

ARCHITECTURAL CONSERVATION SERVICES, LLC

Post Office Box 506

Manchester By The Sea, MA 01944

TELEPHONE: 978-525-3090

FAX: 978-525-3114

Knoxville Mortar Evaluation

The purpose of this evaluation is to determine the properties of the original mortar and to present recommendations for the restoration mortar. Samples taken at the site by the architect have been submitted along with photographs illustrating conditions at the site. Samples included those labeled as original mortar along with later pointing mortars.

All samples were examined under low power magnification to determine gross features and the original mortar subjected to acid digestion to separate components. Results of this testing are recorded on the enclosed analysis sheets. Examples of sand and fines will be forwarded under separate cover.

Precise elemental analysis of each sample could be done at additional cost, but would not likely alter my recommendation for repair

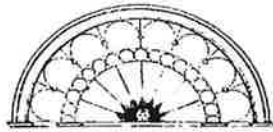
Photographs show cut stone walls with flat cap stones. Large sections function as retaining walls at the perimeter. The walls are in generally good condition but will require overall repointing and some repair. Broken cap stones appear to be repairable as well.

One sample was processed in the lab and that labeled 'original mortar'. The mortar is dark gray in color and moderately hard. The sample yielded an exceptionally high soluble fraction suggesting the presence of soluble aggregate. Reaction time was slow.

Recommendations: Extensive repointing will be necessary to stabilize these walls and unify the appearance. An appropriate mortar would be

1 part Portland cement
1 part hydrated lime
5-6 parts sand.

Original sand was rather fine, but suitable and should be matched if possible.



ARCHITECTURAL CONSERVATION SERVICES

Post Office Box 506
Manchester By The Sea, MA 01944

TELEPHONE: 978-525-3090

FAX: 978-525-3114

MORTAR ANALYSIS

JOB HOWORTH & ASSOCIATES

DATE 7/25/08

SAMPLE KNOXVILLE - ORIGINAL MORTAR

SAMPLE WEIGHT 16.35g SAMPLE HARDNESS _____

TEST SAMPLE WEIGHT 16.35g TEST SAMPLE COLOR 2.5Y - 6/1

NOTES:

DARK GRAY
MODERATELY HARD

WEIGHT SOLUBLE FRACTION 6.02g

WEIGHT SAND 8.69g

COLOR SAND 2.5Y - 6.5/2

WEIGHT FINES 1.64g

COLOR FINES 2.5Y - 6/2

SCREEN SAND	WEIGHT	CUMULATIVE WEIGHT	% PASS
#8	<u>.0.</u>	<u>.0.</u>	<u>100%</u>
#16	<u>.16g</u>	<u>.16g</u>	<u>98%</u>
#30	<u>.99g</u>	<u>1.15g</u>	<u>87%</u>
#50	<u>5.33g</u>	<u>6.48g</u>	<u>25%</u>
#100	<u>1.78g</u>	<u>8.26g</u>	<u>5%</u>
#200	<u>.35g</u>	<u>8.61g</u>	<u>1%</u>
PASS	<u>.08g</u>	<u>8.69g</u>	<u>.0.</u>

NOTES:

MODEST REACTION IN HCL
SLOW -
YELLOW STAIN