

STATE UNIVERSITY CONSTRUCTION FUND PROGRAM DIRECTIVES

DIRECTIVE 1C-6

Issue Date: May 2002

CONTROL TESTING LABORATORY SERVICES

CONSTRUCTION DOCUMENT PHASE, POST-BID PHASE, CONSTRUCTION PHASE

This Directive outlines requirements, procedures, and recommendations for Control Testing Laboratory services. The Consultant shall coordinate these efforts within Construction Documents and during post-bid and construction phases.

1. Construction Documents Phase: The Consultant should not use language to the effect that the testing laboratory "shall" or "will" perform certain tests. Rather, a term such as "may" should be used.
 - a. In the bid documents, usually in the technical specifications, the Consultant should state that the Fund may engage the services of a testing laboratory during the progress of the work. If the technical specifications specifically state the contractor shall be responsible for any testing, during design review the Fund shall be advised and concur before implementing. The specifications should state specifically that the services of the testing laboratory shall in no way relieve the Contractor of any of his responsibilities under the terms of his contract with the Fund, nor give rise to any claim or right of the Contractor as a result of the conduct or curtailment of such tests.
 - b. The specifications should also require the Contractor to cooperate with the testing laboratory in providing access to the work, material for samples (e.g., for concrete cylinders) and time to perform the work (i.e., for compaction testing of fill). Also, the Contractor should provide a suitably heated, insulated and protected storage box for the storage of concrete cylinders for the first 24 hours or until they are removed to the testing laboratory.
 - c. As a general guide, the Consultant would be well advised not to spell out its own (and its testing laboratory's) testing and inspection program in the Contract Documents. However, for certain types of inspection, such as shop inspection of steel fabrication, the specifications should spell out in general terms the types and amount of testing and inspection that the Consultant's testing laboratory will be performing. Otherwise, the Contractor can claim extra payments for delays under terms of the appropriate industry standard.

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- d. If requirements for testing and inspection work are spelled out in the Contract Documents as previously approved by the Project Coordinator, the Consultant must observe certain precautions. Also, language must be included to the effect that the listing of such tests is for the Contractor's convenience only and in no way restricts the Consultant's and Fund's right to all other testing and inspection in accordance with Article II of the Agreement and to vary the amounts and types of testing at any time before or during the progress of the work.
 - e. During the preparation of Construction Documents, the Consultant shall submit to the Fund a schedule of required testing for approval, including an estimate of quantities and respective cost. It is the Consultant's responsibility not to call for excessive testing. The latter is useless to the Consultant and wasteful for the Fund.
2. Post-Bid Phase:
- a. General: It shall be the Consultant's responsibility to ensure that all required testing services are properly implemented. He shall check that the Post Bid Phase procedures listed herein and include all the types of testing required. He shall review the Fund's extra compensation authorization to assure it also clearly states the scope of testing required. Should any additional testing be required during construction, the Consultant should then be able to clearly justify an increase of the upset when requesting Fund approval of additional extra compensation.
 - b. Bidding Documents for Testing Services
 - (1) As soon as the Fund has received acceptable bids for construction award, the Consultant, in consultation with his subconsultants and engineer(s), shall prepare the documents necessary for the solicitation of proposals for the necessary inspection and testing work. An example of a typical proposal format can be found attached in the Appendix. Alternate forms shall be submitted to the Fund in draft for review prior to use.
 - (2) In spelling out requirements for testing and inspection work, it is imperative that the Consultant uses the generally accepted industry standards, such as ASTM, ACI, AISC and AWS. If this is not done, the Contractor may be able to challenge successfully negative test results. If appropriate, the Consultant may call for stricter standards, as approved by the Fund.

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- (3) In the proposal form, the Consultant **MUST** state the estimated quantity of each type of work he expects the laboratory to perform. While payment to the laboratory will depend on the actual amount of work performed (paid for on a per test or daily or hourly basis, as appropriate), the unit prices quoted by a laboratory are usually affected by the estimated quantity. Also, the quantities are necessary to arrive at a "total price" figure to use as a basis for award. (For work to be performed in the field and paid for on a unit basis - e.g., compaction tests - the proposal form should also state the minimum number of tests to be performed by the inspector during each site visit). See the sample Proposal Form attached to this Guide. The definition of a half-day and full day should be noted as shown on the sample proposal found attached in the Appendix.
 - (4) The testing laboratories that are solicited shall be in conformance with ASTM E-329, "Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction."
- c. Before sending the proposal form to the interested laboratories, the Consultant must send a draft to the Fund for review and approval.
 - d. After receiving approval from the Fund to proceed and obtain proposals, the Consultant should send the bidding documents to the selected laboratories. At least three qualified testing laboratories shall be requested to submit proposal. (Exception: In some remote campus areas, such as Plattsburgh and Potsdam, there may not be three qualified laboratories within economic distance of the campus). After receiving and analyzing the proposals, the Consultant should send one copy of each proposal received to the Fund, together with his recommendation for award. If the minimum of three (3) testing laboratories cannot be achieved, part of the Consultant's recommendation shall explain why this was not possible.
3. Construction Phase
- a. **Qualifications of Inspectors:** It is the responsibility of the Consultant to check the qualifications of each and every inspector assigned to his project by the testing laboratory before the inspector starts to work on the project, be it in the field, batch plant or fabricating shop. The inspector must be thoroughly familiar with the pertinent sections of the project specifications and applicable industry standards (ASTM, ACI, AISC, AWS, etc.) and certified in the

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respective testing area as required by the industry (i.e. ACI Field Technician Grade I or II, NICET, etc.).

- b. Availability of Industry Standards: The Consultant must make certain that a copy of every industry standard, (ASTM, etc.) which applies to the testing laboratory's work, is available on the project site. Only in this way can questions about proper test procedures and results be settled factually in timely fashion, which is at the time the question arises, not at a future date.
- c. Reporting and Evaluating of Test Results:
 - (1) The Consultant MUST make certain that copies of written reports of all test results are promptly sent directly by the testing laboratory to the Consultant's field and home offices, the Consultant's Structural Engineer, the Fund and the Contractor. The Consultant and his consultants must PROMPTLY review each and every one of the reports as they are received, note inadequate test results and immediately take corrective actions.
 - (2) Copies of test reports sent to the Fund are for information only. They do NOT in any way reduce the Consultant's sole responsibility to review them promptly and to take corrective actions required.
- d. Supervision of Testing Laboratories:
 - (1) Testing laboratories on Fund projects have contracts with the Fund's Consultants, not with the Fund. Their inspectors and technicians are an extension of the Consultant's own field staff. The Fund authorizes their hire, as a reimbursable cost item, to aid the Consultant to discharge his contractual obligations to the Fund.
 - (2) It is the responsibility of the Consultant's personnel and that of his consultants (i.e., Site Representative) to monitor continuously the performance of the testing laboratory and its project personnel. Should any of the personnel not be performing his assigned tasks properly, he should be removed from the project immediately. Should the performance of the laboratory become deficient, the Consultant should so inform the Fund and make a specific recommendation to the Fund for the cancellation of the laboratory's contract and the hiring of another laboratory. The Fund holds the Consultant responsible for the performance of the testing laboratory, just as that of any other of his

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consultants, and expects this responsibility to be discharged in an active and continuous manner.

- (3) It is the Consultant's responsibility to:
 - (a) The Consultant's field staff must give the laboratory adequate notice when inspectors will be required.
 - (b) The Consultant must inform the laboratory who on the Consultant's staff is authorized to give the laboratory such notice.
 - (c) Provide clear direction to the testing agency regarding scope. Assume accurate location of all tests; monitor and record all on-site time.
 - (d) The inspectors must be told explicitly to whom of the Consultant's field staff they are to report deficiencies noted in the Contractor's work immediately.
 - (e) In any dispute with the Contractor, the Consultant must fully back up the laboratory inspector unless he is obviously in the wrong. Otherwise, both the inspector's effectiveness and morale are destroyed.
 - (f) The Consultant and/or his field staff shall privately resolve any disagreements on inspection and work compliance between themselves and the testing laboratory personnel prior to any confrontation with the Contractor.
- e. **Payment:** The Consultant has the responsibility to process the testing laboratory's payment requests as promptly as his own for field services. Any undue delay in this processing adds needlessly to the laboratory's cost of doing business and will be reflected in the laboratory's proposals on subsequent Fund projects.

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4. Testing Scope and Responsibilities:

Note: The following is not considered a complete and inclusive list of testing requirements

a. Concrete Testing:

(1) General

- (a) For the Fund's general requirements for the work of testing laboratories on concrete projects (cast-in-place, pre-cast and pre-stressed). The Consultant and his Structural Engineer are cautioned to familiarize themselves completely with the current versions of the ASTM and ACI standards to which they refer in both their Contract Documents (plans and specifications) and in their instructions to the testing laboratory.
- (b) Two points require special mention in this regard. First, several of these standards are reissued in revised and updated versions each year. Often these include extensive and significant changes from the previous editions as well as a new designation in addition to the change in date. Second, some of these standards make general recommendations only, instead of stating specific requirements. Consequently, the listing of such a standard by the Consultant is meaningless unless he spells out his specific project requirements at the same time. ACI 605-59, "Recommended Practice for Hot Weather Concreting", is a good example of this.

b. Work Normally Performed by Testing Laboratories

- (1) Preparations, handling, curing, breaking, and reporting of concrete test cylinders for structurally important pours.
- (2) Checking of slump, air content and temperature as required and specified by Consultant for structurally important pours.
- (3) Checking of cements, aggregates and water for conformance with specifications.
- (4) Occasional spot checks of concrete batch plant if concrete is being delivered from a Department of Transportation approved automated batch plant.

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- (5) Full-time or part-time inspection of non-automated batch plant whenever structurally important concrete is being delivered to the project, as determined by the Consultant. This may have to be varied as a project progresses.
- (6) Core tests or other tests called for by the Consultant with Fund approval whenever results of normal testing indicate that the concrete in-place does not meet specification requirements.
- (7) Other tests as required, and approved by the Fund, shall be performed in accordance with the standards issued by the industry's standard organizations.

c. Work Not Normally Performed by Testing Laboratories

- (1) Preparation of concrete design mixes. This work is to be done at the Contractor's expense by a testing laboratory selected by the Contractor and approved in advance by the Consultant. Whenever possible, this should not be the same laboratory as the one doing the testing for the Consultant.
- (2) Inspection of Reinforcing Steel In-Place. This is typically the responsibility of the Consultant (and his Structural Engineer).* In the opinion of the Fund, additional reinforcing steel in-place inspection may be necessary to augment the structural engineer's responsibility. This is not to preclude the Consultant from having his testing laboratory perform the chemical analysis or other tests of reinforcing steel samples if there is any question in his mind concerning the quality of the steel.
- (3) Monitoring the placing of concrete. This is the responsibility of the Consultant's (and Structural Engineer's)* personnel.

*(*While the Fund has no contractual relation with the Consultant's Structural Engineer, it is the Fund's recommendation that the Consultant involve his Structural Engineer in discharging this responsibility.)*

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d. Structural Steel Testing

(1) General

- (a) For the basic and minimum inspection requirements for structural steel, Consultants are referred to the latest edition of "Specifications for Structural Steel Buildings, Load and Resistance Design", "Specification for Structural Steel Buildings, Allowable Stress Design", the "Code of Standard Practice for Steel Buildings and Bridges", and "Quality Criteria and Inspection Standards", all published by the American Institute of Steel Construction (AISC) and to American Welding Society (AWS) Standard D1.0-69, all with amendments to date.
- (b) Familiarity with these standards is essential if Consultants and Engineers are to know what the industry accepted standards for fabrication, erection, quality control, inspection and acceptance are. Without such knowledge, the design professional cannot know when, for his projects, these standards are inadequate and he must call for more stringent requirements. At the same time, he will know what quality he can expect at standard prices and what requirements of his will be extra cost items.
- (c) The following sections are a partial summary of the inspection requirements in the above-named standards. They do not replace the need for the Consultant to familiarize himself with these Directives. Rather, they are intended primarily to give the Fund's staff and Consultants a general guide of the Fund's testing and inspection requirements for structural steel projects. These requirements may be varied up or down to fit the needs of a specific project.
- (d) The amount of inspection during fabrication of steel will be affected by the quantity and quality of the work of the plant's Quality Control Department. The Consultant, Structural Engineer, and Testing Laboratory should have a Quality Control Meeting with the Fabricator before fabrication starts, and should monitor the performance of the Fabricator's Production and Quality Control Department continuously. Adjustments in the Testing Laboratory's work, up or down, should be made as

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appropriate at any time. For both of these requirements, the Consultant has coordinating responsibility.

- (2) Work Normally Performed by Testing Laboratory
 - (a) Provide a non-destructive testing technician (NDT) to perform field check of high-tension bolts, 10% or a minimum of two bolts per connection must be checked. Bolts must be checked for adequate tensioning. If any of the bolts in the connection are found to be improper or inadequate, all the bolts in that connection must be checked.
 - (b) Welds - For a single pass simple weld, such as for cover plates or connection angles being attached to rolled sections, or for the fabrication of simple built-up members, visual inspection for size, length and workmanship will usually suffice. As visual inspection can be applied only to the top pass, where more than one pass is required to accomplish the required amount of welding, multiple-pass welding must be checked with non-destructive testing as described below for more critical types of welding. Where requiring non-destructive weld testing, testing such as ultrasonic shall be used and performed by a non-destructive testing technician (NDT) level II, per ASNT-TC 1A.
 - (c) Other tests as required, and approved by the Fund, shall be performed in accordance with the applicable standards listed in this Directive.
 - (3) Work Not Normally Performed by Testing Laboratory: Inspection of structural steel in the field for proper size of member, mil thickness, etc., is the responsibility of the Consultant's and Engineer's field staff, not that of the testing laboratory. Testing laboratory personnel may be used for this work only if they have SUCF authorization for this work, in addition to the testing, laboratory personnel is not to be increased for the checking of these types of items.
- e. Fill/Backfill Testing
- (1) Work Normally Performed by Testing Laboratory if applicable:
 - (a) Quality of fill material.
 - (b) Gradation of fill material.

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- (c) Compaction of fill material.
- (2) Testing Methods
- (a) When field compaction tests are performed, they should conform to ASTM Standard D1556, Sand Cone Method), D2167 (Rubber Balloon Method) or D2922 (Nuclear Method). The standard against which the results of field compaction tests are to be measured is the Modified Proctor Laboratory Compaction Test, done in accordance with ASTM Standard D1557.
 - (b) A modified proofer should be developed for each type of backfill material used. *(NOTE: Normally, footings are not placed on backfill. The discussion below refers to the occasional cases where this has to be done).*
 - (c) For fill under slabs or backfill against the walls, a guideline would be one compaction test for each 2,000 sq. ft. of area.* This test should be performed only for every other layer; unless otherwise determined by the Consultant.
 - (d) If compacted backfill is being used to support continuous footings, a guideline would be two compaction tests for each fifty (50) lineal feet of footing.*
 - (e) For spread footings, the amount of testing will depend on the size of the spread footings. For the normal range of size of spread footings (from three (3) ft. by three (3) ft., to six (6) ft. by six (6) ft.), one compaction test for every footing would be reasonable if backfilling and compaction is being monitored by the inspector. If this has not been done, then each spread footing should have a field compaction test.

** These are guidelines only and should not be considered to be more than that. As soil conditions vary substantially, not only from one campus to another, but frequently also within a campus, the actual rate of testing will be dependent on the judgment of the design professional and are to be set by them."*

f. Masonry Testing

- (1) Work normally performed by testing laboratory if applicable: sampling and testing of mortar and grout material.

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- (2) Testing Methods: Provide a field technician to sample mortar and grout for compressive strength in accordance with ASTM C1019 ACI for grout.
 - (3) Work not normally performed by testing laboratory: Inspection of concrete masonry construction for proper placement of any steel reinforcement and monitor concrete masonry construction which includes joint details, weeps, mortar mix and curing.
- g. Structural Member Fireproofing Field Testing: Provide a field technician to perform thickness bonding and density testing in accordance with ASTM E605.
- h. Bituminous concrete paving mixture testing
 - (1) Provide a field technician to perform density of bituminous concrete in place by nuclear methods in accordance with ASTM D2950.
 - (2) Work not normally performed by testing laboratory. Monitoring of material temperatures and paving procedures in accordance with specifications performed by Consultant's site rep.
5. Other Testing: Other types of testing frequently conducted as part of a building project, such as equipment testing, utilities line testing and balancing and construction materials testing are not covered in this Directive, as these are normally performed by the Manufacturer or Contractor as part of the general construction work (in accordance with the Contract Documents) and are paid for as part of it.
6. Sample Proposal Form For Laboratory Testing Work
 - a. In preparing the laboratory testing Bid Package, the Consultant should consider use of the Sample Proposal Form on the following pages.
 - b. The Consultant may, of course, use a proposal form of his own.
 - c. In the Sample Proposal Form, the only modification that would have to be made is to delete those tests shown on the Sample Proposal Form which do not apply to the project at hand, and to add those which apply but are not

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shown. The tests shown are merely some of the more common laboratory tests. The list is neither all-inclusive nor exclusive by any means. The Consultant should fill in all the appropriate blank spaces, including Estimated Quantity for each item. The Sample Proposal Form cannot be used as a standard form without being modified as outlined above.

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PROPOSAL FOR LABORATORY TESTING WORK FOR
STATE UNIVERSITY OF NEW YORK AT
(Insert Name of Project)
SUCF Project No.

TO: (Insert Consultant's Name)

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of his knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (2) unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder prior to opening to any other bidder or to any competitor; and (3) no attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose for restricting competition.

The undersigned bidder also hereby declares that he has carefully examined the plans, specifications, the agreement, and all other contract documents, and that he personally inspected the accessibility of the site or sites of work, has satisfied himself as to all quantities and conditions, and understands that in signing this Proposal, he waives all right to plead any misunderstanding of the same.

The undersigned bidder agrees to accept the unit prices stated herein and further understands and agrees that he is to furnish and provide, for the respective unit prices, all the necessary material, machinery, equipment, tools, labor, services, etc., and to perform all testing laboratory work necessary or required under the aforesaid plans, specifications, agreement, or other contract documents, to complete the work in accordance with the plans, specifications, agreement, or other contract documents which shall form a part of this Proposal, and to accept in full compensation for all of said work and amount which shall be computed by applying the appropriate unit prices stated herein for each item of work to be performed and multiplying them by the actual quantities of work furnished, and by totaling the resultant sums.

The undersigned further agrees to accept the aforesaid unit prices as full payment or as credit for any additions, deletions, modification or changes to the portion or portions of work covered by said unit prices, required for any reason whatsoever.

Subject to the approval of the State University Construction Fund, the Contract will be awarded or all bids rejected within thirty (30) days of the opening of bids. (Insert

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Consultant's Name) reserves the right to reject any or all bids at any time prior to a final execution of a written agreement between (Insert Consultant's Name) and the bidder.

This Proposal shall be irrevocable for a period of thirty (30) days from the date of the opening of bids, and may be accepted by (Insert Consultant's Name) at any time within such period.

Item No.	Item	Est. Quant.	Unit Bid Price		Total Amount Bid	
			Dollars	Cents	Dollars	Cents
1.a	Concrete Field Inspector for making of cylinders, air content, slump and temperature tests	____ Days	_____	_____	_____	_____
1.b	Concrete Field Inspector for making of cylinders, air content, slump and temperature tests	____ 1/2 Days	_____	_____	_____	_____
2.	Furnishing mold, making, transporting, curing, breaking, and reporting test cylinders	____ Cyls.	_____	_____	_____	_____
3.a	Concrete Batch Plant Inspector	____ Days	_____	_____	_____	_____
3.b	Concrete Batch Plant Inspector	____ 1/2 Days	_____	_____	_____	_____
4.	Structural Steel Fabrication Shop Inspector exclusive of Travel Costs	____ Days	_____	_____	_____	_____
5.	Structural Steel Erection, Field Inspector	____ Days	_____	_____	_____	_____
6.	Soil Compaction Tests, minimum of 5 tests per site visit	____ Tests	_____	_____	_____	_____
Total or gross sum bid					\$	_____

Total or gross sum bid written in words, _____

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The undersigned hereby binds himself to enter into a written agreement with (Insert Consultant's Name) , within (Insert No. of Days) calendar days from the receipt of a Notice of Award, and further agrees to comply with all the terms and conditions stated in said agreement.

Legal Name of Person, Firm or Corporation

By: _____

The P.O. Address of the bidder is:

City

State

Zip Code

Phone No.

Fax No.

IF A CORPORATION

Name

Address

_____, President _____

_____, Secretary _____

_____, Treasurer _____

IF A FIRM

Name

Address
