

STATE UNIVERSITY CONSTRUCTION FUND

PROGRAM DIRECTIVES

DIRECTIVE 1C-5

Issue date: July 2012

SUBSURFACE (GEOTECHNICAL) INVESTIGATION PROCEDURE

1. General: Provide project specific foundation and soils (geotechnical) investigation as required to comply with the Building Code of New York State. The foundation and soils investigations proposed should be sufficient not only for the design of the project but also for understanding the impacts of subsurface conditions on construction activities and their means and methods. The latter may require substantially more borings than the former. The geotechnical investigation of the project work areas should be completed prior to submission of the Schematic Design. See Directive 1C-12 Survey, Mapping and Utility Locating for surveying, mapping and utility location efforts.
2. Program Verification and Concept Phase
 - a. The Campus will make available all existing subsurface data previously obtained under Campus planning and other construction projects on or near the project site. The Consultant shall review the available data and include an analysis of its reliability and applicability to the project and provide recommendations for the acquisition additional data.
 - b. The Consultant may submit a request for exploratory (preliminary) subsurface investigation if there is no data available or if there is a great deal of uncertainty about subsurface conditions and rock excavation or special foundations are probable. For this request, follow the same procedure as normal subsurface investigation described under the Schematic Phase below.
 - c. Consider the need for additional investigation of footing locations, pavement and base conditions and other subsurface conditions to provide the designer and contractor a thorough understanding of subsurface conditions.
2. Schematic Phase
 - a. Unless included in the lump sum fee or the Schedule B of the Consultant's Agreement, the services and fees related to exploratory subsurface investigation may be an ECA (See Directive 1C-4 Extra Compensation Authorization). Initiate this ECA at the start of the Schematic Phase. Submit a draft proposal for comprehensive geotechnical and subsurface investigation. If the building or a project site is in an active area of the Campus, meet with the Campus to determine the access, staging and work period restrictions for the work. Include the following information to the Fund:

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- (1) Proposal including:
 - (a) Format of cost proposal and anticipated method of billing
 - (i) Mobilization - lump sum
 - (ii) Utility locating and clearance for drilling- lump sum
 - (iii) Earth borings - unit cost
 - (iv) Core borings - unit cost
 - (v) Ground water monitoring well - unit cost (per hole)
 - (vi) Shear wave velocity testing - lump sum
 - (vii) Test pits - unit cost
 - (viii) Any additional sampling/testing anticipated - unit cost
 - (ix) Preparation of geotechnical report - lump sum
 - (x) Total not to exceed based on estimated quantities
 - (b) Time or schedule for starting and completion.
 - (c) List of proposed engineers / contractors (minimum of three unless one is permitted in Directive 1C-4)
 - (d) Number, type and depth of borings proposed, based on reasonably anticipated locations and depths. Where depths may vary due to uneven rock, add a 10% contingency to the total anticipated depth to arrive at the total depth used for bidding.
- (2) Request for Proposal (RFP) Package:
 - (a) Site Plan at a minimum scale of 1" - 50' indicating:
 - (i) Topography (including roads, sidewalks, etc.)
 - (ii) Outline of proposed building and/or new utilities
 - (iii) Location of required borings, test pits, cores, etc.
 - (iv) Location of existing buildings and site construction
 - (v) Access / staging for boring contractor
 - (vi) Location of existing utilities based on most recent survey
 - (b) Narrative of required work including:
 - (i) Examination of site
 - (ii) Notification to Campus prior to starting work and coordination with Campus if required
 - (iii) Borings, defined by number and depth, per ASTM D1586 and other applicable ASTM standards.

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- (iv) Samples and their disposition
- (v) Ground water Well Observation (define period and frequency of observation).
- (vi) Test pits, cores, etc.
- (vii) Samples and Records
- (viii) Holes and pits abandoned and properly restored
- (ix) Determination of pay quantities
- (x) Insurances
- (xi) Requirements to restore areas disturbed by field operations
- (xii) Draft and Final Reports including:
 - Content per ASTM D2488 ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - Written summary of the project and site conditions, as well as surface and subsurface conditions, including soil classification/parameters
 - Foundation engineering recommendations and data needed for design by the Consultant.
 - Soil bearing capacity and settlement analysis
 - Groundwater management
 - Stability during construction
 - Lateral soil pressures
 - Compaction requirements
 - Suitability of excavated material as non-structural backfill. (Excavated material shall not be used for structural backfill.)
 - Consistency of subsurface conditions and the likelihood of variations throughout the site.
 - Plan showing final boring locations
 - Graphic sections through site showing appropriate subsurface profiles
 - NYS PE stamp and signature on final report
 - At least three (3) paper copies, including one for the Campus and one PDF.
- (xiii) Geotechnical report and logs shall be used for bidder's information and included in Project Manual and may be reproduced as required.
- (xiv) Additional geo-technical engineering services may include:

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- Design consultation with the structural and civil engineer
 - Review of final construction documents for compliance with recommendations
 - Recommending guidelines for soil testing during construction (locations, areas, layers, monitoring, etc.). See Directive 1C-6 Control Testing Laboratory Services.
 - Per-diem cost for an onsite review of construction activities and testing, including a written report of observations and recommendations
- (xvii) Payment shall be through the Consultant, who will be reimbursed in accordance with the Fund's "*Bulletin on the Payment of Consultant Fees*"
- (4) Upon receipt and approval of the above, the Fund will authorize the Consultant to obtain proposal(s). Consider having the structural consultant (or designee) visit the site during the soil boring work to observe actual conditions. Consider having the surveyor engage per Directive 1C-12 located actual borings and significant underground features exposed during the investigation. Submit the ECA request following the procedure in Directive 1C-4. After authorization from the Fund, the Consultant will contract with the bidder. Upon total completion of the geotechnical evaluation, the Consultant send one (1) paper copy and one (1) PDF of the geotechnical engineering report, including all test & boring data and the Geotechnical Engineer's evaluation of test results, to both the Fund and the Campus.
- b. The Structural section of the Schematic Phase Report shall indicate the type of foundations selected by the Consultant based on the results of the Subsurface Investigation. The Civil/Structural section shall indicate appropriate extent and retention of excavations, re-use of on-site material if space is available for stockpiling, pavement designs, impacts of rock and groundwater, if any, and consideration of other significant subsurface risks.
3. Design Manual Phase
- a. Update the design narratives to identify any unusual design problems due to subsurface conditions and assess their impact on project budget and design.
- b. If building design loads or site location changes significantly, recommend additional subsurface investigation following the above Schematic RFP process.

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4. Construction Document (Pre-Bid) Phase:
 - a. Include all subsurface investigation information in the specifications or plans for the bidders' information. Verify that the general notes on the structural and civil drawings are aligned with the site specific geotechnical report recommendations.

5. Construction Phase

Observe actual soil and water conditions during the excavation and report to the Fund on any significant variations from anticipated subsurface conditions. Provide testing per Directive 1C-6 Control Testing Laboratory Services

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