

**Dames & Moore**

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September 16, 1981

Mr. Walter Arensberg  
Skidmore, Owings & Merrill  
1201 Connecticut Avenue, N.W.  
Washington, D.C. 20036

Re: CIA-Geotechnical  
Exploration Program

Dear Walt:

This letter and its attachments present our cost estimate for conducting the preliminary geotechnical program for the CIA Master Plan Project.

The primary purpose of this investigative effort is to determine the depth to rock for the selected alternative (i.e. building and parking garage). Dames & Moore will serve as the geotechnical consultant for all aspects of this except for the actual drilling operations which we propose to subcontract to Pittsburgh Testing Laboratory. Dames & Moore will have a field supervisor who will perform all field classifications and log the holes. We will perform all soil analyses in the firm's soils laboratories.

Attachment I is a brief scope of work which outlines what is to be done, how, and in what sequence. As you will recall, we recommend that if it appears that the selected site is a "go" that we proceed to perform basic soils analyses. This could save our having to redrill the same locations when the project gets to the design phase and would also assist in some of your preliminary cost estimating.

Attachment II presents the cost estimate. The estimate includes 1.) basic consulting to organize and execute the program and to provide geotechnical information to you based on the modest sampling program, 2.) field drilling and 3.) sample analyses. Note that there are various options. We will be pleased to discuss this after you have had the opportunity to review this material.

You will note a difference between this estimate and our original estimate. The original estimate was based on drilling six holes in various locations where potential alternatives were identified and in areas with reasonably good access. This estimate is based on eleven holes in the location of the preferred alternative. Here there is difficult access for several holes.

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I should point out that the \$750 mobilization charge is for two rigs: a trailer mounted rig for the top of the hill and similar areas with difficult access and a truck mounted rig. The drilling can be completed in approximately eight days with this arrangement. It is possible to use the trailer mounted rig throughout. Mobilization costs would reduce to \$500 but it will take eleven days or three days longer to get the results and this will increase the time by three days for our field person thusly resulting in higher costs overall. Also having the work in a shorter time will provide a better chance of having the samples available for analyses should we proceed with these.

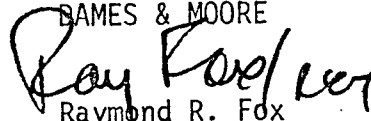
I recommend that the contract for these services be established on the "cost plus fixed or percentage fee" basis. It is impossible to determine precisely exactly how many feet of borings will be required and how much field and office engineer time will be necessary. We are open to other methods of contracting but believe this is in the best interests of all concerned as the client will only pay for services actually performed.

It will be necessary to have the boring locations staked in the field. Attached is a map showing the desired locations of the eleven borings. We have indicated a desire to take eight of the borings at the column locations on the corners of the building and parking garage, two borings along the building center line (one in the plaza area and one at the building line) and one at the summit in a location where access does not present a problem. We recommend that you handle the contracting for this work presumably as a modification to your existing surveying contract. We presume you have the exact dimensions and can provide this information to the surveyor.

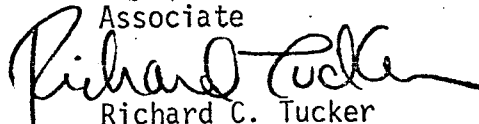
We appreciate the opportunity to work with you in this regard and look forward to our continuing association on this project.

Sincerely yours,

DAMES & MOORE

  
Raymond R. Fox

Associate

  
Richard C. Tucker  
Partner-in-Charge

RRF/RCT:lma

Enclosures

Attachment I

CIA MASTER PLAN

SCOPE OF WORK

FOR GEOTECHNICAL INVESTIGATION

Field Investigation

A site visit will be conducted prior to the start of any field work. The primary purpose will be to explore the surface geology, topographic features and drainage, select appropriate boring locations, evaluate the logistics of equipment access, establish nearby usable water sources, and consult with CIA engineers on the proposed drilling program.

In order to evaluate subsurface soil and ground water, and geologic conditions, several test borings will be drilled at the site. A key objective of the drilling program will be to evaluate the depth of residual soils at the site and to investigate the depth to bedrock. The proposed locations for the eleven borings to be drilled have been determined as shown on the attached maps. The type of drill rig (truck- or track-mounted or skid rig) to be used for each boring will be selected based upon suitability and site accessibility. Depending on soil type, either a hollow stem auger drill or a rotary wash drill will be used.

For estimating purposes, the 7 borings at the building have been assumed to average about 50 feet in depth (40 feet in soil and 10 feet in rock). If rock is encountered within the depths significant to the proposed construction, approximately El. 177, it will be cored to a depth of 10 feet. However, if only weathered bedrock is observed an attempt to core 5 feet into sound, unweathered rock will be made provided

that not more than 20 feet of rock coring is attempted in any borehole. It is assumed the four borings at the parking garage will average 40 feet in depth (30 feet in soil and 10 feet in rock). Obviously these will not be necessary if the results of the drilling at the building would cause a change in alternatives.

It has been assumed further that approximately 120 feet of the total of 400 feet will need to be cased to enable rock coring to extend beyond 10 feet.

Soil samples will be obtained at intervals of 5 feet and at depths of major changes in the subsoil conditions. In addition, one extra sample will be taken in each boring within the top 10 feet.

The sampling will be accomplished by using the standard split-spoon and Dames & Moore samplers. The standard split-spoon will provide disturbed samples for visual classification, Atterberg, moisture and particle size analyses. The Dames & Moore sampler will be used to obtain relatively undisturbed samples of the soil which will be tested in the laboratory to evaluate the engineering properties of the soils, as described below. The two types of samplers will be alternated in any one bore stratum.

Rock will be cored using a double tube NX size core barrel.

Field classification of the soils and rock encountered will be made and continuous logs of the subsurface conditions will be maintained by members of the geotechnical team. Soil samples and rock cores will be suitably packed and preserved for testing.

The ground water level will be measured in all borings before proper backfilling. We recommend that temporary perforated PVC pipe be installed in some borings to permit the taking of ground water level readings in the event portions of the hole collapse. These tests would provide data with which to evaluate the permeability characteristics of the subsoils.

#### Laboratory Testing

In addition to field classifications, the undisturbed soil samples obtained in the borings will be classified in the laboratory. The laboratory tests will include moisture content and density, Atterberg limits, particle size analyses and shear strength and consolidation tests to evaluate the engineering properties of the soils encountered such as strength, compressibility, and permeability. All laboratory tests on soils will be performed by Dames & Moore. This is presented as an optional item since it is not necessary to conduct these analyses to determine depth to bedrock. Obviously the laboratory tests would only be performed when it has been decided to site the building at the proposed location. This decision on lab testing should be made in about one week.

#### Engineering Analysis and Report Preparation

As the data from the literature review and field and laboratory investigations become available, they will be correlated and analyzed to provide an understanding of site conditions. Existing soils and geohydrologic data will be reviewed and updated using the site specific data obtained during the field investigation. All data will be formatted and analyzed to permit effective use in the evaluation of site suitability. The evaluation of the various project considerations will include ground

water (type, depth), soils (type, depth, strength, compressibility, permeability), and bedrock (depth, strike, dip). Engineering analyses will be performed to develop preliminary recommendations for foundation design. These analyses will include a preliminary review of the bearing capacity, depth and anticipated settlement behavior of various foundation types and ground water problems associated with the design, construction and operation of the facility, and construction recommendations with respect to site preparation, dewatering, excavations, and the placement of any structural fill that may be required at the site. The findings from this investigation, including preliminary recommendations will be submitted in a brief final report.

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Approved For Release 2003/08/13 : CIA-RDP89-00244R000100040039-7

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LABORATORY TESTS (optional)

10 Atterberg Limits @ \$50	\$ 500
40 Moisture Densities @ \$7	280
4 Particle Sizes @ \$50	200
3 Unconfined Compressions @ \$50	150
2 Consolidation Tests @ \$200	400
8 Direct Shear Tests @ \$50	<u>400</u>

SUBTOTAL: Laboratory Tests

\$ 1,930

SUBTOTAL: Costs

\$22,784

FEE

\$ 2,278

TOTAL COST ESTIMATE

\$25,062

\*Weighted average hourly rates including fringe benefits  
 (believed to be those currently applicable for government  
 contracting based on DCAA audits).