BIRDSALL ENGINEERING, INC.
CONSULTING & ENVIRONMENTAL ENGINEERS

A BIRDSALL SERVICES GROUP COMPANY

Via Facsimile (609)-633-8598

State of New Jersey
Department of Human Services
Office of Facilities Support
P.O. Box 700
Trenton, NJ 08625-0700

September 5, 2006
Proposal No. BEI060905RCM1

Attn: William Schaffer

Re: **Capital Place One**
222 South Warren Street
Trenton, NJ

Dear Mr. Schaffer:

Per your request, Birdsall Engineering Inc. (BEI) responded to a structural failure that occurred directly adjacent to the Capital Place One office building, which is occupied by the State of New Jersey, Department of Human Services. The structural failure consisted of a large 'sinkhole' in the ground abutting the Southeast corner of the building. It was first noticed in the morning of September 3, 2006. BEI personnel consisting of Thomas K. Rospos, P.E., Richard C. Maloney, P.E. and Nicolas Dicotiis, were onsite to inspect the 'sinkhole' at 3:30 p.m. on September 3, 2006.

Observation revealed that the 'sinkhole' is the result of a failure of the roof structure of an underground culvert that carries the Assunpink Creek from South Broad Street past South Warren Street. Plans of the building's recent renovation (Sheets T-3 and A-100, prepared by Ronald Schmidt & Associates, P.C., dated 2-22-00) and field inspection show that this culvert runs from the bridge at South Broad Street and traverses the open field located to the East and South of Capital Place One, and literally passes "right by" the Southeast corner of the building. The original structural plans of the building (prepared by Gleit, Olenek & Associates P.C., dated 4/20/77) show that the culvert wall abuts that actual corner of the building's foundation. Water was flowing through both flumes of the culvert at the time of the inspection.

Inspection at the culvert ends indicate that the culvert structure is made up of two concrete sidewalls and a concrete center wall which divides the culvert into two 22' +/- wide flume openings. The culvert contains a roof structure that consists of 8" deep precast, hollow-core concrete deck slabs, spanning each 22' wide half of the culvert. The precast deck slabs contain a reinforced concrete topping (thickness unknown). The culvert roof is then covered with soil. The areas of the culvert around Capital Place One and along South Warren Street also contain concrete walls and brick patios over the culvert roof. The height of soil and structure over the culvert roof ranges from approximately 3' in the open field to over 6' in the areas of the brick patios.

Inspection revealed that the structural failure consisted of the culvert roof structure in an approximately 24' by 35' area directly at the patio and stairs to the South of Capital Place One.

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The roof deck slabs over the northern flume of the culvert collapsed into the culvert. The collapse of the deck slabs removed support for the soil and structure above, which in turn collapsed into the culvert. Sections of the wall and stair structure above the roof collapse still remain in place, however these sections are extremely unstable and could collapse into the culvert at any time. The use of precast hollow-core slabs in a buried condition is a very questionably application and the failure of the deck slabs can most likely be attributed to some combination of the following three conditions.

Hollow-core slabs contain large voids inside the slabs and gain their strength from high-strength strands of steel that are located in the bottom segments of the deck slab. In an exterior application, especially a buried application, the deck slab is exposed to continual moisture and water infiltration. In this application, the slabs are exposed to the creek below and continual water seepage through joints from the soil above. Evidence of water seepage was seen on the exposed walls in the collapsed area. The steel strands usually contain only about 1 ¼" of concrete cover and when exposed to such moist conditions, the possibility of eventual corrosion of the strands is great. When the strands corrode, they expand and cause the concrete to spall, only accelerating the corrosion process and reducing the bonding strength of the strand to the deck slab. Both of these conditions can eventually lead to sudden collapse. Secondly, when hollow-core deck slabs are not properly installed with weep holes and are then exposed to freezing, the cores which inevitably collect water are subject to freezing which can also cause catastrophic damage to the structural integrity of the deck slabs. Finally, 8" deck slabs spanning approximately 22' have allowable load carrying capacities that are lower than the conditions that appear to exist at this site. The load of three feet of soil alone is on the order of 350 pounds per square foot, which is beyond the traditional carrying capacities for 8" decks. This load only rises at the areas of the raised patios and walls, and also does not include the load of the reported ponds of water that collect in the open field during heavy rains.

From our visual inspection, we have determined that the collapse is from the failure of the culvert roof deck slabs. Further, based on the reasons outlined above, we have concern that other sections of the culvert roof may contain highly questionably structural integrity with the potential for sudden collapse. While walking the open field over the culvert, one section of grass appeared to have settled over the culvert roof only strengthening our concern of the roof's integrity. **BEI highly recommends that the entire culvert roof area including a minimum buffer of 10 feet on each side of the culvert be pardoned off to any access. No access should be allowed on top of the culvert until the entire culvert roof structure can be inspected and properly repaired.** Our inspection was limited to visual observations as made from the ground surface and did not include any inspection of the actual roof of the culvert, which will require access into the culvert to perform. It is our understanding that the actual culvert belongs to the City of Trenton. This letter assumes that further inspection of the culvert will be the responsibility of the City of Trenton including investigation into the items mentioned above.

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We informed Mr. M. Sean Semple, Acting Director of the Division of Traffic and Transportation for the City of Trenton, who was present on site at the time of the inspection, of our findings and recommendations. We further informed Mr. Semple of the fact that South Warren Street was located over the culvert. He stated that this section of the culvert did in fact contain a reinforced concrete roof and not the precast deck slabs observed at the 'sinkhole' location and at the beginning of the culvert at South Broad Street. We further request through this letter that the State of New Jersey send a copy of this letter to the City of Trenton formalizing our recommendations of their structure.

With regards to the actual building, Capital Place One, review of the structural drawings indicate that the building structure is supported on steel H-piles that extend down to "ledge rock". The perimeter grade beam of the building is thickened to 12'-6" at the Southeast corner of the building to apparently address the existence of the culvert structure. With the failure being related to the culvert roof slabs and the building being independently supported on its own deep foundation system, the structural failure of the culvert roof does not compromise the structural integrity or safety of the building structure. It is our professional opinion that it is safe to occupy and use Capital Place One as long as external access is restricted from the areas over the culvert roof and a 10' buffer on each side of the culvert as was outlined in the field at the time of the inspection and as marked on the attached plan of the building site.

We trust that this inspection letter addresses your immediate concerns. If you need further assistance as this issue proceeds or if you have any questions, please do not hesitate to contact either Thomas Rospos at 732-380-1700, extension 1201, or the undersigned at extension 1274.

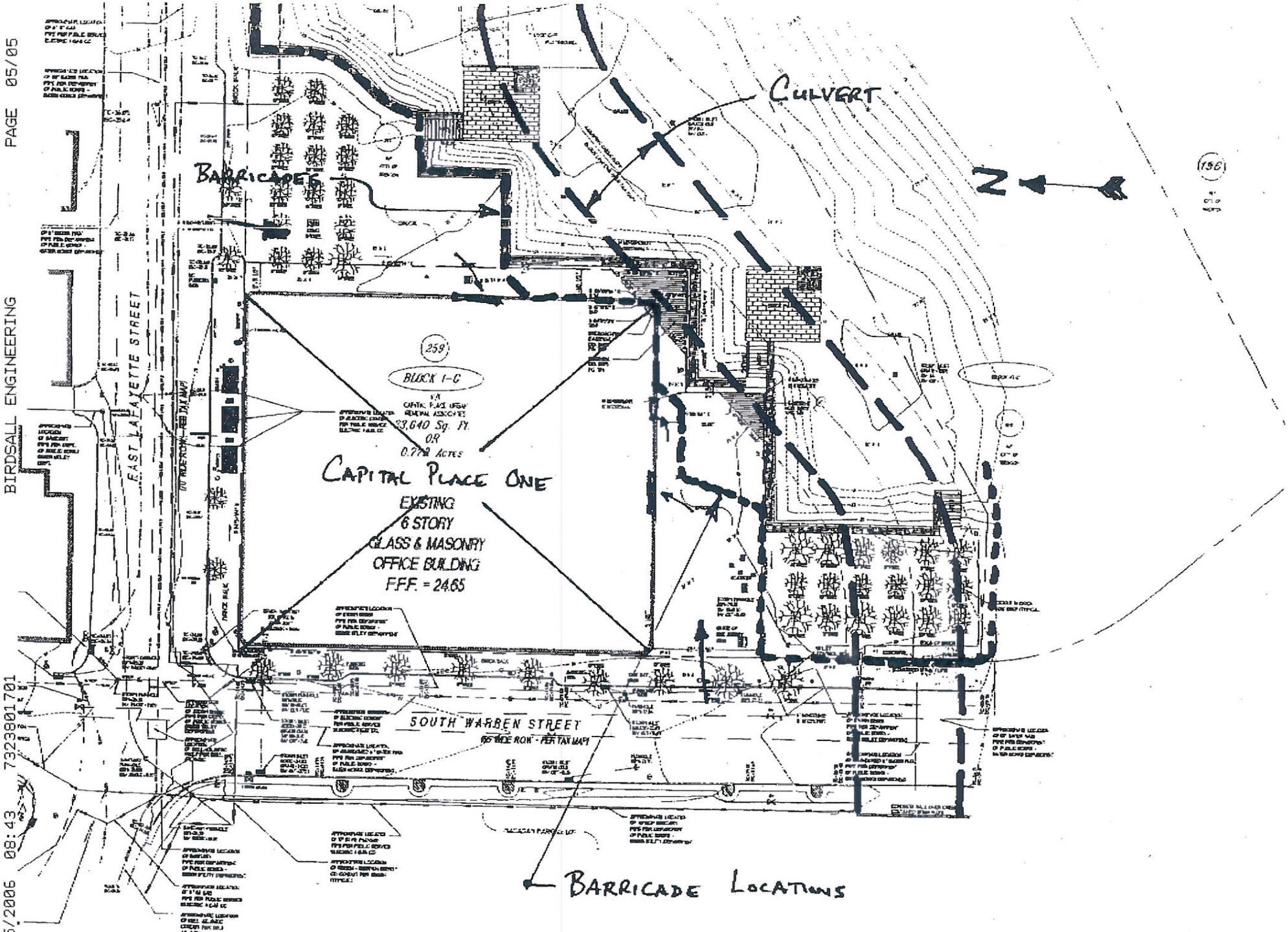
Very truly yours,

BIRDSALL ENGINEERING, INC.

Richard C. Maloney, P.E.
Vice President

RCM:aic
Attachment

cc: Thomas K. Rospos, P.E., Executive Vice President, BEI
William T. Birdsall, P.E., Senior Vice President, BEI



1 SITE SURVEY

LAWYERS TITL