



# OFFICE MEMORANDUM

DATE: May 25, 1976

TO: L. T. Oehler  
Engineer of Research

FROM: R. W. Muethel

SUBJECT: Petrographic Analysis of Coarse Aggregate: Wallace Stone Co. Pit No. 32-4 (Testing Laboratory Sample 75 A-2501). Research Report No. R-1003.

On December 3, 1975, a sample of crushed stone coarse aggregate was received by the Department's Testing Laboratory at Ann Arbor. Information accompanying the sample stated that the material was obtained from a stockpile at the Wallace Stone Co. quarry, Pit No. 32-4, location SW of NW, Section 5, T16N-R10E, Huron County. The material identified as Full Face Rock, was submitted to the Laboratory to be tested for information. Petrographic analysis of a portion of the sample was requested by G. H. Gallup.

## Summary

Petrographic analysis was completed on February 12, 1976. The sample was found to contain 100 percent sedimentary rock particles, predominantly arenaceous limestone grading into sandstone. Also present in the sample were smaller amounts of limestone or dolomite interbedded with sandstone, laminated to shaley limestone, dolomitic limestone, and cherty particles.

Detailed tabulations of petrographic composition are included in Table 1.

## Detailed Petrography

Petrographic examination was conducted in general conformance with ASTM C295, "Petrographic Examination of Aggregates for Concrete." Representative portions — 300 particles — of each sieve fraction of the sample were identified megascopically, along with acid testing and a scratch test for hardness; and microscopically with a stereomicroscope. The following pages contain the rock type descriptions.

TESTING AND RESEARCH DIVISION

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Geologist

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TABLE 1  
 PETROGRAPHIC COMPOSITION  
 Testing Laboratory Sample No. 75 A-2501

Rock Type	Sieve Fractions Analyzed				Computed Sample Composition
	1 to 3/4 in.	3/4 to 1/2 in.	1/2 to 3/8 in.	3/8 to No. 4	
Limestone	12.7	12.6	11.3	14.3	12.7
Laminated to Shaley Limestone	2.3	3.3	2.7	5.0	3.3
Arenaceous Limestone	45.3	56.0	47.4	33.3	45.5
Dolomitic Limestone	1.3	1.7	1.3	1.7	1.5
Dolomite	2.0	2.7	2.3	4.0	2.8
Interbedded Limestone or Dolomite and Sandstone	0.7	1.0	2.0	2.7	1.6
Sandstone	33.0	21.7	32.7	38.3	31.4
Cherty Particles	2.7	1.0	0.3	0.7	1.2
Totals, Percent	100.0	100.0	100.0	100.0	100.0

NOTE: Computed sample composition is based upon counts of 300 particles contained in each of the sieve fractions noted.

SEDIMENTARY ROCKS

Rock Type	Limestone	Laminated to Shaley Limestone	Arenaceous Limestone
Color	buff; yellowish brown; dark gray- ish brown; and mottled buff and dark grayish brown	mottled buff or brown and dark brown to black	buff to grayish brown
Texture	fine grained to microcrystalline	fine grained to microcrystalline	fine grained to microcrystalline
Luster	dull to earthy	dull	dull
Hardness	matrix moderately hard: Mohs 3; quartz grains hard: Mohs 7	matrix soft to moderately hard; Mohs 2-1/2 to 3; quartz grains hard: Mohs 7	matrix moderately hard: Mohs 3; quartz grains hard: Mohs 7
Porosity	non-porous to slightly porous	non-porous to slightly porous	non-porous to slightly porous
Particle Shape	angular to subangular	angular	angular to subangular
Particle Surface	fresh, rough to moderately smooth, dented to ridged	fresh, rough, dented to ridged	fresh, rough, dented to ridged
Remarks	A few particles contain traces of quartz grains. A number of par- ticles are slightly argillaceous.	A number of particles contain quartz grains. Particles vary from highly laminated to poorly laminated.	

SEDIMENTARY ROCKS (Cont.)

Rock Type	Dolomitic Limestone	Dolomite	Interbedded Limestone or Dolomite and Sandstone
Color	buff; and mottled buff and gray	buff to grayish brown	mottled buff and gray
Texture	very fine grained to micro-crystalline	fine grained to microcrystalline	fine grained to microcrystalline
Luster	dull	dull	dull
Hardness	moderately hard: Mohs 3 to 3-1/2	matrix moderately hard: Mohs 3-1/2 to 4; quartz grains hard: Mohs 7	carbonate exposures moderately hard: Mohs 3 to 4; sandstone hard: Mohs 7
Porosity	non-porous to slightly porous	non-porous to slightly porous	non-porous to slightly porous
Particle Shape	angular	angular to subangular	angular
Particle Surface	fresh, rough to smooth, dented to ridged	fresh, rough to moderately smooth, dented to ridged	fresh, rough to moderately smooth, dented to ridged
Remarks		A number of particles are partially arenaceous, pyritic, or slightly argillaceous. A few particles display small calcite exposures.	

SEDIMENTARY ROCKS (Cont.)

Rock Type	Sandstone	Cherty Particles
Color	greenish gray to buff	mottled buff and gray to yellowish brown
Texture	fine to very fine grained	fine grained to microcrystalline
Luster	dull	dull to vitreous
Hardness	calcareous cementation moderately hard: Mohs 3; quartz grains hard: Mohs 7	carbonate exposures moderately hard: Mohs 3; chert exposures hard: Mohs 7
Porosity	non-porous to finely porous	non-porous to slightly porous
Particle Shape	angular to subrounded	angular
Particle Surface	fresh, rough, dented to ridged	fresh, rough to smooth, dented to ridged