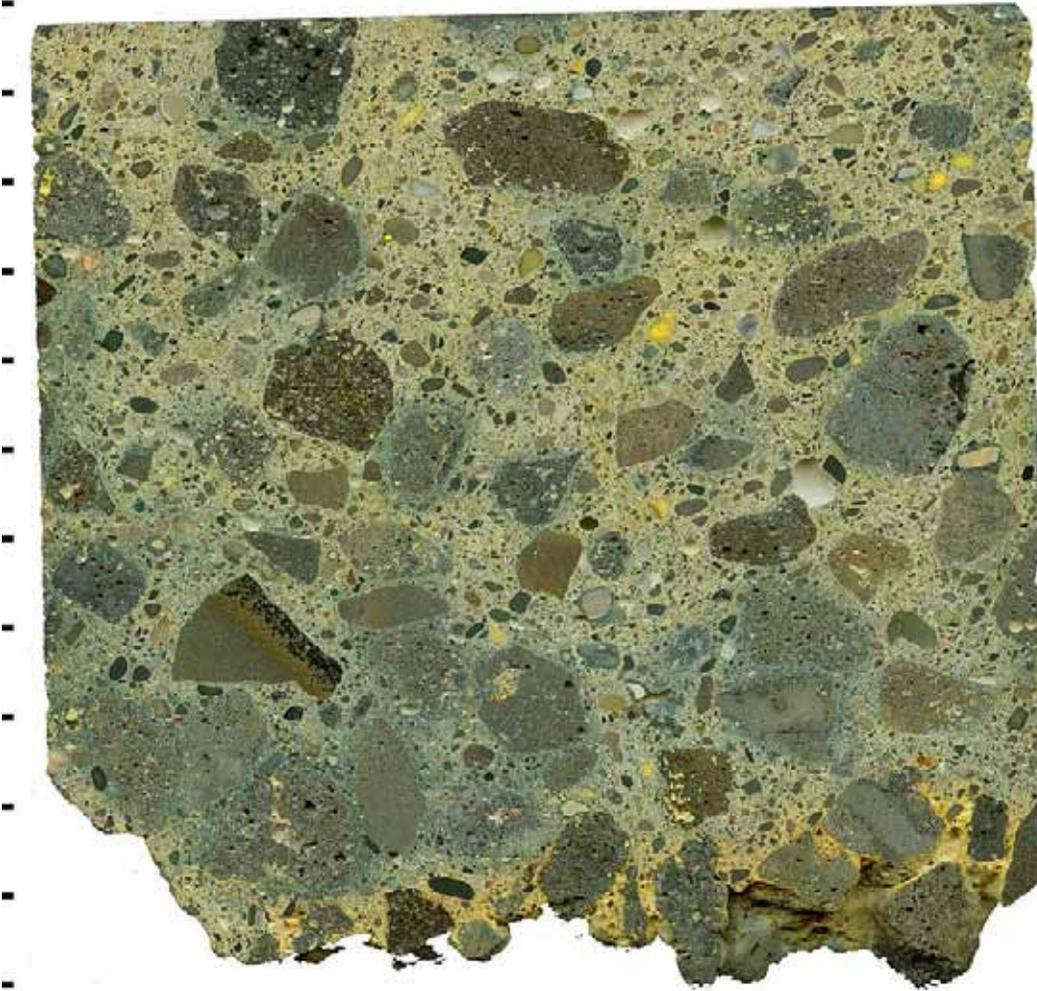
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



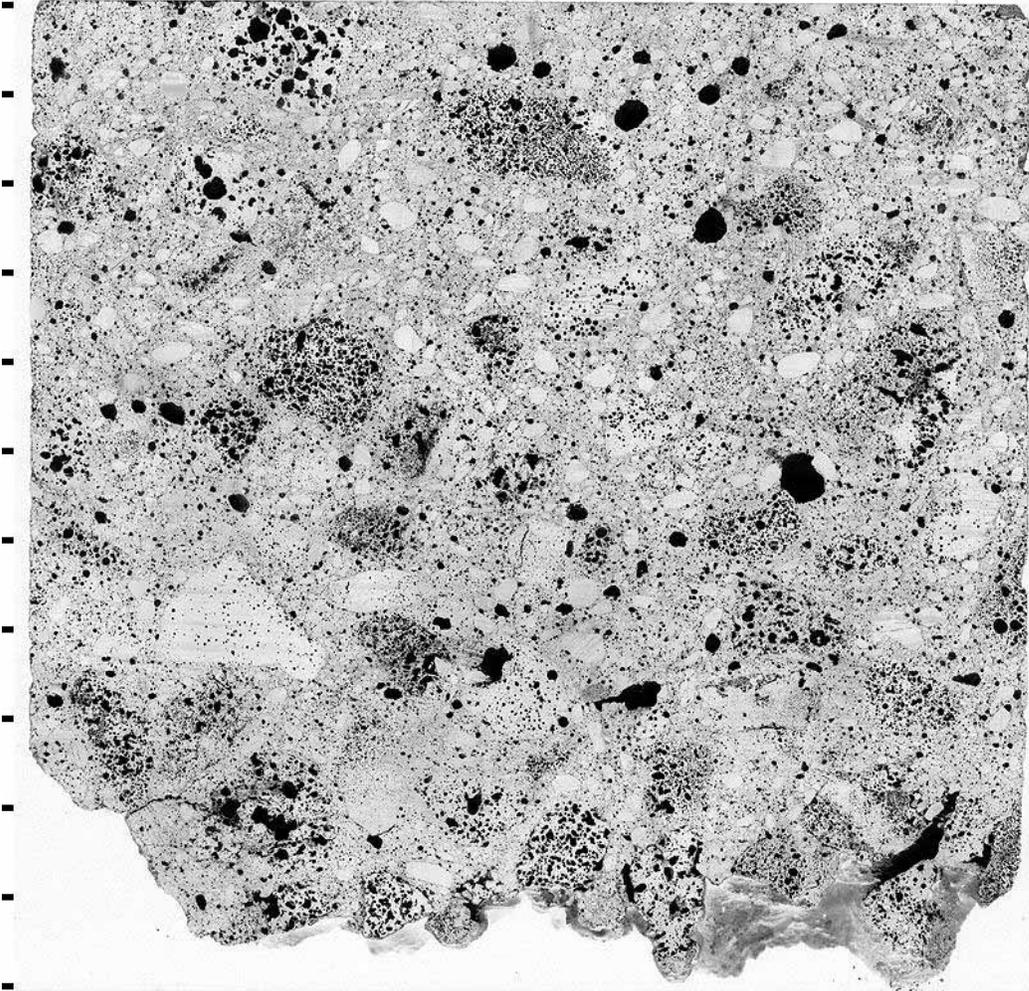
Slab representing cross section through bottom half of pavement, as polished, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



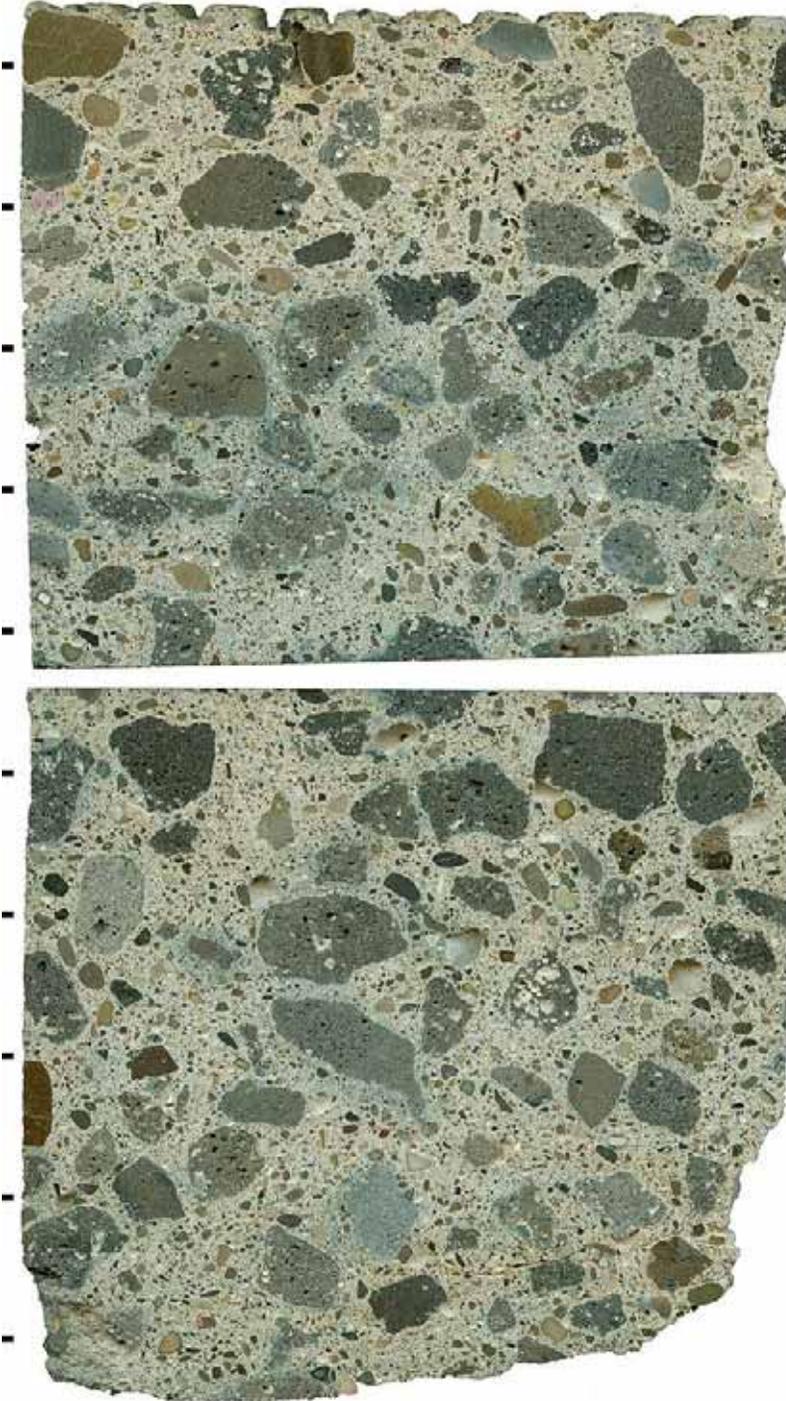
Slab representing cross section through top half of pavement, after sodium cobaltinitrite stain, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



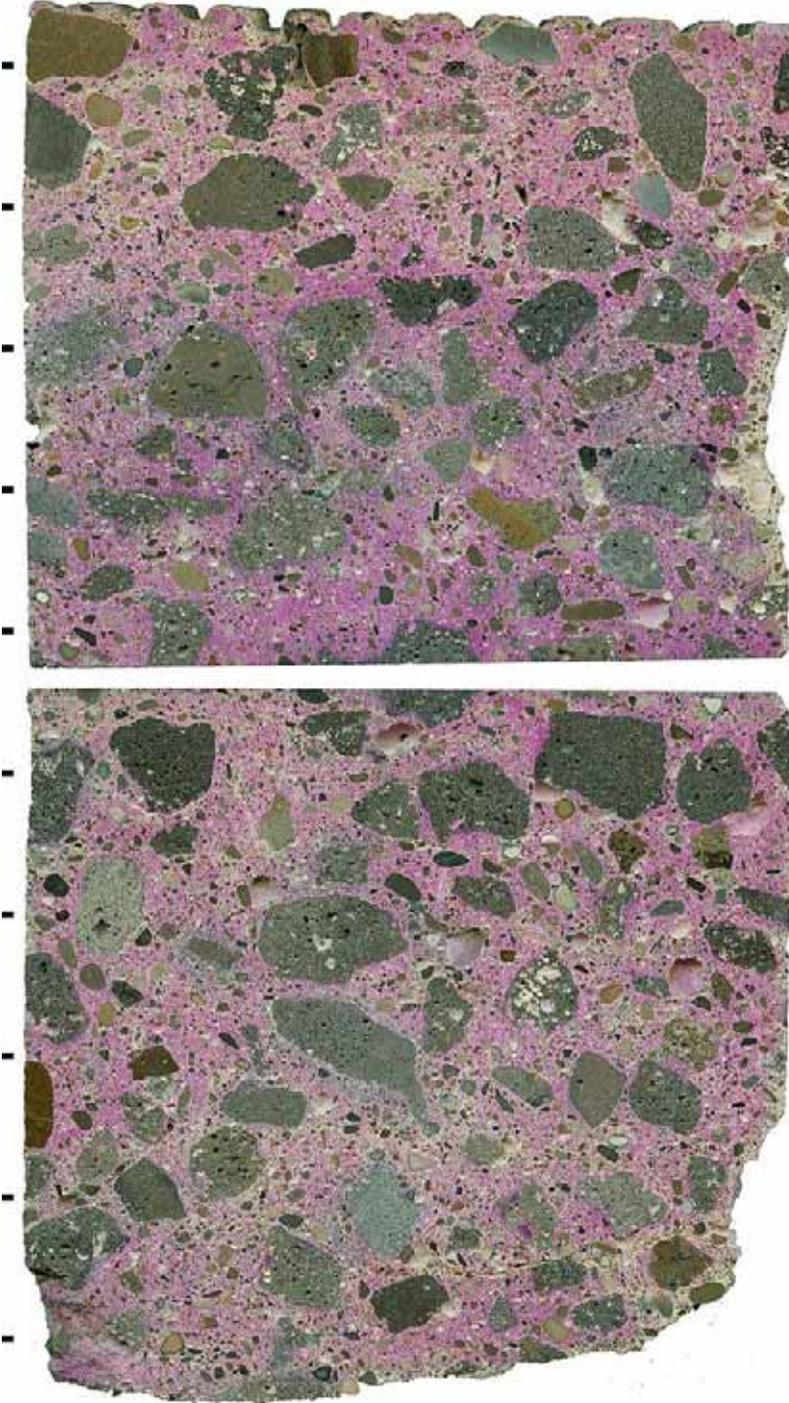
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02, tic marks every half inch.

Appendix C
M-59 Core Site



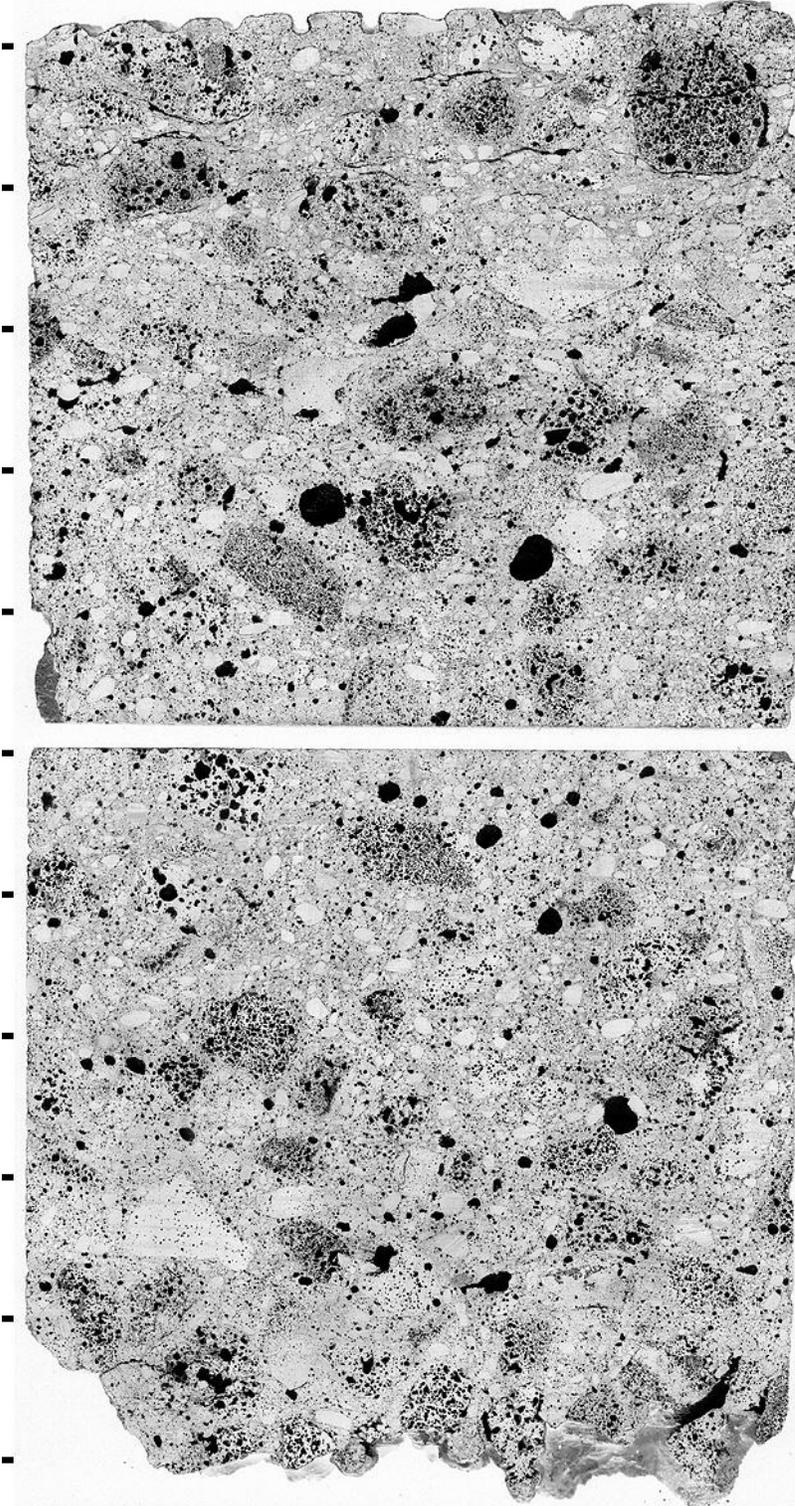
Slabs representing full cross section through pavement, as polished, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every inch.

Appendix C
M-59 Core Site



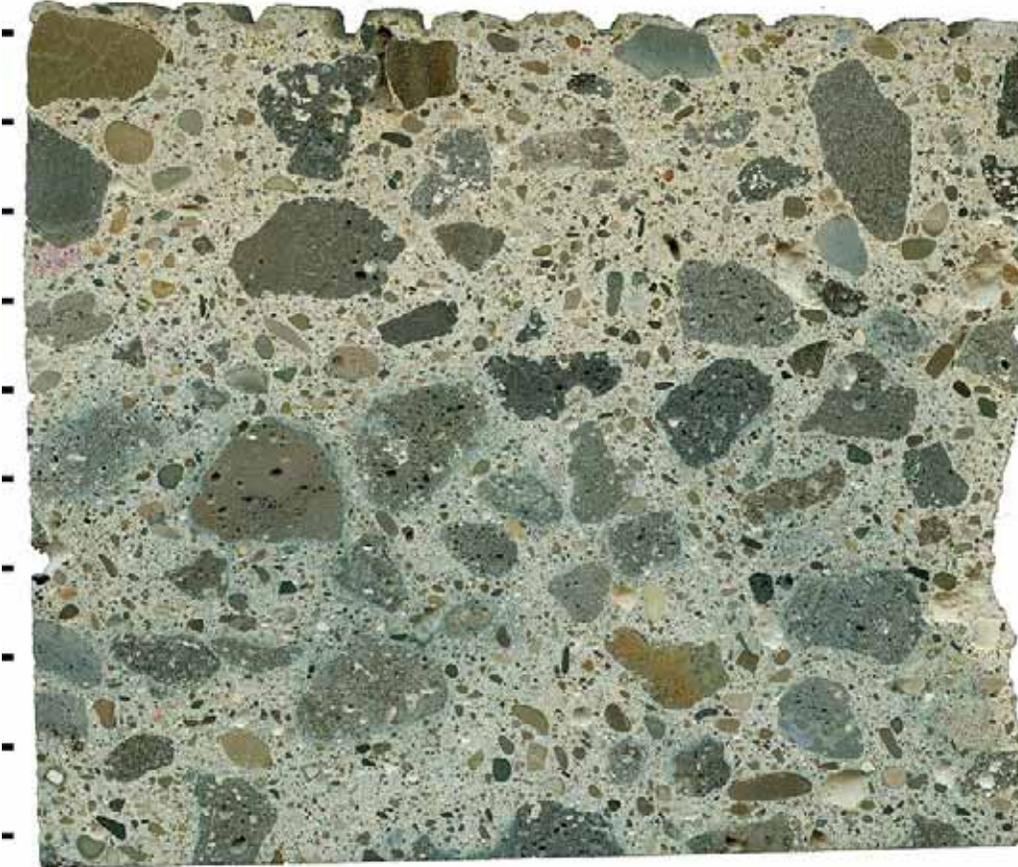
Slabs representing full cross section through pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every inch.

Appendix C
M-59 Core Site



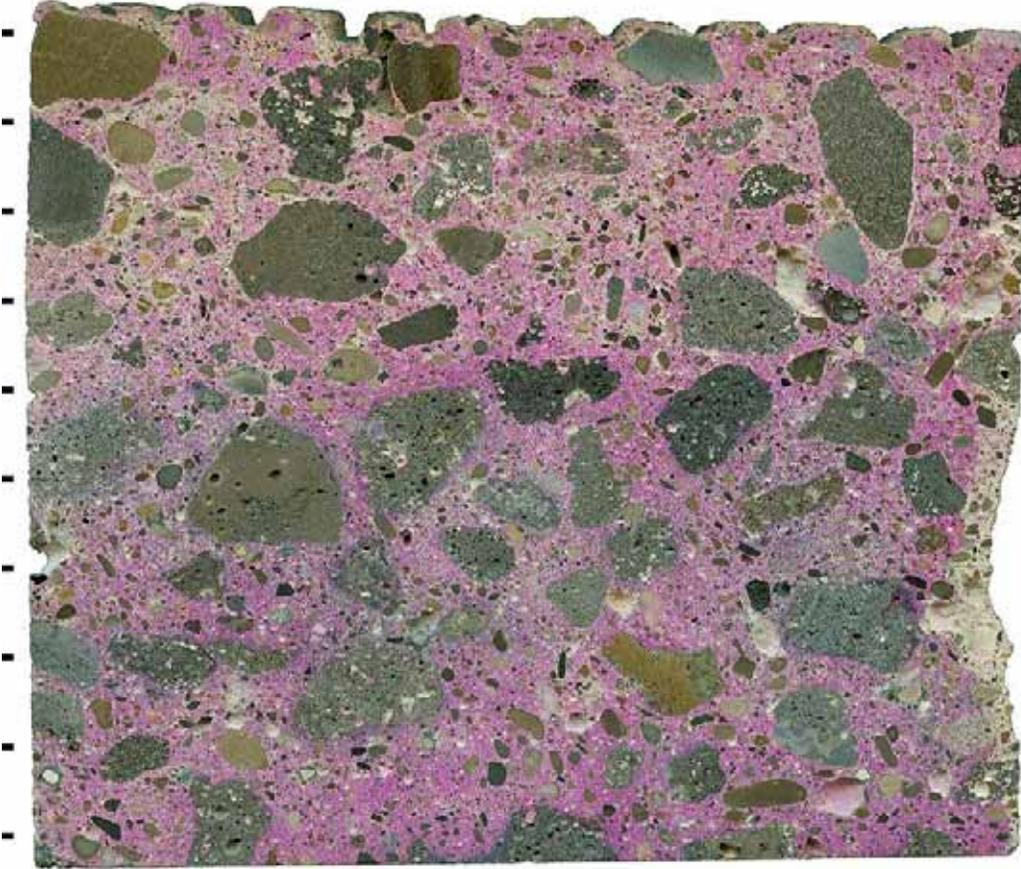
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every inch.

Appendix C
M-59 Core Site



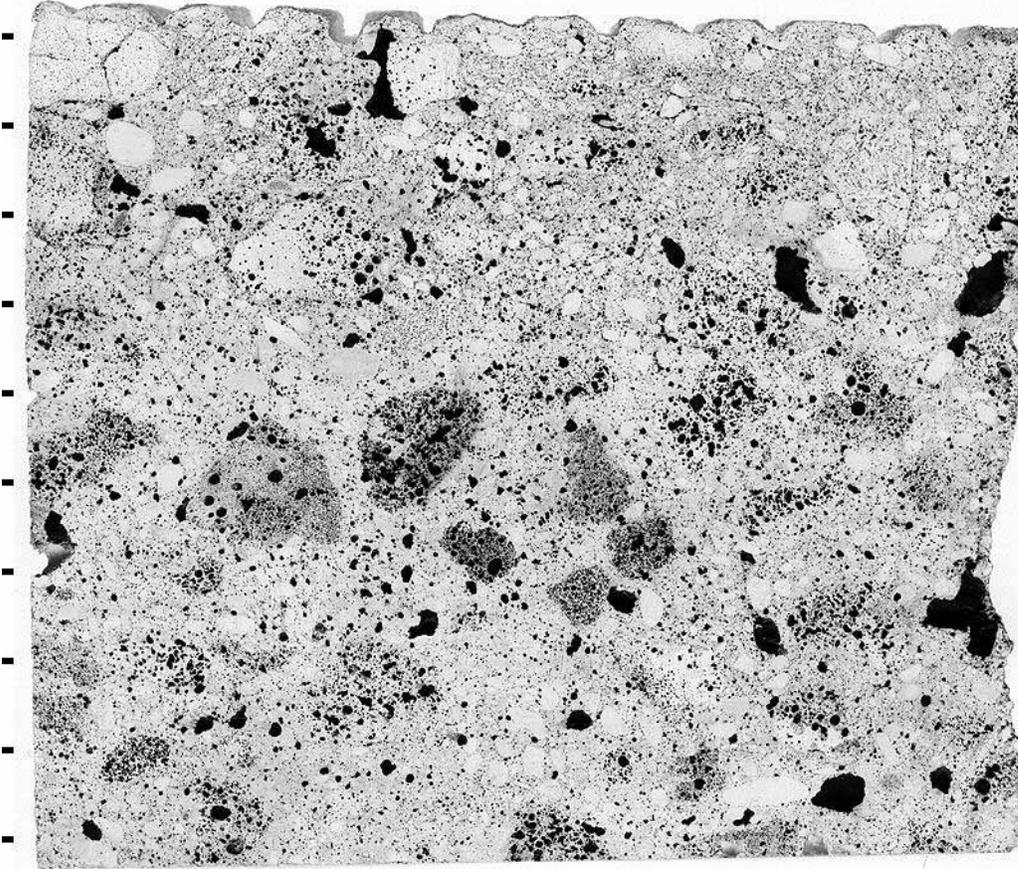
Slab representing cross section through top half of pavement, as polished, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



Slab representing cross section through top half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



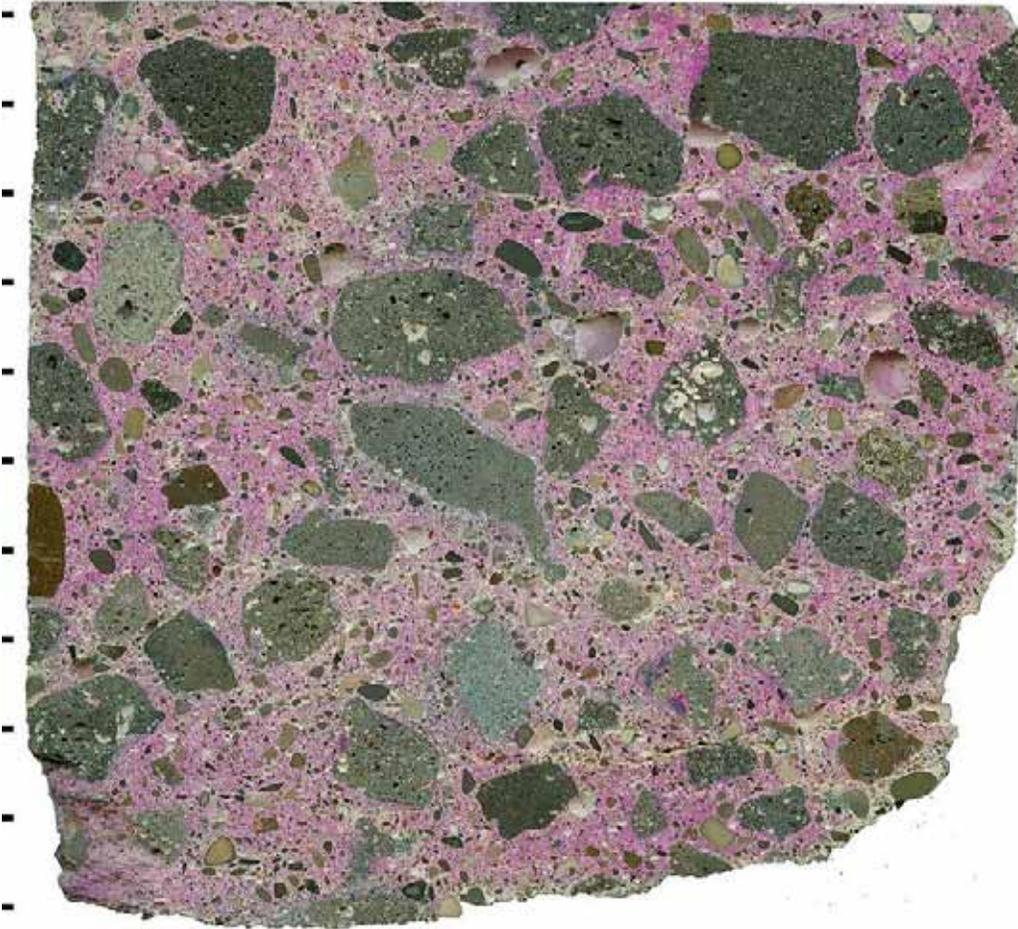
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



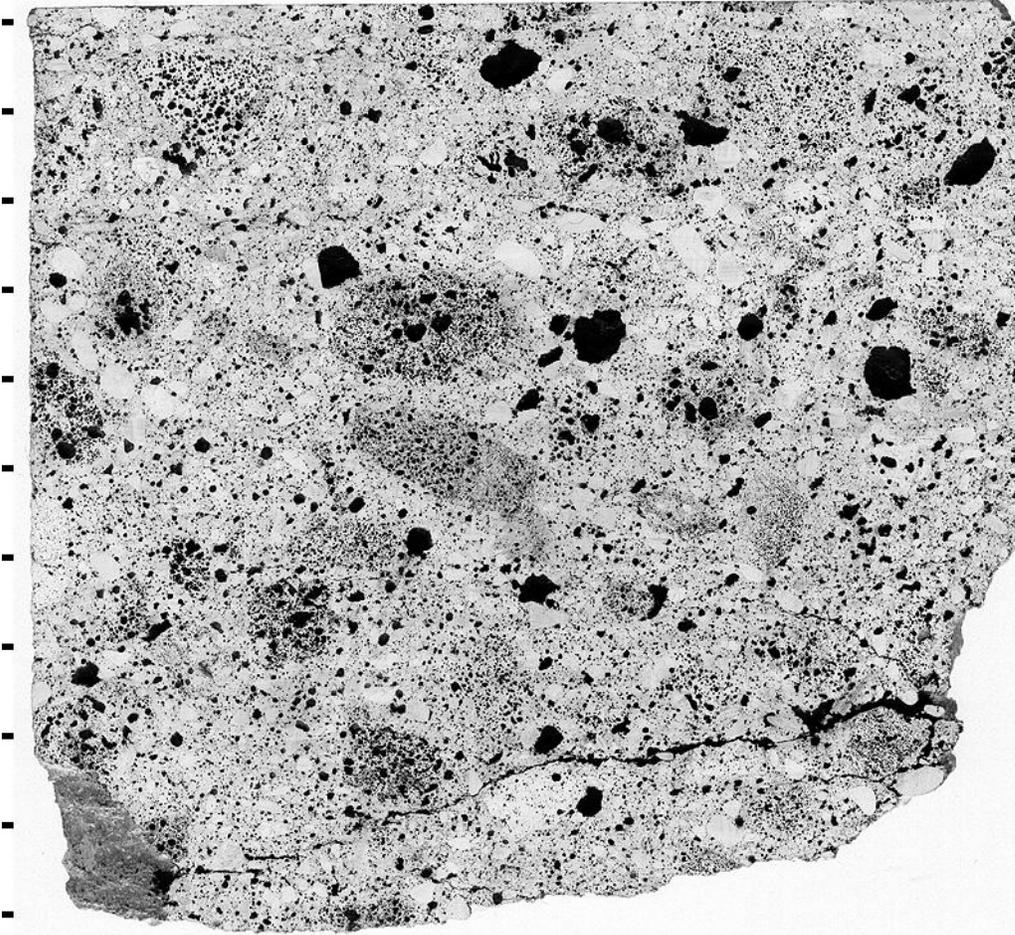
Slab representing cross section through bottom half of pavement, as polished, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



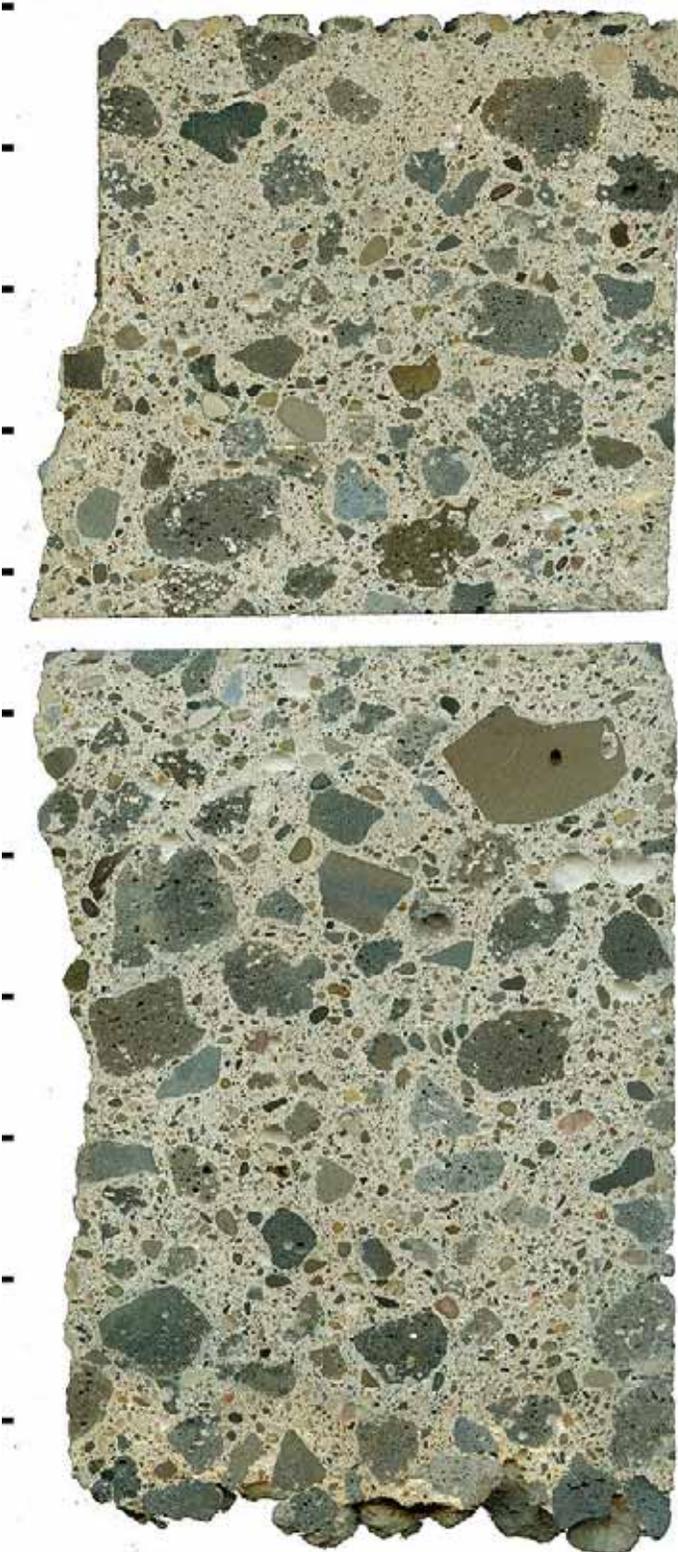
Slab representing cross section through bottom half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



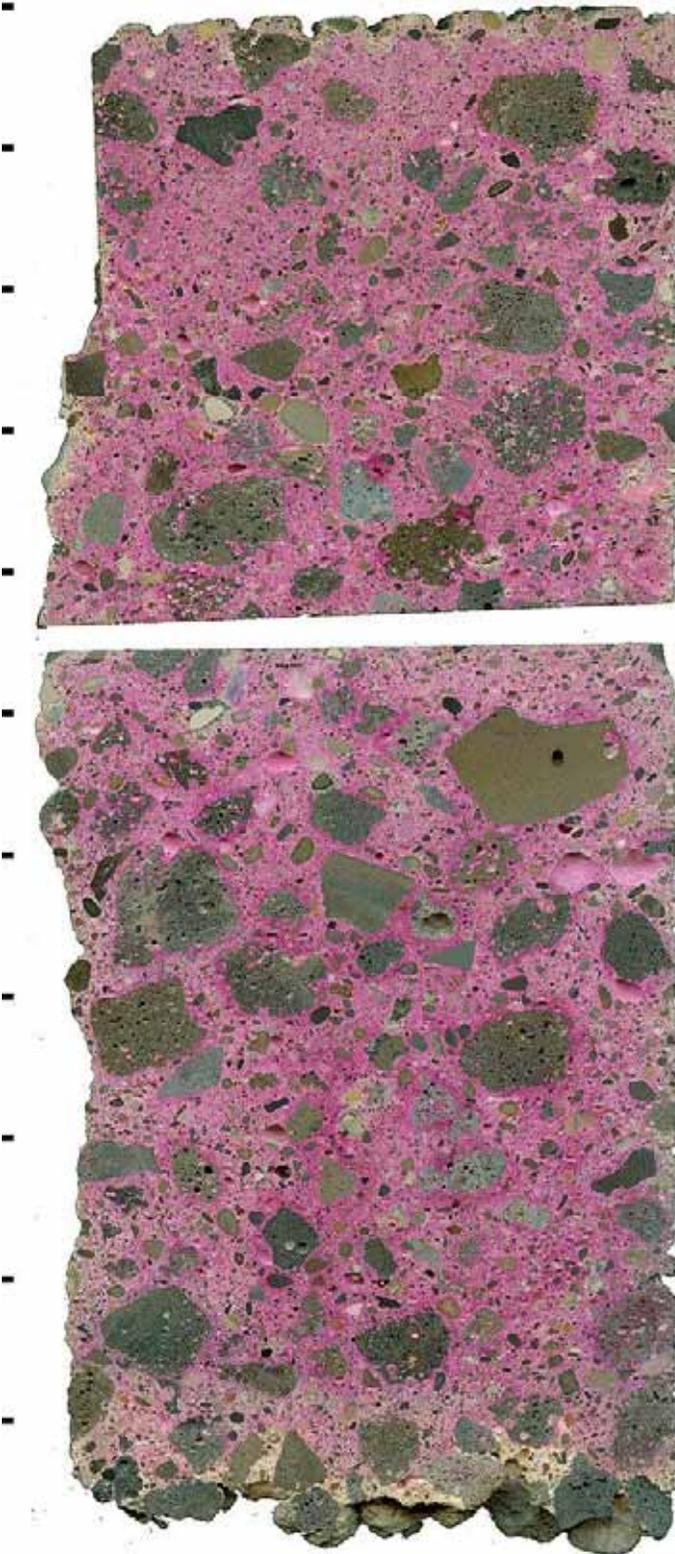
Slab representing cross section through bottom half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04, tic marks every half inch.

Appendix C
M-59 Core Site



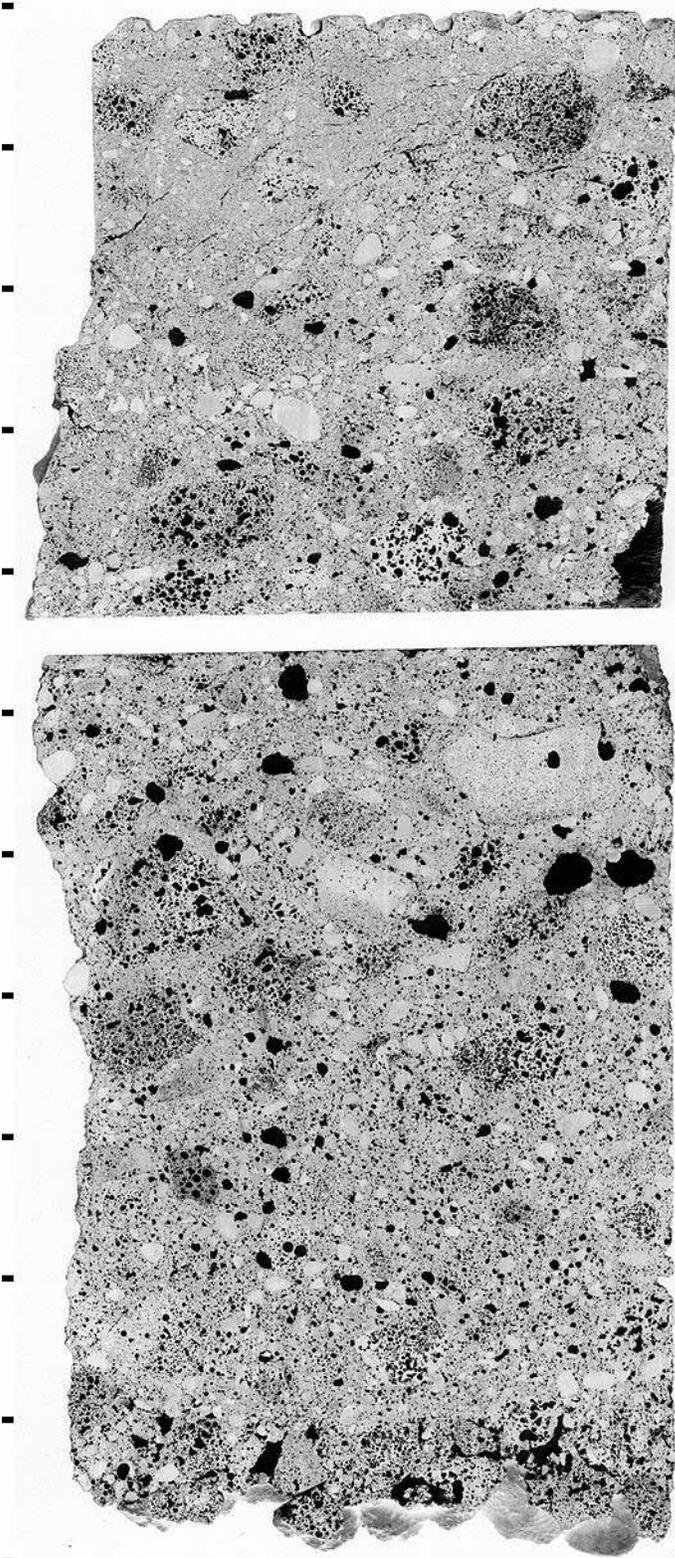
Slabs representing full cross section through pavement, as polished, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every inch.

Appendix C
M-59 Core Site



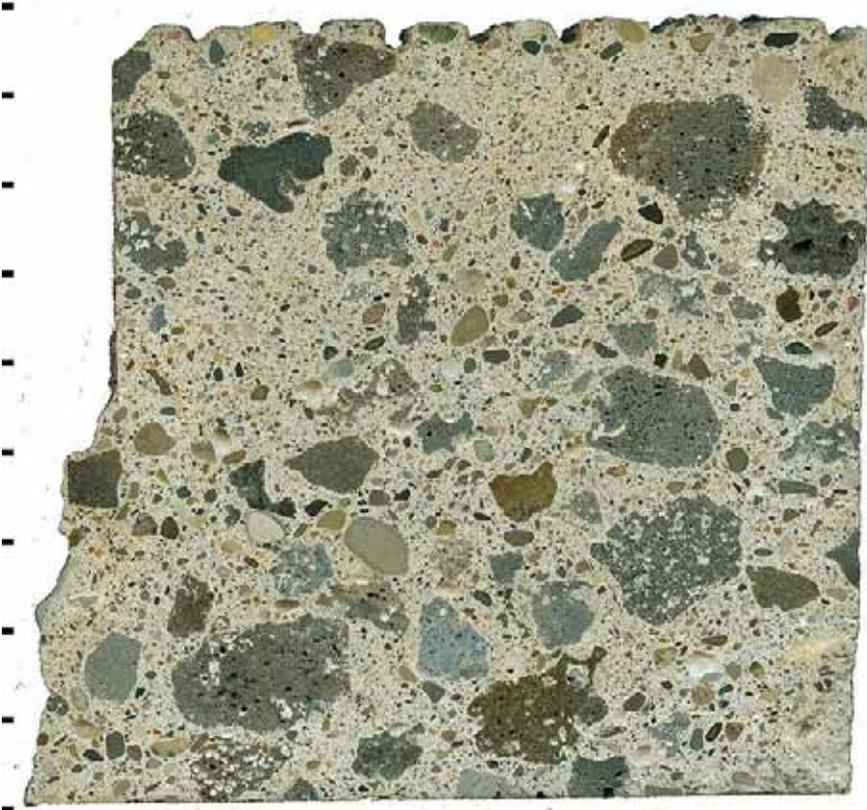
Slabs representing full cross section through pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every inch.

Appendix C
M-59 Core Site



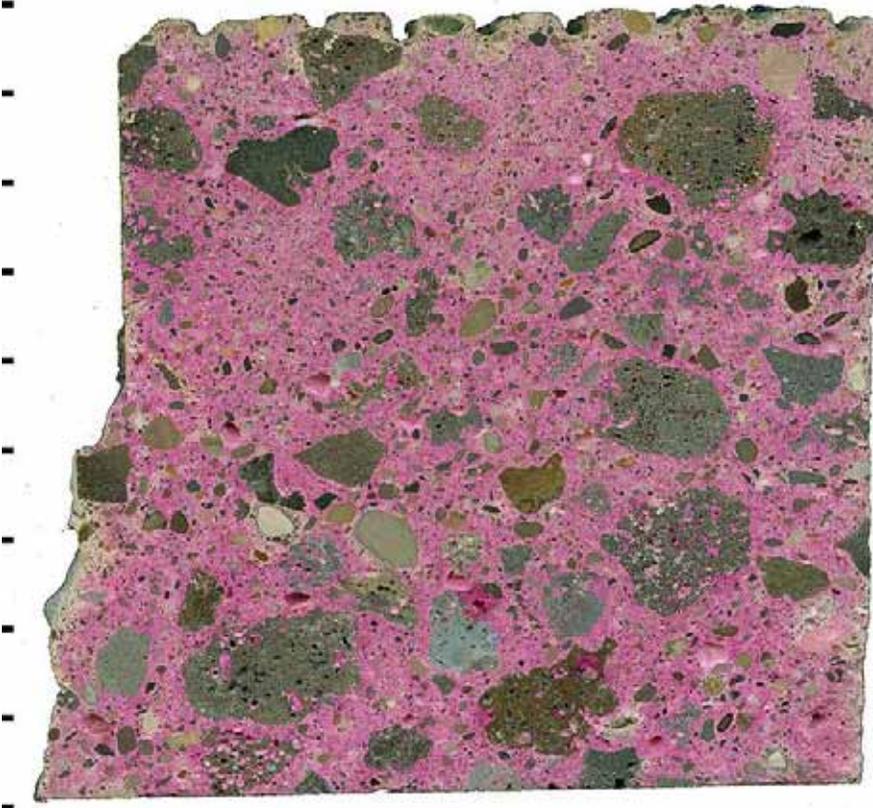
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every inch.

Appendix C
M-59 Core Site



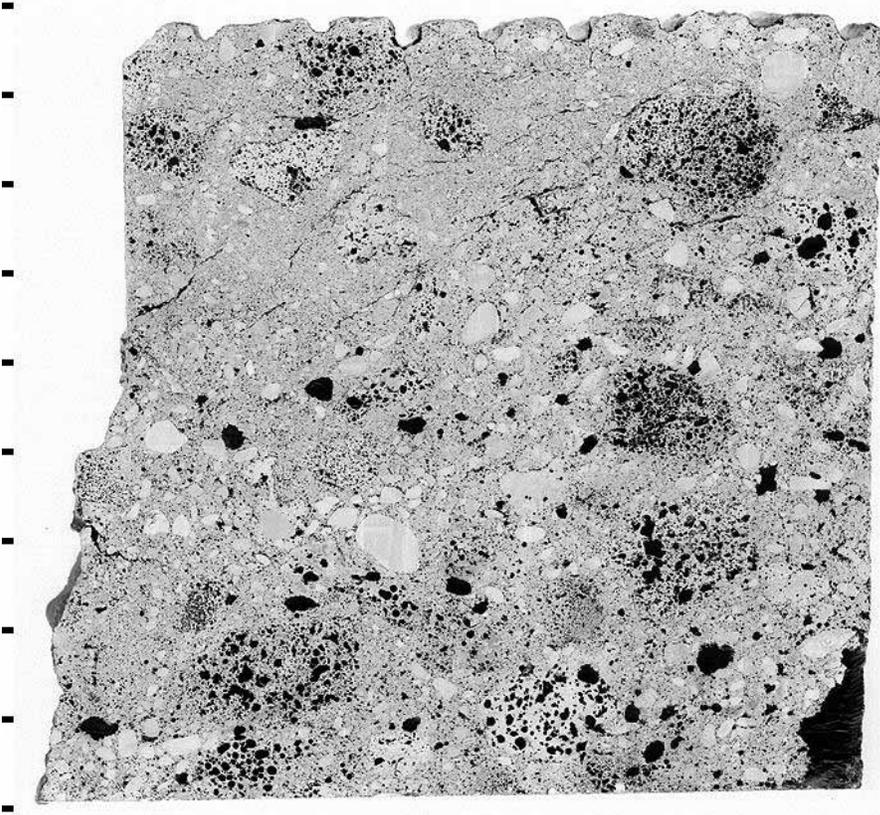
Slab representing cross section through top half of pavement, as polished, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site



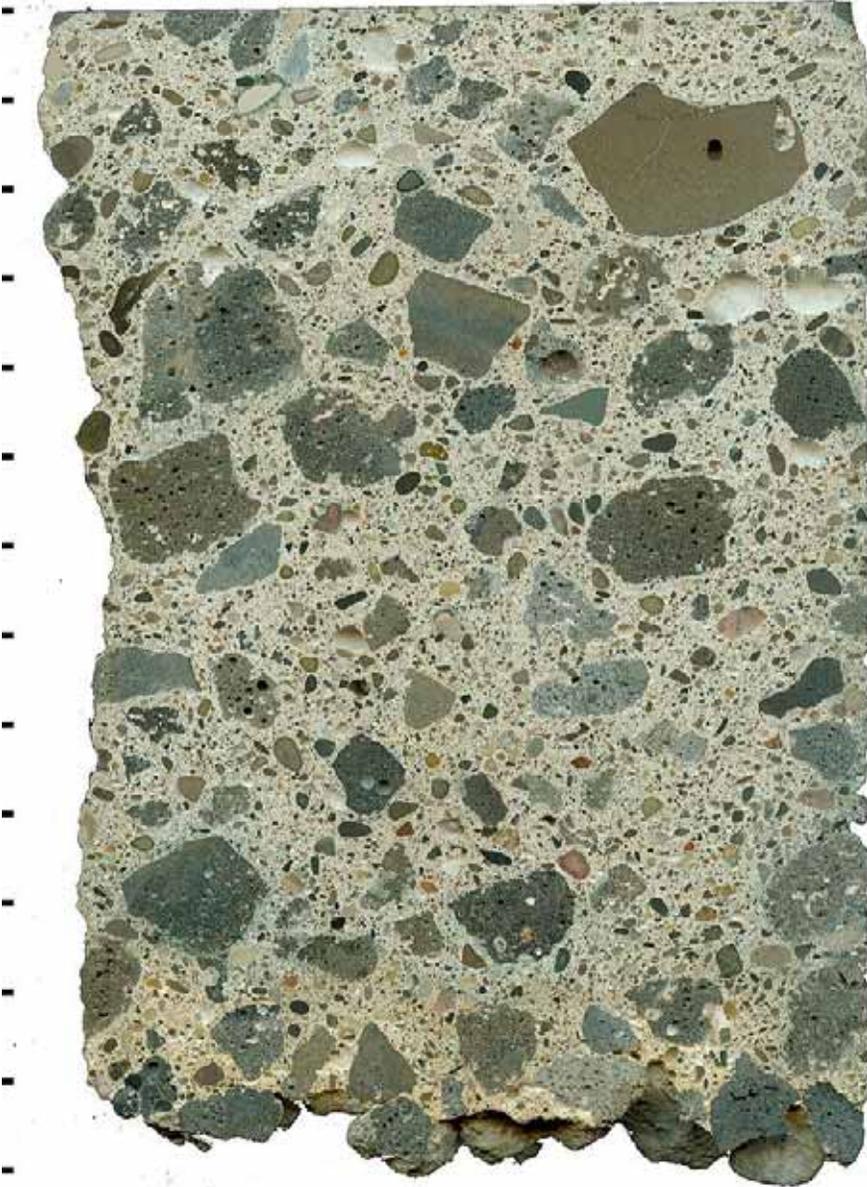
Slab representing cross section through top half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site



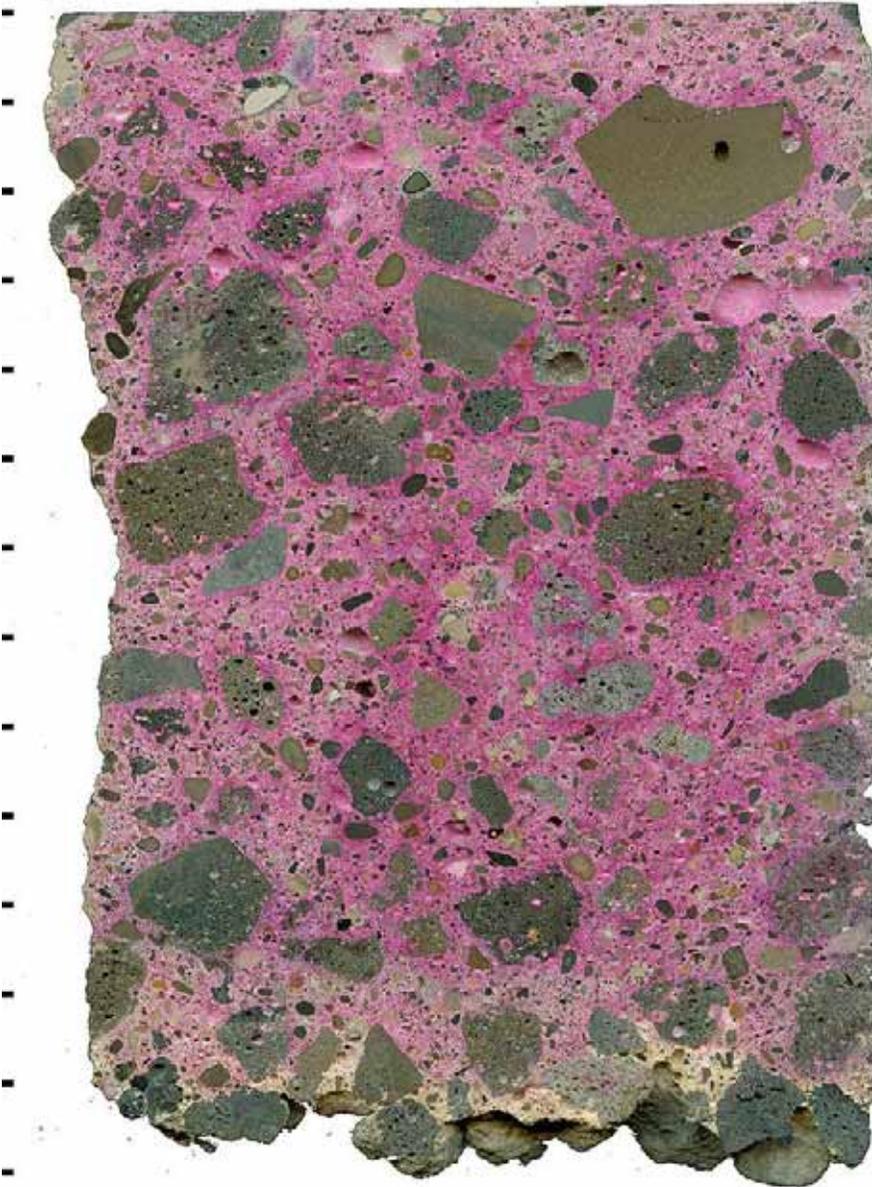
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site



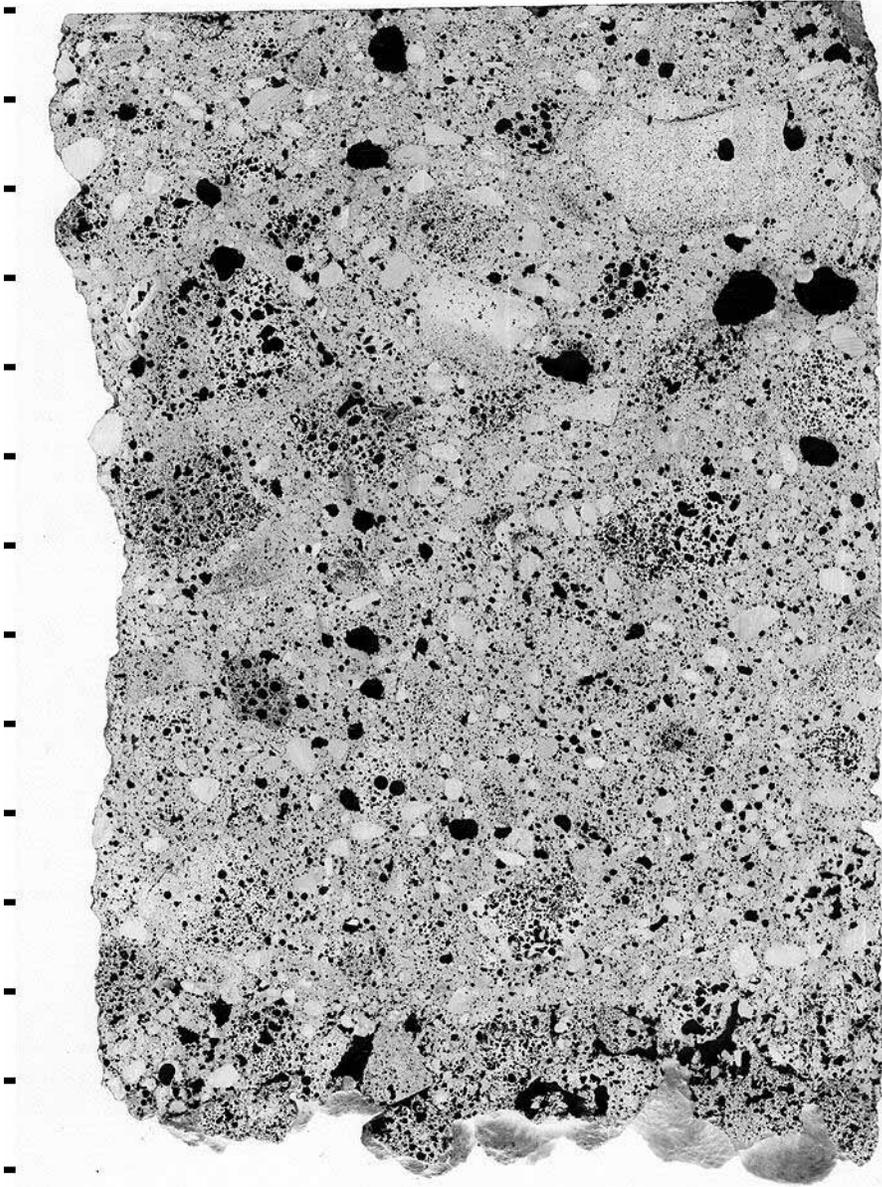
Slab representing cross section through bottom half of pavement, as polished, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site



Slab representing cross section through top half of pavement, after phenolphthalein stain, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site



Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, EB M-59, constructed 1997/98, shoulder, at transverse joint, core A, MTU ID M59-05, tic marks every half inch.

Appendix C
M-59 Core Site

M-59, constructed 1997/98, outside lane, away from transverse joint, core A, MTU ID M59-01

Data Analysed - 5/10/ 7 at 16:20			
Operator Name - matt			
Sample ID - m59-1			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1886.041	1886.041	3772.082
Total Area Analyzed (cm ²)	37.0	37.0	73.9
Air Stops	54	41	95
Paste Stops	193	219	412
Aggregate Stops	475	462	937
Secondary Phase Stops	0	0	0
Total Stops	722	722	1444
# of Air Void Intercepts	651	803	1454
# of Filled Void Intercepts	0	0	0
Results			
Air vol%	7.5	5.7	6.6
Paste vol%	26.7	30.3	28.5
Aggregate vol%	65.8	64.0	64.9
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.194	0.159	0.185
Paste/Air ratio	3.57	5.34	4.34
Specific Surface (mm ² /mm ³)	18.5	30.0	23.4
Void Frequency (voids/m)	345	426	385
Average Chord Length (mm)	0.217	0.133	0.171

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M-59 Core Site

M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02

Data Analysed - 12/19/ 6 at 9:49			
Operator Name - Karl			
Sample ID - m59_2			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	2068.898	2068.898	4137.796
Total Area Analyzed (cm ²)	40.5	40.5	81.1
Air Stops	70	76	146
Paste Stops	218	224	442
Aggregate Stops	503	492	995
Secondary Phase Stops	1	0	1
Total Stops	792	792	1584
# of Air Void Intercepts	775	779	1554
# of Filled Void Intercepts	2	2	4
Results			
Air vol%	8.8	9.6	9.2
Paste vol%	27.5	28.3	27.9
Aggregate vol%	63.5	62.1	62.8
Secondary Phase vol%	0.1	0.0	0.1
Spacing Factor (mm)	0.185	0.188	0.186
Paste/Air ratio	3.13	2.95	3.03
Specific Surface (mm ² /mm ³)	17.0	15.7	16.3
Void Frequency (voids/m)	375	377	376
Average Chord Length (mm)	0.236	0.255	0.245

Appendix C
M-59 Core Site

EB M-59, constructed 1997/98, shoulder, near joint?, core B, MTU ID M59-04

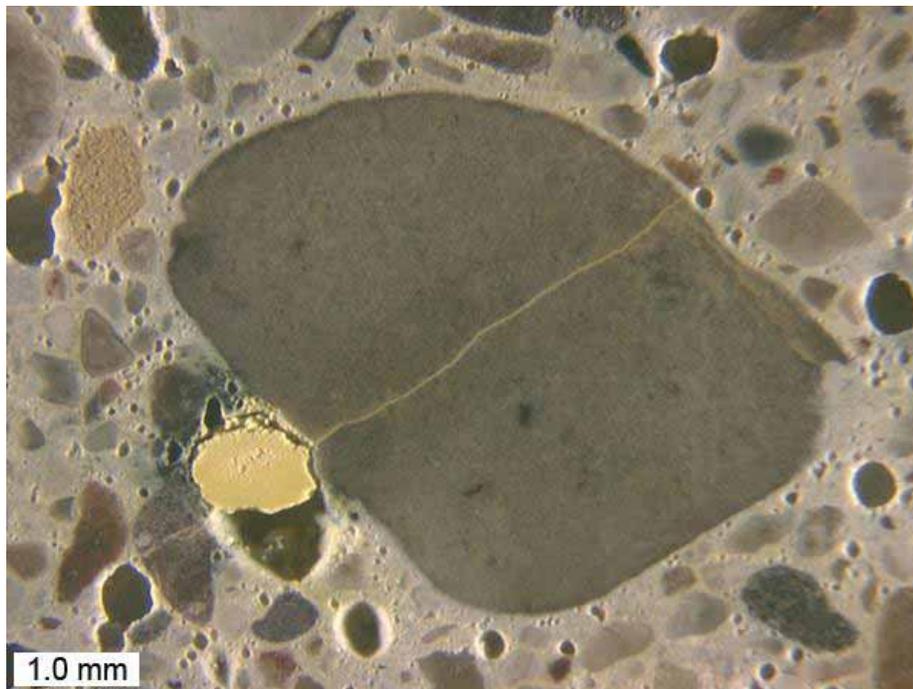
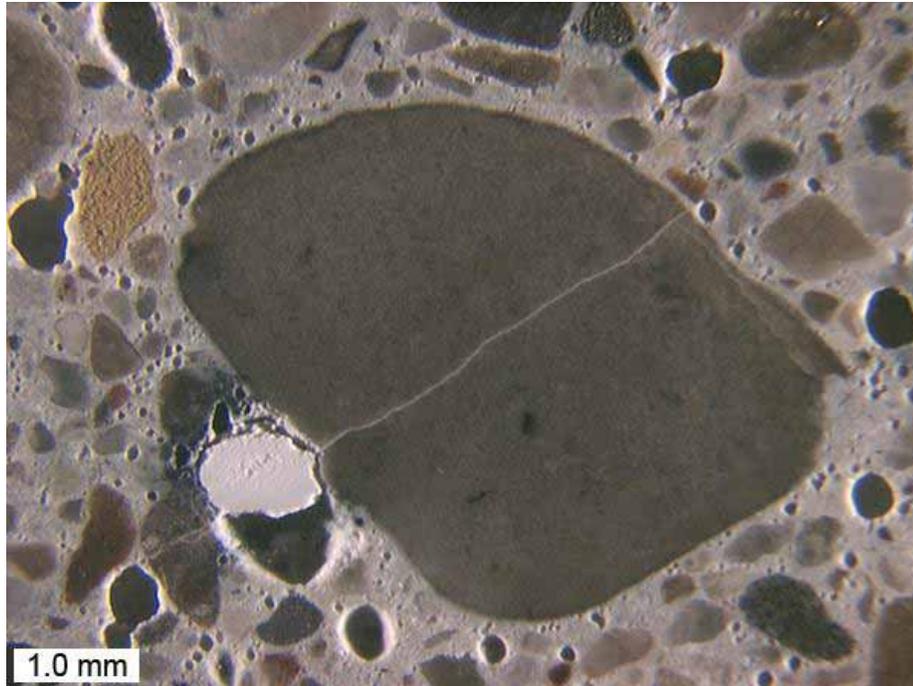
Data Analysed - 12/14/ 6 at 16:39			
Operator Name - Karl			
Sample ID - M 59 4 bot c			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	2068.898	2068.898	4137.796
Total Area Analyzed (cm ²)	40.5	40.5	81.1
Air Stops	78	61	139
Paste Stops	237	200	437
Aggregate Stops	475	531	1006
Secondary Phase Stops	2	0	2
Total Stops	792	792	1584
# of Air Void Intercepts	814	653	1467
# of Filled Void Intercepts	7	1	8
Results			
Air vol%	9.9	7.7	8.8
Paste vol%	29.9	25.3	27.6
Aggregate vol%	60.0	67.0	63.5
Secondary Phase vol%	0.3	0.0	0.1
Spacing Factor (mm)	0.192	0.200	0.195
Paste/Air ratio	3.06	3.28	3.14
Specific Surface (mm ² /mm ³)	16.0	16.4	16.2
Void Frequency (voids/m)	393	316	355
Average Chord Length (mm)	0.250	0.244	0.248

Appendix C
M-59 Core Site

EB M-59, constructed 1997/98, shoulder, at joint, core A, MTU ID M59-05

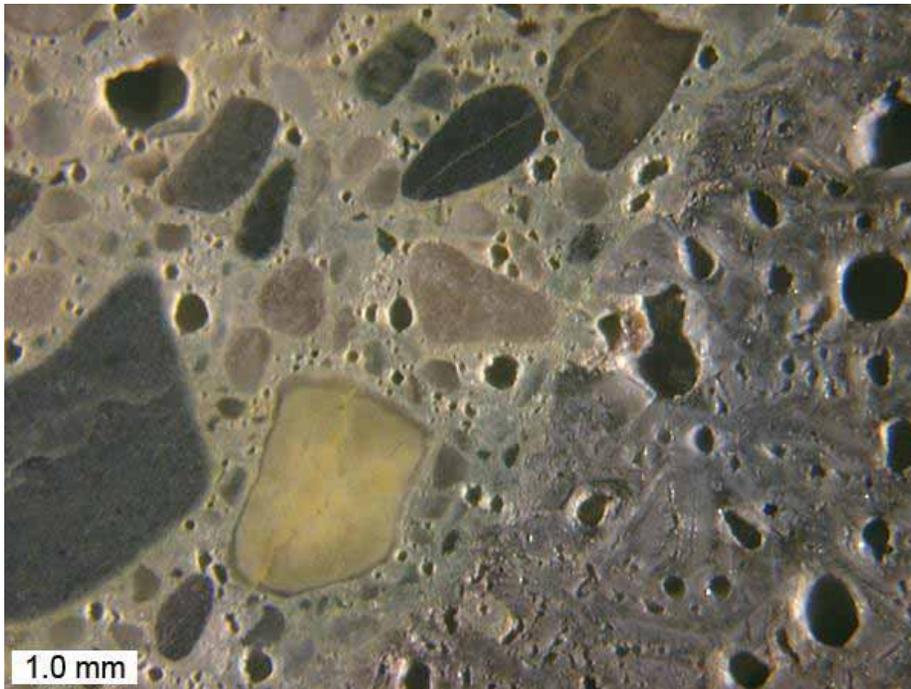
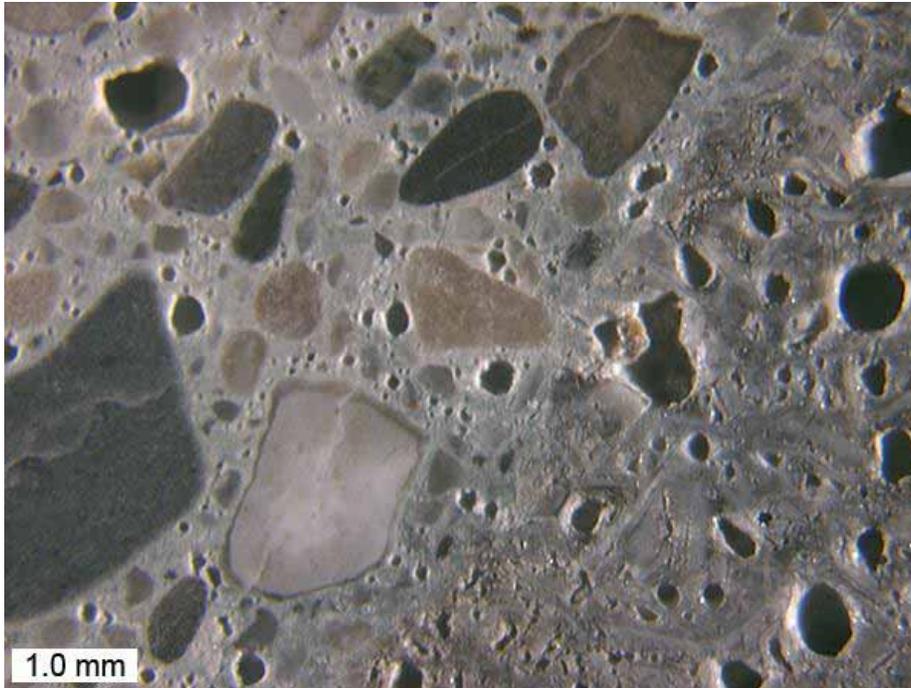
Data Analysed - 5/ 9/ 7 at 16:19			
Operator Name - matt			
Sample ID - m59-5			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1886.041	1886.041	3772.082
Total Area Analyzed (cm ²)	37.0	37.0	73.9
Air Stops	68	53	121
Paste Stops	203	237	440
Aggregate Stops	451	432	883
Secondary Phase Stops	0	0	0
Total Stops	722	722	1444
# of Air Void Intercepts	828	894	1722
# of Filled Void Intercepts	0	0	0
Results			
Air vol%	9.4	7.3	8.4
Paste vol%	28.1	32.8	30.5
Aggregate vol%	62.5	59.8	61.1
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.160	0.170	0.167
Paste/Air ratio	2.99	4.47	3.64
Specific Surface (mm ² /mm ³)	18.6	25.8	21.8
Void Frequency (voids/m)	439	474	457
Average Chord Length (mm)	0.215	0.155	0.184

Appendix C
M-59 Core Site



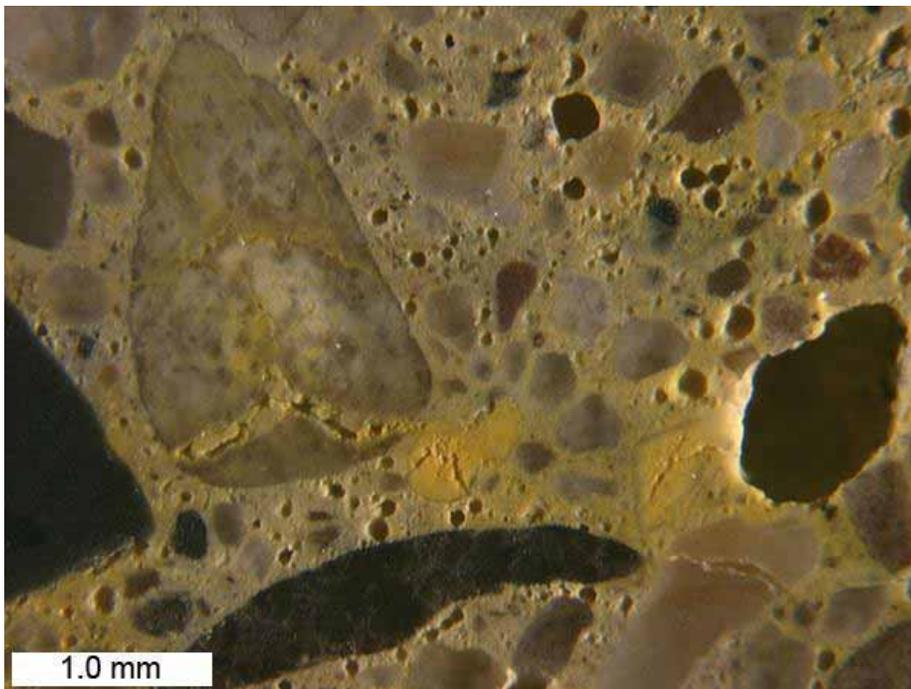
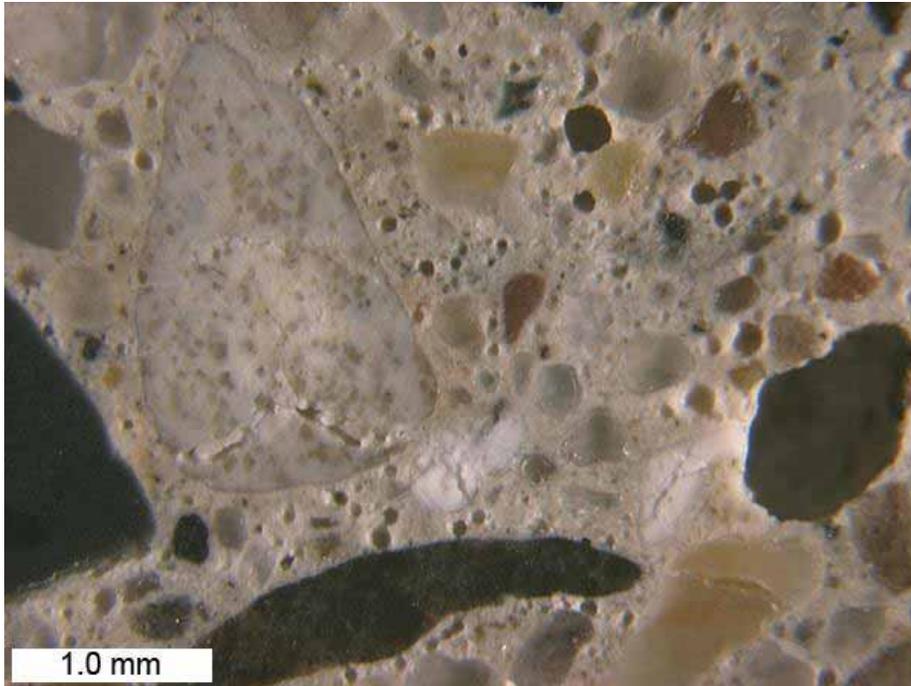
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



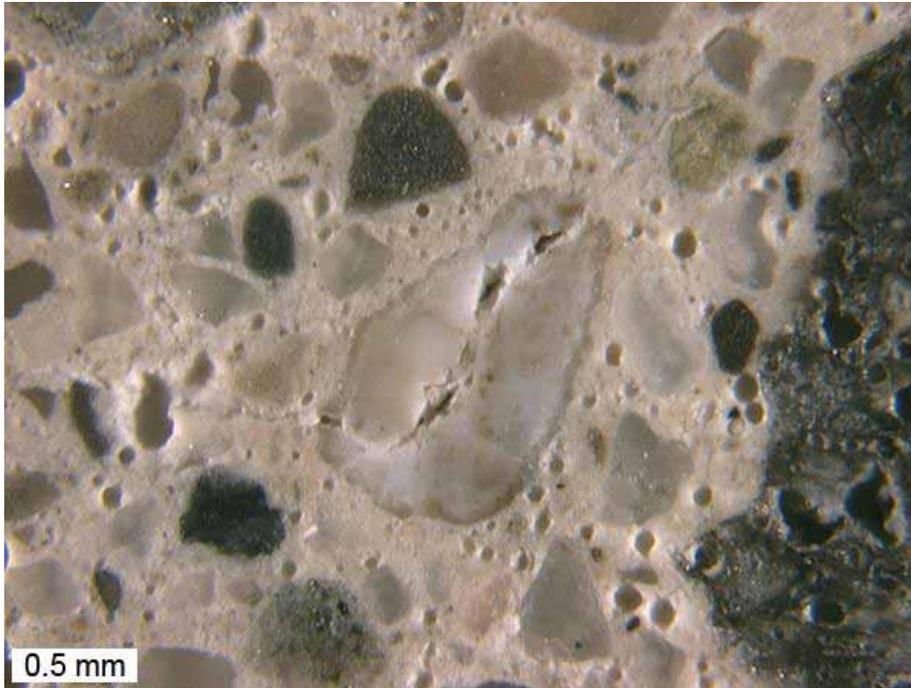
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



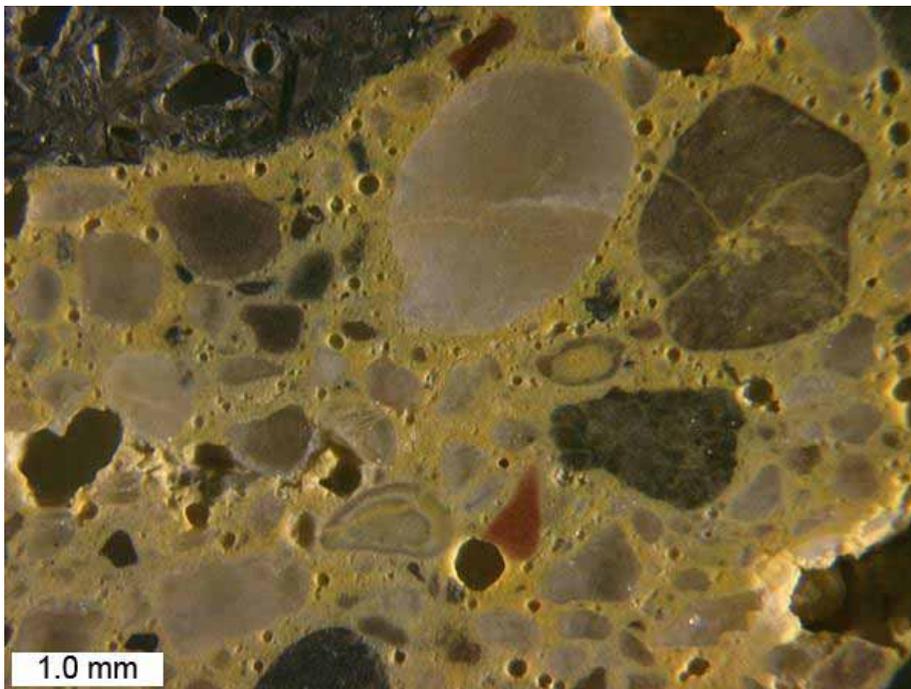
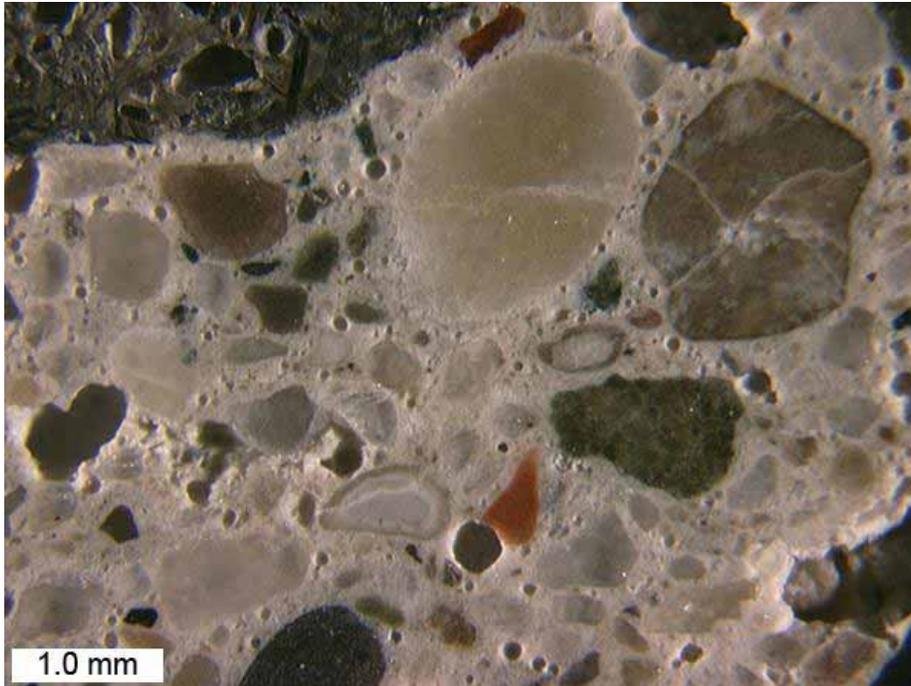
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



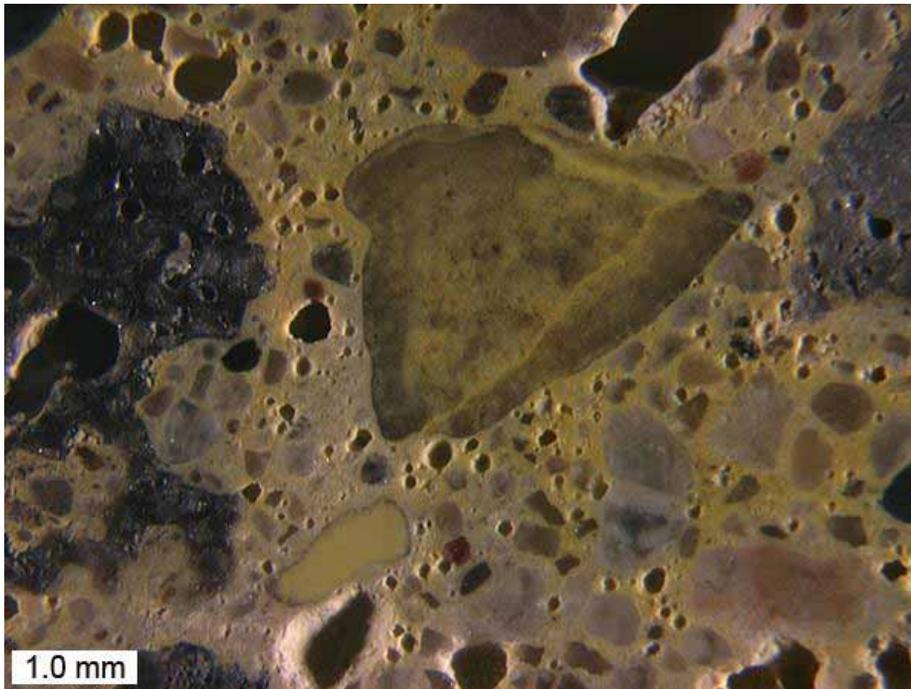
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



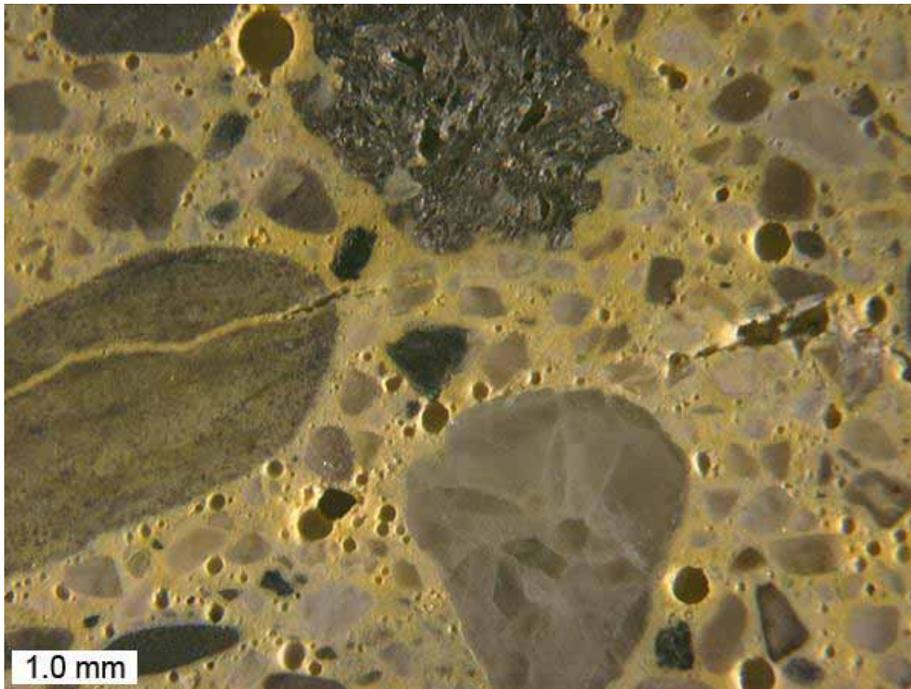
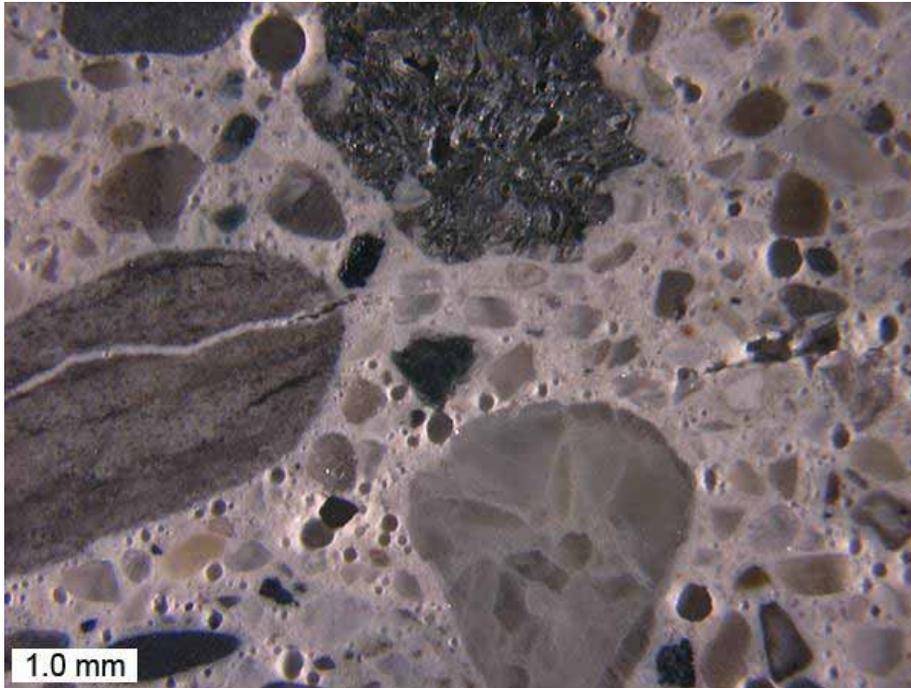
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



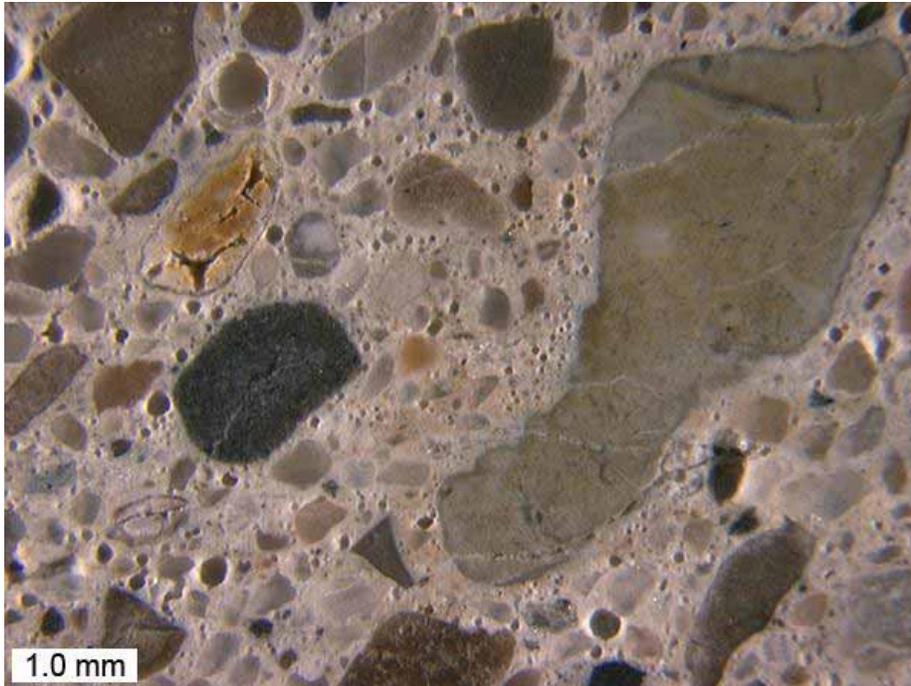
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



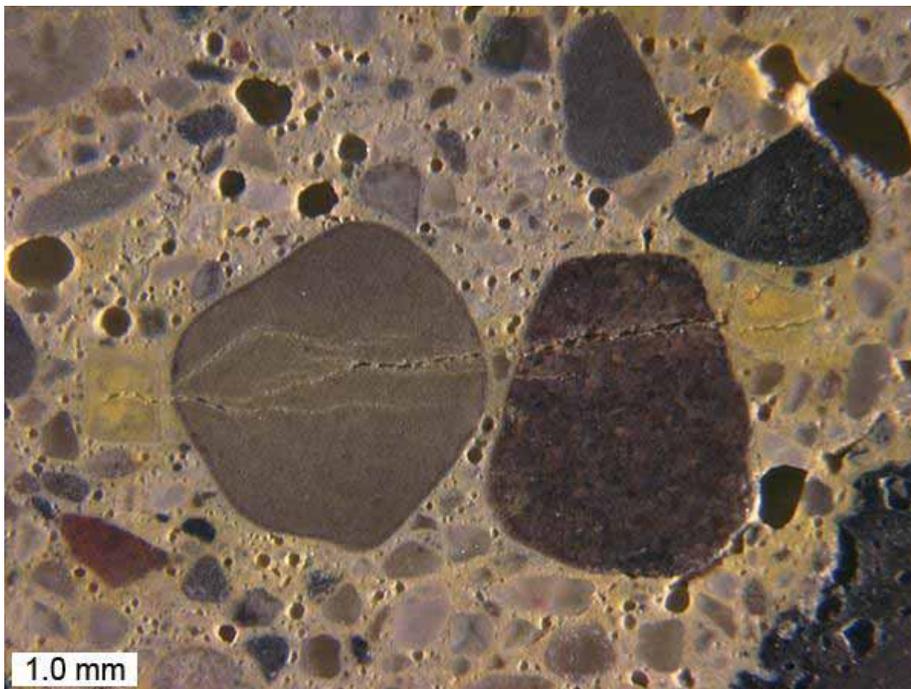
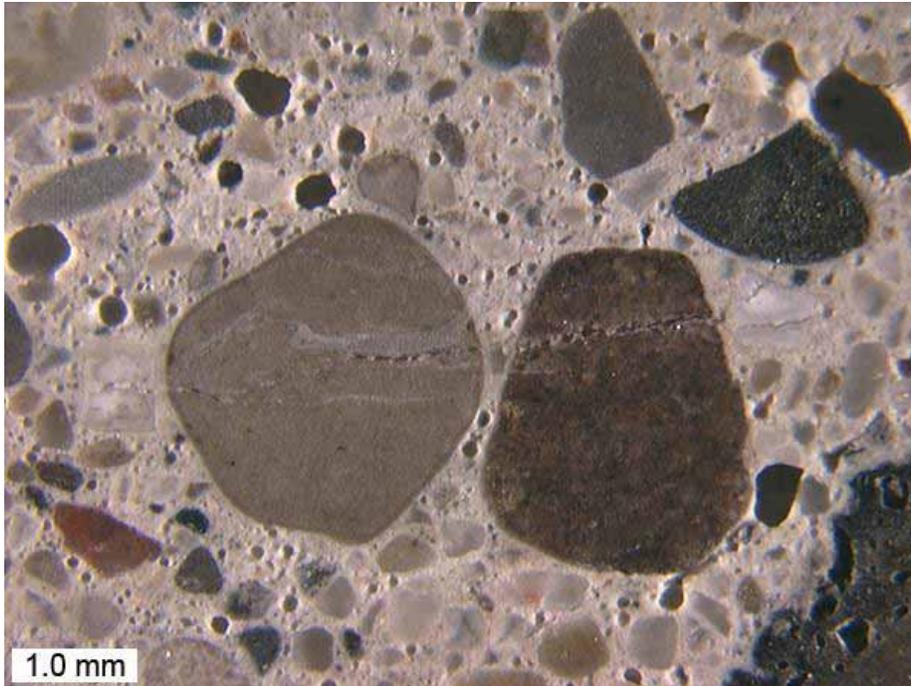
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



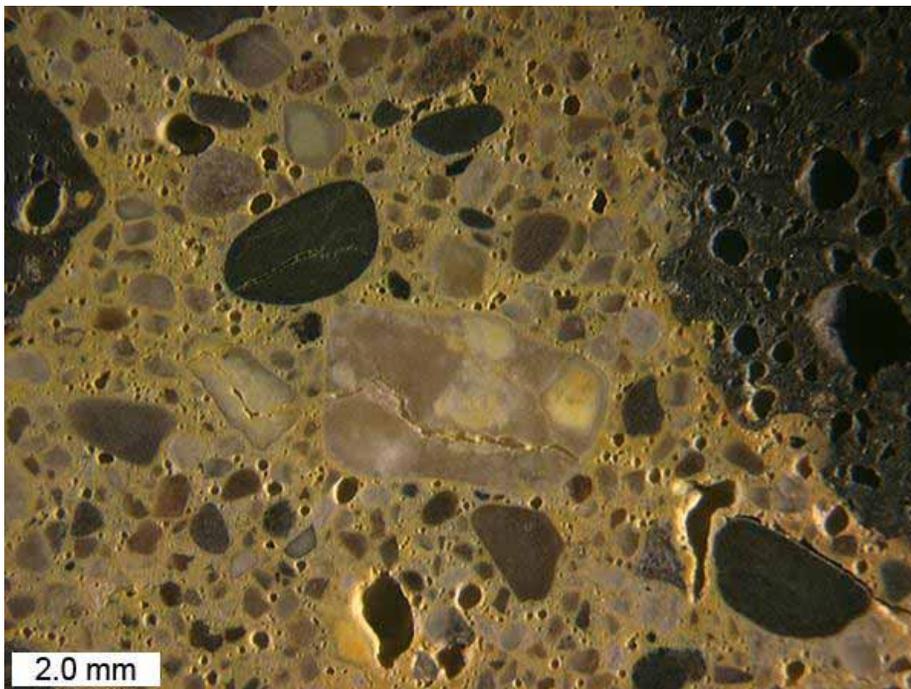
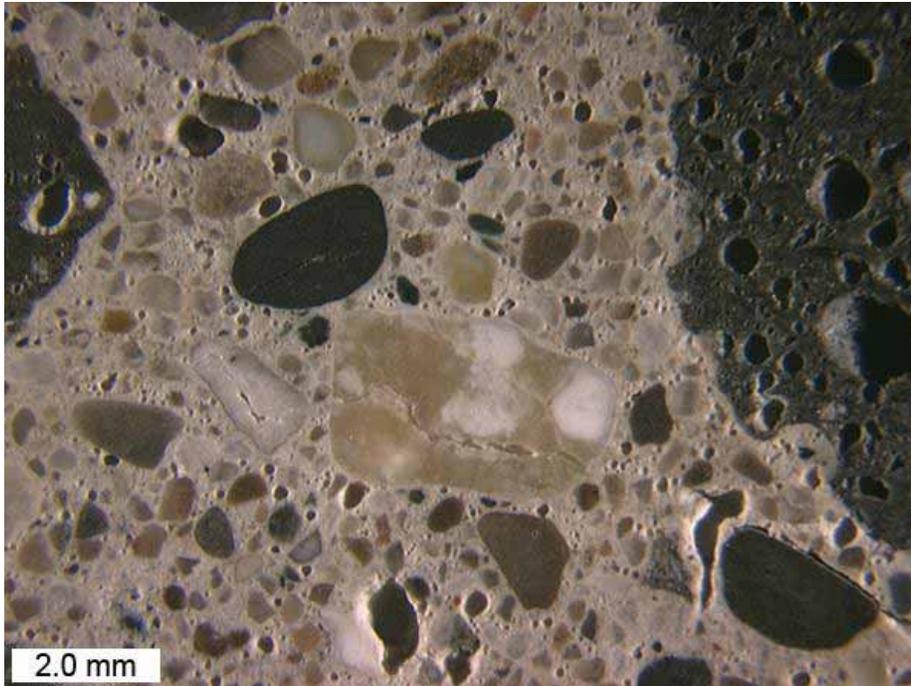
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



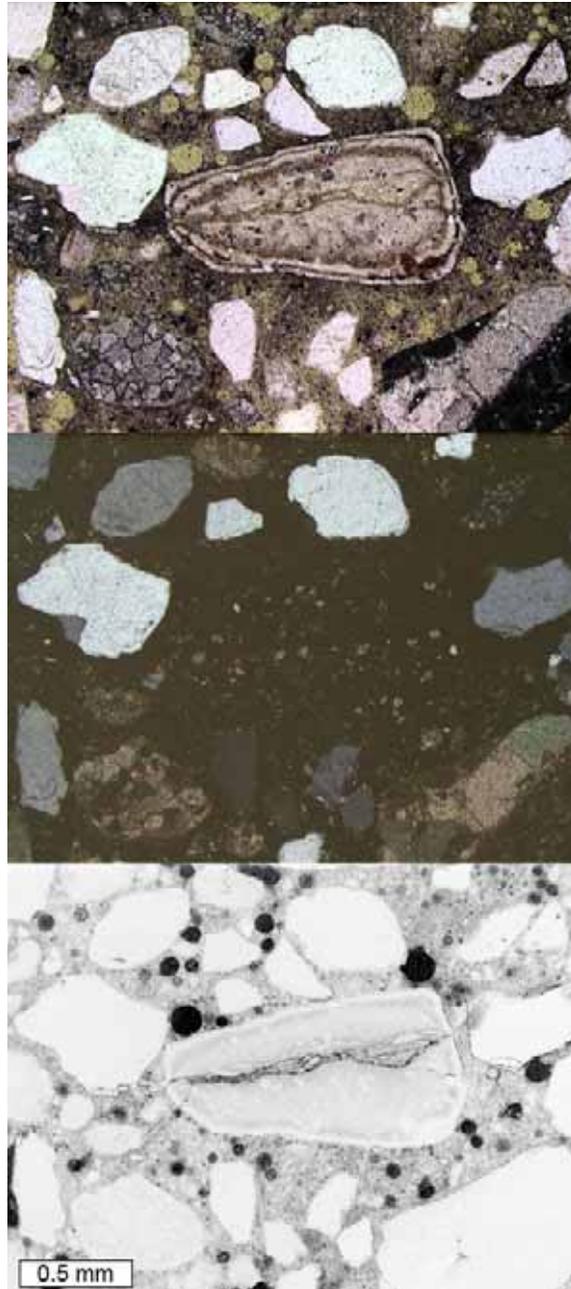
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



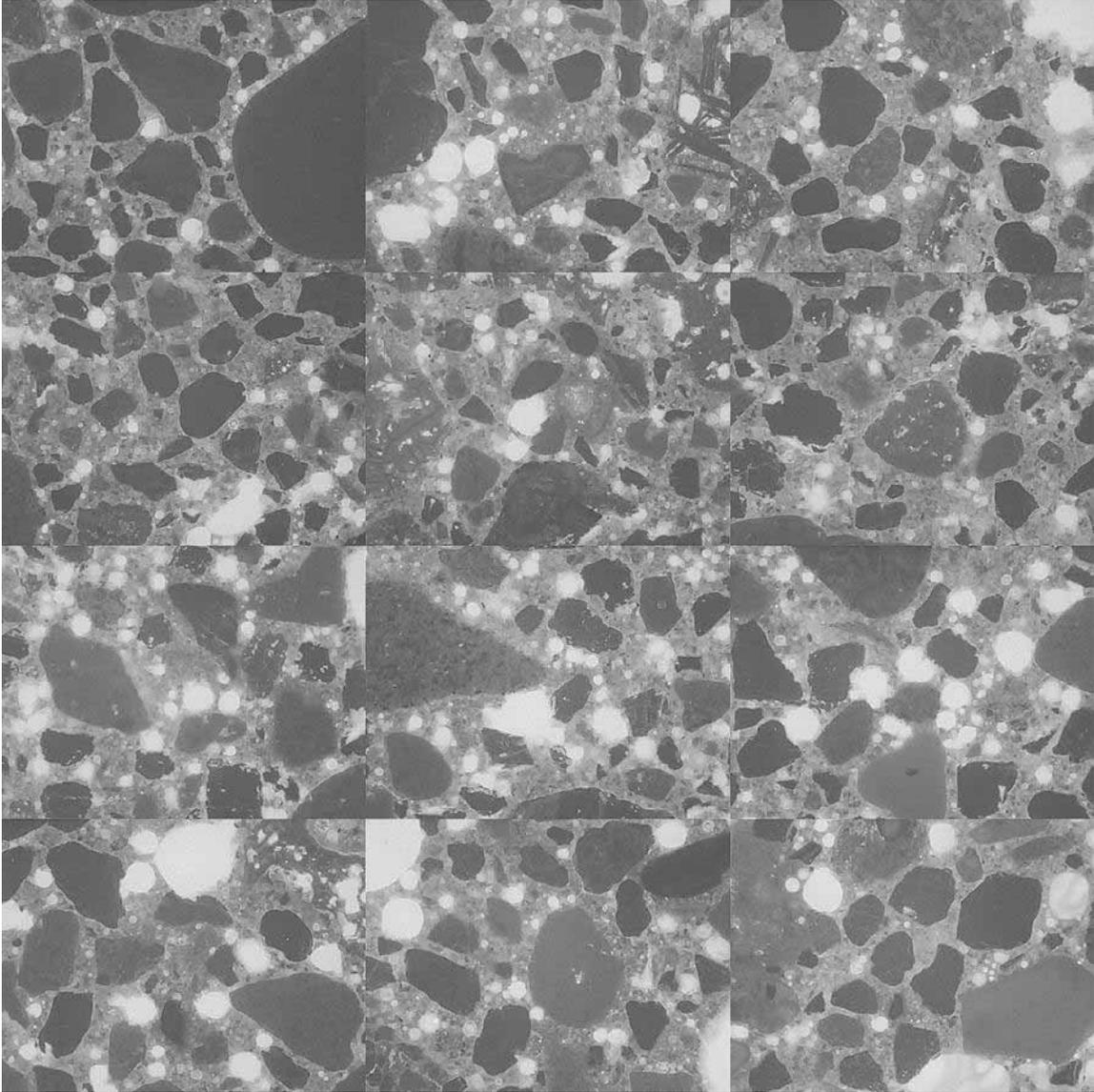
Alkali silica reaction in fine aggregate and associated cracking, before and after sodium cobaltinitrite stain, polished slab from top half of M-59, constructed 1997/98, outside lane, away from transverse joint, core C, MTU ID M59-02.

Appendix C
M-59 Core Site



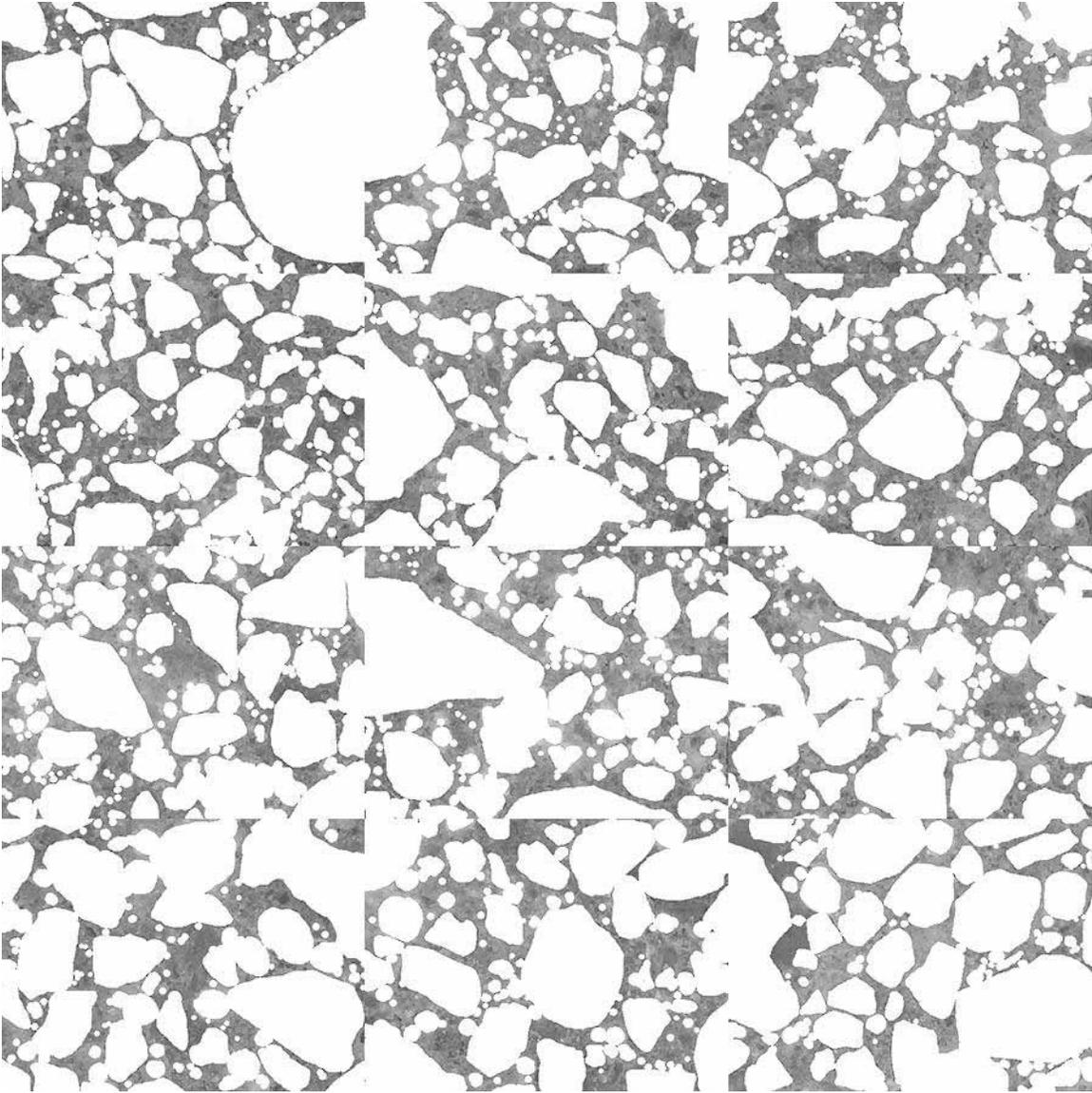
Example of chert particle exhibiting deleterious alkali-silica reaction, from thin section prepared from core from M-59, at joint, MTU ID M59-01. From top to bottom: transmitted light, crossed-polars, and epifluorescent mode images.

Appendix C
M-59 Core Site



Mosaic of 12 epifluorescent mode images collected from thin sections prepared from core M-59, constructed, outside lane, away from transverse joint, MTU ID M59-02 (each individual frame measures 2.612 x 1.959 mm).

Appendix C
M-59 Core Site



Mosaic of 12 epifluorescent mode images collected from thin sections prepared from core M-59, constructed, outside lane, away from transverse joint, MTU ID M59-02, after masking out air voids and fine aggregate to isolate cement paste (each individual frame measures 2.612 x 1.959 mm).

Appendix C
M-59 Core Site

Average cement paste pixel intensities per frame, and equivalent w/c values (as compared to 28-day moist cured mortar samples) from thin section prepared from core from M-59, constructed, outside lane, away from transverse joint, MTU ID M59-02.

cement paste pixel fluorescence measurements (average intensity per frame)			
70	86	86	74
81	83	93	94
92	81	84	91
equivalent w/c ($y = 0.0044x + 0.0329$)			
0.40	0.34	0.41	0.41
0.36	0.39	0.40	0.44
0.44	0.43	0.38	0.40