



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

November 19, 2010

File No. 10-03099

Ted Corvey, Vice-President
Pine Hall Brick Company, Inc.
2701 Shorefair Drive
Winston-Salem, NC 27116

Reference: StormPave Permeable Clay Paver Permeability Testing
University of Pennsylvania – Franklin Field
Philadelphia, Pennsylvania

INTRODUCTION

This letter summarizes the results of the permeability testing conducted on Pine Hall Brick Company's (PHB) StormPave permeable clay brick paver system at the above referenced site. To facilitate the study, Gilmore & Associates, Inc. (G&A) performed one single-ring infiltration test at the Franklin Field location within the University of Pennsylvania Campus on October 13, 2010. The purpose of this investigation was to establish a post-construction (baseline) infiltration rate for stormwater passing through the paver surface into the open-graded subbase material.

SETTING

PHB reported to G&A that the Franklin Field permeable clay brick paver walkway was installed in April 2010, and has been in service for approximately seven months. The paver walkway consists of brick units and No. 89 stone infill, over AASHTO No. 57 stone. The paver walkway is located on the north side of the Field, adjacent to the Dunning Coaches' Center. G&A performed a single-ring infiltrometer test at the side entrance to the lower-level fitness room. This location is in an open area that experiences relatively low pedestrian traffic volumes. See the attached Location Map for the approximate testing location.

PROCEDURE

A single-ring infiltrometer was used to test the surface infiltration rate of the constructed permeable clay brick paver walkway. This method uses a modified version of ASTM C1701, known as a "surface inundation test." The double-ring infiltrometer was not utilized for this study because water infiltration was too rapid for the outer ring to maintain a constant head. Due to the high rates of infiltration, the relatively minor impact of lateral water movement is not significant. The single-ring infiltrometer consisted of a 0.25-inch gauge, 12-inch diameter, 10-inch high steel cylinder. The ring was placed on the brick pavers so that the minimum, or most conservative, infiltration area was exposed at the cylinder base and the perimeter then sealed to the brick surface with plumber's putty. Water was added to the single-ring to a measured depth and the time was recorded for the water to infiltrate below the brick paver surface.

RESULTS

The testing was terminated when a stabilized infiltration rate was obtained in the single-ring infiltrometer. The final infiltration rate, based on the last reading, was calculated at 720 inches per hour. It is our

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Reference: Permeable Clay Paver Permeability Testing
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Page -2-

File No. 10-03099
November 19, 2010

professional opinion that this infiltration rate is an accurate assessment of the post-construction permeability properties of the StormPave permeable clay brick paver system at this location.

The test of this surface, consisting of brick paver units and No. 89 stone infill, determined that the paver surface has a very high post-construction infiltration rate. The surface infiltration capacity of the brick pavers is generally an order of magnitude higher than infiltration rates typically associated with undisturbed native soils. See the attached Permeability Testing Summary Table for more detailed testing data.

G&A appreciates the opportunity to work with you on this project. Please do not hesitate to contact us with any questions.

Respectfully submitted,



Matthew C. Hostrander, CPSS
Soil Scientist
Gilmore & Associates, Inc.



Trevor G. Woodward, P.G.
Engineering Geologist
Gilmore & Associates, Inc.

MCH/TGW/dmk

Enclosures: Permeability Testing Summary Table, Photographs, Location Map

Permeability Testing Summary Table
University of Pennsylvania – Pine Hall Brick Pavers
G&A Project No. 10-03099
November 19, 2010

Franklin Field (10/13/2010)

Test Location	Water Depth (inches)	Elapsed Time (mins:secs)	Final Rate (in/hr)
Surface test adjacent to side stairs and ramp	4	0:20	720.0
	4	0:20	
	4	0:20	
	4	0:20	
	4	0:20	
	4	0:20	

NOTES:

- Permeability testing performed using a 12-inch diameter single-ring infiltrometer.
- No presoaking of the single-ring was completed prior to starting the test.
- The final infiltration rate is based on the last reading. The infiltration rate is determined from the time it took the specified depth of water to drain below the brick paver surface.
- The testing location was field-located by Gilmore & Associates, Inc. and Pine Hall Brick Co. the day of the field investigation.

G&A Representative: Matthew Hostrander, CPSS – Soil Scientist

Single-Ring Infiltrometer and Testing Location
University of Pennsylvania – Franklin Field
G&A Project No. 10-03099
November 19, 2010



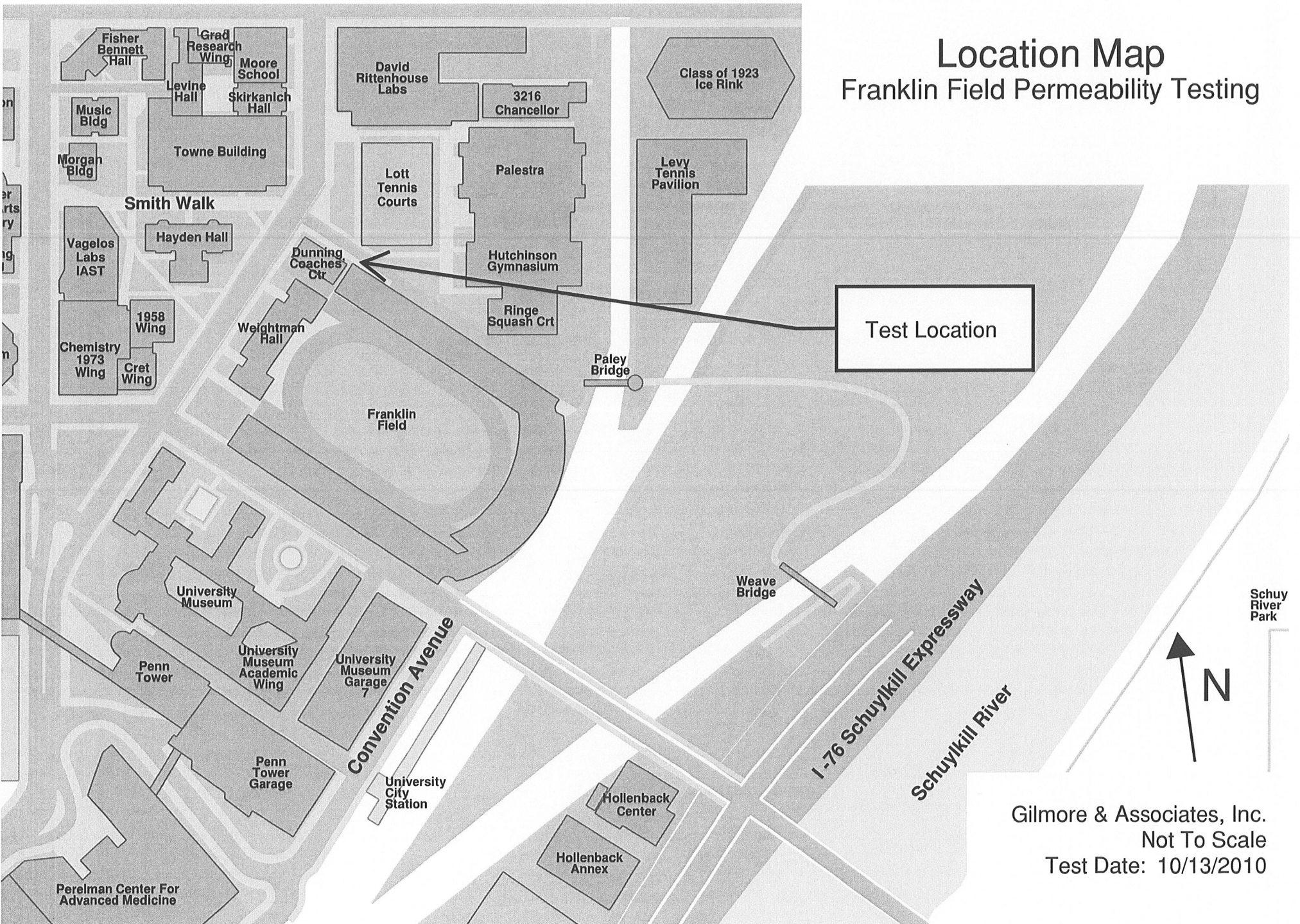
Permeability
testing
location



Photographs from 10/13/2010

Location Map

Franklin Field Permeability Testing



Gilmore & Associates, Inc.
Not To Scale
Test Date: 10/13/2010