QUALITY ASSURANCE
LABORATORY ACCREDITATION
PROGRAM GUIDE

EXHIBITS

Developed by

WACEL

7508 Wisconsin Avenue, 4th Floor
Bethesda, Maryland 20814
301-652-7925

Seventh Edition

DRAFT 2016
EXHIBIT 1: Minimum Capabilities to be a WACEL Accredited Laboratory

A testing laboratory that seeks accreditation for concrete testing shall be capable of performing the required ASTM test methods or practices listed below:

1. Sampling, Method C172
2. Slump, Test Method C143
3. Unit Weight, Yield, and Air Content C138
4. Air Content, C173 (volumetric method) and C231 (pressure method)
5. Making and Curing Test Specimens, C31
6. Compressive Strength, C39
7. Capping Cylindrical Concrete Specimens C617 or C1231
8. Temperature, C1064

A concrete testing laboratory that also performs testing on concrete aggregates shall be capable of performing the required ASTM test methods or practices listed below.

1. Organic Impurities, C40
2. Minus No. 200 Wash, C117
3. Specific Gravity, C127 and C128
4. Sieve Analysis, C136

A testing laboratory that seeks accreditation for soils testing shall be capable of performing the required ASTM test methods or practices listed below.

1. Proctors D698 (standard), D1557 (modified), VTM-1, and the equivalent test methodology required by Maryland.
2. Specific Gravity of Coarse Aggregate (oversized particles), C127
3. Specific Gravity of Soils, D854
4. Hydrometer and Sieve Analysis, D422
5. Moisture Content, D2216
6. Field Density Testing D1556 (sand cone), or D2922 (nuclear) or both

7. Atterberg Limits, D4318

8. California Bearing Ratio (CBR)* -- ASTM D1883/VTM-8

*CBR is required only of a principal laboratory in the WACEL service territory. Branch labs in the WACEL service territory need not necessarily have to have the equipment or capability in their particular office to perform CBRs. The region known as the WACEL service territory is defined annually by the Board of Directors.
EXHIBIT 2: Application Form

Accreditation Review No. _____

APPLICATION FOR ACCREDITATION

1. Firm Seeking Accreditation ________________________________

2. Address___________________________________________________

____________________________________________________ZIP_____ 

3. Authorized Representative ________________________________

4. Work Phone AC____ _______________Ext_______ Fax No.:____

If information about the laboratory for which accreditation is sought differs from
information conveyed in responses to items 1-4, complete items 5-9. Otherwise skip
to item 10.

5. Laboratory Name __________________________________________

6. Laboratory Address________________________________________

____________________________________________________ZIP_____ 

7. Authorized Representative ________________________________

8. Rep's Work Phone: _____ _____________ Ext______ FAX: _____ 

9. If the individual identified in item 4 is not the same as the one in item 8, should the
Materials Review and Facilities Inspection Report be sent to the person identified in
item 4, item 8 or both? (Circle one) 4 8 Both

10. How many persons employed at the applicant laboratory participate in:
    a. soils testing ______
    b. concrete testing ______ concrete aggregate ______

11. Indicate the accreditation you seek (check one):
    _____ soils only       _____ concrete only  _____ both soils and concrete

12. Approximately when would you like the Facilities Inspection to occur?___________
13. Are you aware that Laboratory Accreditation Team personnel serve on a voluntary basis and may be unable to comply with your preferred schedule? (Circle one) Yes  No

14. Are you aware that other organizations offer laboratory accreditation in the fields of soils and concrete and that these may be applied to if WACEL cannot handle your request promptly? (Circle one)  Yes  No

15. The fees associated with accreditation (which must accompany this application by check payable to WACEL) are based on the number of persons required to serve on the LAT. Inspection fees are: $1,000 for WACEL Members; $5,000 for nonmembers. Annual Audit fees are $500 per members and $2,500 for nonmembers. The total amount due at this time, and provided herewith, is $_______.

16. I understand that the scope of the accreditation involves the following:
   • an examination of materials identified in Exhibit 3;
   • a review of facilities during a Materials Review and Facilities Inspection (Exhibit 5);
   • a possible reinspection to verify that deficiencies, if any, have been addressed to the satisfaction of the Laboratory Accreditation Team within 90 dates of the date of the MRFI Report;
   • an annual audit to assure that the laboratory continues to meet the requirements of the WACEL Laboratory Accreditation Program an
   • the need to complete and return within 30 days of the first and second anniversary date of the accreditation a completed Certificate of Continued Compliance (Exhibit 4) signed by the Professional Engineer in charge of the lab and accompanies by evidence of participation in a reference sampling program for each discipline for which accreditation has been obtained (Circle
one to signify your understanding of the scope of the program) along with an annual audit fee of $500. Yes No

17. Do you understand that additional costs are associated with the Program? (These include the cost of Laboratory Accreditation Team participants' transportation to and from various meetings and the applicant laboratory, and their cost of meals for the Materials Review, Pre-Inspection and luncheon meetings, feasibly among others.) Do you understand that the applicant laboratory also is responsible for similar expenses of whatever Novice Members and/or Outside Observers may be assigned? Do you understand that nonmembers are required to pay an additional fee and additional expenses if reinspection is required for any reason? (Circle one in response to all three questions) Yes No

18. Are you aware that WACEL may refuse to accredit the applicant laboratory but you will nonetheless be required to pay all charges associated with the accreditation program? (Circle one) Yes No

19. Have you read and become fully familiar with the WACEL document that describes the Quality Assurance Laboratory Accreditation Program? (Circle one) Yes No

20. Do you have authority to act on behalf of the firm herewith seeking accreditation? (Circle one) Yes No

21. Please read the following statement and add your initials where indicated only if you understand it and agree to bind to it the firm you represent:

I understand that this accreditation procedure is being entered into at the request of the firm I represent. I understand, also, that WACEL could feasibly face some liability exposure either from the firm I represent or from third parties who may, among many other things, claim the firm I represent was negligent and that WACEL's accreditation was accorded in a negligent manner. As to liability exposure as a result a of claim or action brought against WACEL by the firm I represent, the firm I represent herewith
agrees to take no action whatsoever against WACEL or any of its agents, voluntary or paid, for implementation of procedures associated with the accreditation process. It is understood that WACEL, for reasons it considers valid, may refuse to accredit the applicant laboratory. Even though I or another representative of that laboratory may disagree with WACEL's judgment or interpretation of facts, it is agreed WACEL's determination is final. It is understood, further, that WACEL will do its best to maintain confidentiality, but that it cannot and does not offer a guarantee that confidentiality will be maintained. And as to claims which may arise from any aspect of this accreditation procedure, when such claims are brought against WACEL by any entity or person other than the firm I represent, this firm hereby declares that it shall hold harmless, indemnify and defend WACEL and/or any of its agents from and against any and all such claims, as well as any losses or damages WACEL and/or its agents may suffer as a result of such claims, demands, costs or judgments.

Initials of Authorized Representative ____________

22. By signature affixed below, I certify that I have read and understood WACEL's Quality Assurance Laboratory Accreditation Program Guide, as well as this accreditation application form, and that, by authority vested in me by the firm I represent, herewith bind my firm to all terms and conditions of the Program as made clear in the Program Guide and to all terms and conditions made clear in this application form.

Signature________________________________________

Date_____________________________________________

RETURN THIS FORM WITH YOUR CHECK AND THE MATERIALS IN EXHIBIT 3 TO:

WACEL, 7900 Wisconsin Avenue, Suite 305, Bethesda, MD 20814
EXHIBIT 3: Materials for Review Listing

Accreditation Review No. (#)

Materials List

The following list of materials must be provided with Exhibit 2, Application for Laboratory Accreditation. If you are applying for accreditation for both soils and concrete testing, provide relevant materials for each, unless the document in question is equally applicable to both soils and concrete (Note that more than one copy of a given document may be required. The number required is indicated in the space provided in the right-hand margin of the following list.) Please be certain to indicate on each copy of each document furnished exactly what the document is, unless a title or some other inherent identification in or on the document makes its identification self-evident. The documents listed are referenced in the Materials Review and Facilities Inspection Worksheet (Exhibit 5), with the Worksheet reference shown in parentheses. If you have additional materials that you believe are relevant, or which you would like the Laboratory Accreditation Team to review and comment upon, include them with other materials furnished, but be sure to describe them in a covering letter or note and explain your reasons for providing them.

ALL MANDATORY DOCUMENTS MUST BE FURNISHED WITH THE APPLICATION FOR ACCREDITATION.

1. *Photocopy of registration certificate of professional engineer in full-time responsible charge of the laboratory in jurisdiction of office location (1.4.4).
2. General information concerning the laboratory covered by the application, such as primary function, relationship to larger corporate entity and, if applicable, physical location of the laboratories involved

3. Written QA program (Quality Manual) (2.1.1).

4. Copies internal quality system review records (2.1.3).

5. Copies of management review records (2.1.4).

6. If accreditation in concrete testing is sought, a current C.C.R.L. laboratory inspection, Corp of Engineers inspection report or report from another WACEL-recognized program capable of objectively investigating concrete laboratory testing techniques and equipment is required. The applicant must also furnish evidence of participation in a WACEL-recognized Reference Sampling Program within the last year (2.7).

8. Two recent concrete test reports (if accreditation in concrete testing is sought; delete or obscure names of client and project) (2.5.2).

9. If accreditation in soil testing is sought, a current laboratory inspection report from A.M.R.L. or another WACEL-recognized program capable of objectively investigating soil laboratory testing techniques and equipment is required. This will include evidence of participation in a WACEL-recognized Reference Sampling Program within the last year (2.7).

10. Two recent soils test reports (if accreditation in soils testing is sought; delete or obscure names of client and project) (2.5.2).

*Failure to have this material precludes accreditation.
EXHIBIT 4: Certification of Continued Compliance

WACEL Laboratory Accreditation Program Certification of Continued Compliance

Accreditation No. _____  Date: __________
Date of Accreditation: __________________
Laboratory: __________________________
Address: _____________________________
Representative: _______________________  

CERTIFICATION OF CONTINUED COMPLIANCE
This form must be completed and returned to WACEL by no later than __________. I have read and am familiar with WACEL's Quality Assurance Laboratory Accreditation Program Guide specifically relative to those factors that affect quality control and the ability of this engineering laboratory to provide accurate, reliable test data. Furthermore, I have read and am familiar with the Materials Review and Facilities Inspection Report issued subsequent to inspection of this facility by WACEL, and any subsequent reinspection. Based on my review and understanding of these materials, and based on my knowledge of developments which have occurred in this facility over the past year, I hereby certify that no major events calling for a reinspection have transpired; that the high level of quality control which permitted accreditation is being maintained, and that this laboratory is fit for continued accreditation. In addition, I recognize that the laboratory's current accreditation expires on ____________, and that application for reaccreditation should be made no later than three months prior to that date.

I also understand that as a condition of maintaining accreditation, this laboratory must participate annually in a WACEL-recognized reference sample testing program for soils and/or concrete, as appropriate. Evidence documenting the laboratory's participation in soils and/or concrete reference sampling programs as appropriate for the continuation of our accreditation should be provided to WACEL with the Certificate of Compliance and verified during the annual maintenance review audit.

Signed by the registered professional engineer with full-time supervision of the laboratory:

________________________________________________________________________
Printed Name of Signatory: ______________________________

THIS SIGNED FORM MUST BE RETURNED BY ____________

TO
WACEL
7508 Wisconsin Avenue, 4th Floor
Bethesda, MD 20814
EXHIBIT 5: Materials Review and Facilities Inspection Worksheets

WACEL

QUALITY ASSURANCE LABORATORY ACCREDITATION PROGRAM

LABORATORY ACCREDITATION TEAM MATERIALS REVIEW AND
FACILITIES INSPECTION WORKSHEET

Instructions: Each Laboratory Accreditation Team (LAT) participant shall be furnished with a copy of this form. Each shall complete those elements of the form that pertain to areas of concern assigned by the LAT Captain. Particularly for Materials Review, most of which should be performed prior to Facilities Inspection, more than one LAT participant may be assigned to review a given item. In most of Section 2.0, a simple "YES" or "NO" is used as a response. If the response is “NO” – record exactly why the area is weak and resulting as a deficiency. Use either the blank space on the worksheet or record your findings on a separate sheet of paper and attach it to the worksheets. Additionally, the equipment calibration and verification records check should be performed on a separate sheet of paper and attached to these worksheets upon completion. Each LAT participant is encouraged to record comments and observations in full, including those relating to observations about matters deemed important even though assigned to some other member of the LAT or not identified on the worksheet.
1.0 GENERAL INFORMATION

1.1 ACCREDITATION REVIEW NO.______________________________________________

1.2 LABORATORY ACCREDITATION TEAM COMPOSITION

1.2.1 LAT Captain___________________________________________________________
1.2.2 LAT Member(s)________________________________________________________
1.2.3 LAT Novice Member(s)__________________________________________________
1.2.4 Outside Observer(s)_____________________________________________________

1.3 PERSON COMPLETING THIS WORKSHEET________________________________

1.4 APPLICANT LABORATORY

1.4.1 Name_________________________________________________________________
1.4.2 Address_______________________________________________________________

________________________________________ZIP_____________
1.4.3 Telephone _____ _____ - _____________ FAX _____ _____ - ____________
1.4.4 Professional engineer in full-time responsible charge
Name______________________________________________________________________
State(s) in which registered______________________
Registration certificate no.__________________________
Copy of certificate provided? _____ Yes _____ No
1.4.5 Facility manager (if not P.E. in responsible charge)__________________________

1.5 ACCREDITATION SOUGHT _____ SOILS _____ CONCRETE

1.6 DATE OF APPLICATION_______________________________________________

1.7 DATE OF MATERIALS REVIEW MEETING____________________________________

1.8 DATE OF FACILITIES INSPECTION________________________________________
2.0  GENERAL QUALITY ASSURANCE CONSIDERATIONS

2.1  QUALITY ASSURANCE POLICY

2.1.1 Does the applicant have a written Quality Manual?    YES / NO

2.1.2 Has the laboratory identified a technical (or quality) manager and
       nominated deputies to serve in their absence?    YES / NO

Technical (or Quality) Manager _____________________________
Deputy to serve in absence _____________________________

2.1.3 Has the laboratory performed and documented an internal
       quality system review within the past year? ____________   YES / NO

2.1.4 Has the laboratory performed and documented a management
       review within the past year? ______________         Y E S  /  N O

2.1.5 Other comments and observations_______________________________________

______________________________________________________________ ___
______________________________________________________________ ___
______________________________________________________________ ___

2.2  ORGANIZATIONAL POLICIES AND GENERAL REQUIREMENTS

2.2.1 Does each page of the QM include a preparation or revision date?    YES / NO

2.2.2 Does the QM include the legal name and address of the company
       and that of the main office, if different?    YES / NO

2.2.3 Does the QM include ownership and management structure?    YES / NO

2.2.4 Does the QM include an organizational chart?    YES / NO

2.2.5 Does the QM include position descriptions for each technical
       operational position shown?    YES / NO

2.2.6 Does the QM include resumes for technical staff (or ref. location)?   YES / NO

2.2.7 Does the agency use temporary site facilities?  YES / NO

If so, does the QM describe this situation?   YES / NO / NA
2.2.8 Does the QM include a document defining its policies and objectives for commitment to good practice and quality of inspection/testing? YES / NO

2.2.9 Does the QM include a statement to the effect that their policies and operational procedures have been established to meet the requirements of ASTM E329? YES / NO

2.2.10 Does the QM include a list showing applicable dates of qualifications, accreditations, and recognition by others? YES / NO

2.2.11 Other comments and observations

________________________________________________________________________
________________________________________________________________________

2.3 STAFF TRAINING/COMPETENCY/CERTIFICATIONS

2.3.1 Does the QM include a document describing methods used to ensure that personnel are properly trained to perform the work assigned? YES / NO

2.3.2 Does the QM include a document describing methods used to ensure that personnel are competent to perform the work assigned? YES / NO

2.3.3 Does the laboratory conduct formal competency reviews of certified technicians annually? YES / NO

2.3.4 Does the QM include a blank form for recording the results of training and competency evaluations? YES / NO

2.3.5 Have training and competency evaluations been performed for all technicians? YES / NO

2.3.6 Have all technicians obtained applicable certification(s) within 120 days of hire? YES / NO

2.3.7 CONCRETE SOILS

Supervising Lab Tech __________________________ __________________________
Level of Certification __________________________ __________________________
2.3.8 Do supervising technicians have at least 5 years of relevant experience and an adequate certification level?  YES / NO

2.3.9 Other comments and observations

2.4 EQUIPMENT

2.4.1 Does the QM include an inventory of major equipment, or reference the location?  YES / NO

• Does the inventory list include the name of the equipment, manufacturer, model and serial number, date received and in service, and condition?  YES / NO

2.4.2 Does the QM include a list of equipment requiring cal/ver?  YES / NO

• Does the list include the required interval, a reference the procedure used, and the location of the resulting record?  YES / NO

2.4.3 Does the QM include in-house cal/ver procedures, or reference the location?  YES / NO

2.4.4 Does the QM include certificates or other documents that establish the traceability of in-house calibration equipment or reference standards, or reference their location?  YES / NO

2.4.5 Do cal/ver records include the date that the work was performed, the next due date, the individual performing the work, an identification of any calibration equipment used, and detailed results of the work performed?  YES / NO

2.4.6 Is all equipment currently calibrated or verified?  YES / NO
2.4.7 Other comments and observations

__________________________________________________________________

2.5 TEST RECORDS AND REPORTS

2.5.1 Does the QM include a document describing procedures used to prepare, check, and amend test reports?  
YES / NO

2.5.2 Does the QM include typical reports for the work routinely performed by the laboratory?  (Laboratories seeking accreditation for soils should include a few typical soils reports, likewise for laboratories seeking accreditation for concrete.)  
YES / NO

2.5.3 Impressions gained from review of at least two typical reports for each discipline in which accreditation is sought.

__________________________________________________________________

__________________________________________________________________

o Soils reports (if applicable)  
__________________________________________________________________

o Concrete reports (if applicable)  
__________________________________________________________________

2.5.4 Do corrections or additions to reports clearly reference the report being amended?  
YES / NO

2.6 SAMPLE MANAGEMENT

2.6.1 Does the QM include standard operating procedures for sample identification, transfer of samples from the field to the laboratory, sample storage, retention, disposal, and recording of results?  
YES / NO

2.7 DIAGNOSTIC AND CORRECTIVE ACTION

2.7.1 Does the QM include a document describing participation in proficiency sample and on-site inspection programs?  
YES / NO
2.7.2 Does this document include methods used to identify poor results and procedures followed when poor results or deficiencies occur? YES / NO

2.7.3 CCRL or Army COE Report (If the applicant seeks accreditation in concrete testing, it must have on file a report of a CCRL inspection or Army COE inspection performed within the past two years.) YES / NO
  - Report No. and Date _____________________________
  - Have deficiencies noted in the report been corrected within 30 days? YES / NO
  - Have corrective measures been adequately documented? YES / NO

2.7.4 AMRL or Army COE Report (If the applicant seeks accreditation in soils testing, it must have on file a report of an AMRL inspection or Army COE inspection performed within the past two years.) YES / NO
  - Report No. and Date _____________________________
  - Have deficiencies noted in the report been corrected within 30 days? YES / NO
  - Have corrective measures been adequately documented? YES / NO

2.7.5 Comments and observations___________________________________________
   ________________________________________________________________
   ________________________________________________________________

2.7.6 Does the QM include a procedure for handling external technical complaints? YES / NO

2.7.7 Does the procedure include who in responsible for handling the complaint, the review system, and the type of reply issued? YES / NO

2.8 INTERNAL QUALITY SYSTEM REVIEW

2.8.1 Does the QM include a document describing the scope of internal quality system reviews, the frequency of the reviews, identify the
individual responsible for the reviews, distribution of reports to management, and identify the location of the resulting record? YES / NO

2.9 SUBCONTRACTING AND EXTERNAL TECHNICAL SERVICES

2.8.1 Does the QM include a document describing the procedures followed relative to subcontracting and ensuring the quality of external technical services? YES / NO

2.9.2 Does the subcontracting policy describe procedures for selecting competent subcontractors and how the results obtained from a subcontractor are reported? YES / NO

2.9.3 Does the laboratory maintain records of verification of competency for external organizations used? YES / NO

2.9.4 Other comments and observations_______________________________________________________________

2.10 TEST PROCEDURES

2.10.1 Does the laboratory maintain copies of current standards which relate to the tests performed? YES / NO

2.10.2 Have procedures which differ from recognized standards been committed to writing (exclusions)? YES / NO

2.10.3 For laboratories seeking accreditation for Soils:
   - Has a “Laboratory Procedures Manual” been developed?
     A “Laboratory Procedures Manual” is a manual describing the procedures for standard tests performed by the laboratory (not just the ASTM Standards). YES / NO / NA

2.11 ADDITIONAL DOCUMENTATION REQUIREMENTS

2.11.1 For laboratories seeking accreditation in Concrete:
• Has the laboratory participated in a proficiency sample testing program for C128 (Fine Agg Sp. G)? YES / NO / NA

• If the laboratory also tests concrete aggregates: Have mechanical sieve shakers been verified for each different type of aggregate tested? YES / NO / NA

2.11.2 Are records maintained for at least 3 years? YES / NO

2.11.3 Does the laboratory have documented policies to ensure the protection of clients’ confidential information and proprietary rights? YES / NO

2.11.4 Does the laboratory have documented procedures for the purchase, reception, and storage of consumable materials used for the technical operations of the laboratory? YES / NO

2.12 IN THE LABORATORY

2.12.1 Is all equipment (including reference materials) labeled/marked/identified to indicate its calibration status? YES / NO

2.12.2 Is non-functioning equipment (either out of calibration or not properly working) segregated from use, or clearly labeled as out of service? YES / NO

COMMENTS

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________
3.0 CONCRETE TESTING EQUIPMENT

<table>
<thead>
<tr>
<th>APPLICABLE ASTM REQUIREMENT</th>
<th>STATUS</th>
</tr>
</thead>
</table>

3.1 COMPRESSION TESTING MACHINE C39

3.1.1 Make and model_______________________ --

3.1.2 Serial number_______________________ --

3.1.3 Capacity (lbs.)_______________________ --

3.1.4 Dial readable to nearest_________lbs. 0.1% Full Scale

3.1.5 Zero adjustment on dial Required

3.1.6 Load Applied Continuously Required

3.1.7 Variable rate of loading --

3.1.8 Spherical seated upper block Required

3.1.9 Date of calibration _________________ 1 yr. max.

3.1.10 Calibration agency___________________ --

3.1.11 Calibration method*_________________ --

3.1.12 Copy of calibration certificate available Required

3.1.13 Does the certification include curve data Required

3.1.14 Safety guards --

3.1.15 Other

* Load Cell or Proving Ring
### 3.2.1 Capping with Gypsum Plaster of Sulfur Mortar

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of capping compound</td>
<td></td>
</tr>
<tr>
<td>Type of capping plate</td>
<td>--</td>
</tr>
<tr>
<td>Visual condition of plate</td>
<td>--</td>
</tr>
<tr>
<td>Suitability of alignment devices</td>
<td>--</td>
</tr>
<tr>
<td>Caps checked for proper planeness</td>
<td>--</td>
</tr>
<tr>
<td>Temperature control on melting pot</td>
<td>Required</td>
</tr>
<tr>
<td>Cube strength records of capping material</td>
<td>--</td>
</tr>
</tbody>
</table>

#### Safety Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust fans</td>
<td>--</td>
</tr>
<tr>
<td>Fire extinguisher</td>
<td>--</td>
</tr>
<tr>
<td>First-aid kit</td>
<td>--</td>
</tr>
<tr>
<td>Safety glasses</td>
<td>--</td>
</tr>
<tr>
<td>Other</td>
<td>--</td>
</tr>
</tbody>
</table>

### 3.2.2 Use of Unbonded Caps

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of pads</td>
<td>--</td>
</tr>
<tr>
<td>Pad manufacturer</td>
<td>--</td>
</tr>
<tr>
<td>Durometer hardness</td>
<td>--</td>
</tr>
<tr>
<td>Are the number of tests on each pad recorded?</td>
<td></td>
</tr>
<tr>
<td>Are pads used more than 100 times?</td>
<td></td>
</tr>
<tr>
<td>If so, has qualification testing been performed (C1231-9.2.2)</td>
<td></td>
</tr>
</tbody>
</table>
o  Are cylinder ends checked for perpendicularly prior to testing (< 0.5 degrees or 1/8 inch for 12 inch cylinders)?

o  Are cylinder ends checked for depressions prior to testing (< 0.2 inches)

o  How are cylinders that do not meet the perpendicularly or depression checks handled?__________________________

o  Is cylinder verticality checked during load application (1/8 inch in 12 inches)?

o  Are cylinders tested to complete failure (C1231 - Note 5)?

3.2.3  Are cylinder diameters measured and recorded

3.2.4  Other

3.3  CURING FACILITIES

3.3.1  Moist room or lime water curing (circle one)  C511

3.3.2  General description of facility and condition

3.3.3  Cylinder storage method

3.3.4  Heating and cooling method

3.3.5  Free moisture on cylinders (no running water) Required
<table>
<thead>
<tr>
<th>3.3.6 Temperature</th>
<th>69.8 to 77.0°F</th>
<th>________</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.7 Recording thermometer installed</td>
<td>Required</td>
<td>________</td>
</tr>
<tr>
<td>3.3.8 Temperature records available</td>
<td>Required</td>
<td>________</td>
</tr>
<tr>
<td>3.3.9 Humidity</td>
<td>95% min.</td>
<td>________</td>
</tr>
<tr>
<td>3.3.10 Method of determining humidity</td>
<td>--</td>
<td>________</td>
</tr>
<tr>
<td>3.3.11 Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPLICABLE ASTM REQUIREMENT</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4 CYLINDER COMPRESSIVE TEST REPORT FORM</td>
<td>C39</td>
</tr>
<tr>
<td>3.4.0 Contains information required by ASTM C39/CCRL/ACI</td>
<td>________</td>
</tr>
<tr>
<td>3.4.1 Contains information recommended by WACEL?</td>
<td>________</td>
</tr>
<tr>
<td>3.4.2 Other</td>
<td></td>
</tr>
<tr>
<td>3.5 FIELD CURING OF CYLINDERS</td>
<td>C31</td>
</tr>
<tr>
<td>3.5.1 Type of cylinder molds used</td>
<td>________</td>
</tr>
<tr>
<td>3.5.2 Field curing method reportedly used (ACI 301)</td>
<td>________</td>
</tr>
<tr>
<td>3.5.3 Maximum/minimum thermometers reportedly used</td>
<td>________</td>
</tr>
<tr>
<td>3.5.4 Cylinders reportedly picked up (48 hours max)</td>
<td>ASTM C31</td>
</tr>
<tr>
<td>3.5.5 Method of transporting reported (protection from air drying/freezing)</td>
<td>________</td>
</tr>
<tr>
<td>3.5.6 Condition of cylinder racks</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.6 FIELD TESTING EQUIPMENT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6.1 Condition of slump cones/rods</td>
<td>C143-5.1/5.2</td>
</tr>
<tr>
<td>3.6.2 Evidence of smooth/nonabsorptive surface use</td>
<td>C143</td>
</tr>
</tbody>
</table>
3.6.3 Condition of air meters________________________ C-138/C-231 ________
3.6.4 Calibration of air meters______________________ C-138/C-231 ________
3.6.5 Condition of unit weight buckets_______________ C-29 ________
3.6.6 Evidence of unit weight bucket calibration C-29 ________
  - Plexiglas, Glass, or Metal Plate available in the correct size? ________
3.6.3 Condition of Concrete Beam Molds C-31 ________

3.7 ADDITIONAL REMARKS

<table>
<thead>
<tr>
<th>4.0 SOIL AND AGGREGATE TESTING EQUIPMENT</th>
<th>APPLICABLE ASTM REQUIREMENT</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 MOLDS AND HHAMMERS</td>
<td>D698, D1557, VTM-1</td>
<td></td>
</tr>
<tr>
<td>4.1.1 Adequate molds on hand (4&quot;, 6&quot;)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>Evidence of calibration of molds (both water filled and dimensional)</td>
<td>______</td>
</tr>
<tr>
<td>4.1.2 Adequate hammers on hand (5.5 lb, 10 lb)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>Evidence of calibration of hammers</td>
<td>______</td>
</tr>
<tr>
<td>4.1.3 Adequate number of accessories (screens pans, trowels, spatulas, water sprinklers, balances, ovens, straight edges, extruder)</td>
<td>______</td>
<td></td>
</tr>
<tr>
<td>4.1.4 Adequate base (200 lb min)</td>
<td>______</td>
<td></td>
</tr>
<tr>
<td>4.1.5 Automatic Proctor hammer (optional)</td>
<td>______</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Evidence of calibration</td>
<td>______</td>
</tr>
<tr>
<td></td>
<td>o How was the calibration performed?</td>
<td></td>
</tr>
</tbody>
</table>
### 4.1.6 Additional Comments


### 4.2 SIEVES AND SHAKERS

#### 4.2.1 Correct soils, concrete sieves on hand (see Appendix 1)

#### 4.2.2 Sieves nest easily

#### 4.2.3 No broken wires in use

#### 4.2.4 Each sieve labeled as per ASTM E-11

#### 4.2.6 Mechanical sieve shaker functioning properly

#### 4.2.7 Other

<table>
<thead>
<tr>
<th>APPLICABLE ASTM STANDARDS</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>E11</td>
<td></td>
</tr>
</tbody>
</table>

### 4.3 ATTERBERG LIMIT DEVICES

#### 4.3.1 Liquid limit devices

- Complete devices and accessories
- Liquid limit devices in good condition (no grooves, not worn, tight axle, limited-impact circle, etc.)
- Devices properly calibrated (1cm drop)

#### 4.3.2 Plastic limit equipment

- Complete accessories
- Ground glass plate meets criteria

#### 4.3.3 Other

<table>
<thead>
<tr>
<th>APPLICABLE ASTM STANDARDS</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4318</td>
<td></td>
</tr>
</tbody>
</table>
### 4.4 DRYING OVENS

<table>
<thead>
<tr>
<th>STATUS</th>
<th>ASTM MANUAL OF TESTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.1 Adequate number, size &amp; condition</td>
<td>Various</td>
</tr>
<tr>
<td>4.4.2 Thermostatically controlled and accurate</td>
<td></td>
</tr>
<tr>
<td>4.4.3 Provisions for checking temperature against calibrated thermometer</td>
<td>Not Req'd</td>
</tr>
<tr>
<td>4.4.4 Provision to eliminate hot spots in oven</td>
<td></td>
</tr>
<tr>
<td>4.4.5 Other</td>
<td></td>
</tr>
</tbody>
</table>

### 4.5 THERMOMETERS

<table>
<thead>
<tr>
<th>STATUS</th>
<th>ASTM MANUAL OF TESTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5.1 Adequate number and ranges</td>
<td></td>
</tr>
<tr>
<td>4.5.2 Currently calibrated or traceable to NIST</td>
<td></td>
</tr>
<tr>
<td>4.5.3 Other</td>
<td></td>
</tr>
</tbody>
</table>

### 4.6 SAMPLE PREPARATION APPARATUS

<table>
<thead>
<tr>
<th>STATUS</th>
<th>ASTM MANUAL OF TESTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6.1 Sample splitter</td>
<td>C702</td>
</tr>
<tr>
<td>o Physical condition with flat scoop, etc.</td>
<td></td>
</tr>
<tr>
<td>4.6.2 Quartering method</td>
<td>Acceptable</td>
</tr>
<tr>
<td>4.6.3 Evidence of Presoaking Proctors</td>
<td>D698, D1557</td>
</tr>
<tr>
<td>4.6.4 Evidence of low-temperature drying of samples</td>
<td>D4318</td>
</tr>
</tbody>
</table>
### 4.6 SAMPLE PREPARATION APPARATUS

<table>
<thead>
<tr>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D422</td>
</tr>
</tbody>
</table>

#### 4.6.5 Dispersion apparatus
- High-speed mechanical stirrer
- Proper physical dimensions of cup, baffles, and stirrer
- Proper motor speed 10,000 rpm
- Air jet (unlikely to see)
- Proper design and dimensions

#### 4.6.6 Other

### 4.7 IN-PLACE DENSITY EQUIPMENT

#### 4.7.1 Sand cone method
- Sand
- Evidence of calibration (apparatus and sand)
- Jar, funnel, and plate
- Miscellaneous equipment
- Complete set (balances, drying equipment, spoons, chisels, pans, brush, etc.)

#### 4.7.2 Nuclear method
- NRC and/or state license on hand
- NRC and/or state regulations on hand
- Procedures manual available for operators
- Documentation of training
- Notice to employees identifying emergency contact
4.7.2 Nuclear method (continued)  

o Film badge records  
o Shipping, transfer and survey records  
o Transport containers properly labeled  
o Sign-in/sign-out records  
o Evidence of bill of lading use  
o Field book with copy of license, charts and daily standard counts  
o Leak test records on hand  
o Calibration within 18 months  
o Standardization blocks (serial no. matches gauge)  
o Condition and workability of equipment  
o Evidence of standardization checks  

4.7.3 Other

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
### SCALES AND BALANCES

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.8.1 All scales (field and laboratory clean and operable)</strong></td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.2 Scale conditions</strong></td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.3 Recent calibration traceable to NIST</strong></td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.4 Scales used for purpose intended to proper accuracy range</strong></td>
<td>______</td>
</tr>
<tr>
<td>o Concrete weight (sufficient capacity accurate to 3.0%)</td>
<td>C138 ______</td>
</tr>
<tr>
<td>o Sensitivity</td>
<td>______</td>
</tr>
<tr>
<td>o Range</td>
<td>______</td>
</tr>
<tr>
<td>o Aggregate weight (at least 100# capacity accurate to 0.1%)</td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.5 Proctor</strong></td>
<td>D698, D1557 ______</td>
</tr>
<tr>
<td>o 20kg capacity readability to ±1 gram</td>
<td>______</td>
</tr>
<tr>
<td>o At least 1000 gram capacity readable to ±0.01 gram</td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.6 Sand cone</strong></td>
<td>D1556 ______</td>
</tr>
<tr>
<td>o 20 kg readable to ± 5 grams</td>
<td>______</td>
</tr>
<tr>
<td>o 1000g readable to ± 0.1 gram</td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.7 Atterberg limits (balance accurate to 0.0l gram)</strong></td>
<td>D4318 ______</td>
</tr>
<tr>
<td><strong>4.8.8 Sp. gravity of course aggregate (5kg accurate to 0.5 gram)</strong></td>
<td>C127 ______</td>
</tr>
<tr>
<td><strong>4.8.9 Sp. gravity of fine aggregate (1kg readable to 0.1 gram)</strong></td>
<td>C128 ______</td>
</tr>
<tr>
<td><strong>4.8.10 Sp. gravity of soils (accurate to 0.1% of recorded mass)</strong></td>
<td>D854 ______</td>
</tr>
<tr>
<td><strong>4.8.11 Moisture Content</strong></td>
<td>D2216 ______</td>
</tr>
<tr>
<td>sample &lt; 200 g GP1 readable to 0.01g</td>
<td>______</td>
</tr>
<tr>
<td>sample &gt; 200 g GP2 readable to 0.1g</td>
<td>______</td>
</tr>
<tr>
<td><strong>4.8.12 Other</strong></td>
<td>______</td>
</tr>
</tbody>
</table>
### 4.9 SPECIFIC GRAVITY TESTING

<table>
<thead>
<tr>
<th>Item</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.9.1 Coarse aggregate</strong></td>
<td></td>
</tr>
<tr>
<td>Container (wire basket or bucket)</td>
<td></td>
</tr>
<tr>
<td>Suspension – wire of smallest practical size</td>
<td></td>
</tr>
<tr>
<td>Thermometer (minimum range 21 to 25°C)</td>
<td></td>
</tr>
<tr>
<td>Oven and suitable containers</td>
<td></td>
</tr>
<tr>
<td>Towels or cloths</td>
<td></td>
</tr>
<tr>
<td>No. 4 and 1 ½-inch sieve</td>
<td></td>
</tr>
<tr>
<td><strong>4.9.2 Soils</strong></td>
<td>ASTM D854</td>
</tr>
<tr>
<td>Pycnometer (100ml volumetric flask or larger or 50ml stoppered bottle)</td>
<td></td>
</tr>
<tr>
<td>Thermometer (minimum range 10 - 40°C)</td>
<td></td>
</tr>
<tr>
<td>Oven and suitable containers</td>
<td></td>
</tr>
<tr>
<td>Vacuum or suitable heat source to expel entrapped air</td>
<td></td>
</tr>
<tr>
<td>Distilled water available</td>
<td></td>
</tr>
</tbody>
</table>

### 4.10 MISCELLANEOUS

<table>
<thead>
<tr>
<th>Item</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.10.1 Sieves (see item 4.2)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>4.10.2 Hydrometer bulb for mechanical analysis</strong></td>
<td>D422</td>
</tr>
<tr>
<td><strong>4.10.3 Evidence of calibration of hydrometer bulb</strong></td>
<td>D422</td>
</tr>
<tr>
<td><strong>4.10.4 Other</strong></td>
<td></td>
</tr>
</tbody>
</table>

__________________________________________

__________________________________________

__________________________________________
APPENDIX 1

SIZES OF SIEVES REQUIRED

A. For soils testing, ASTM D422 (Particles Size Analysis) lists the following as a complete set of sieves:

<table>
<thead>
<tr>
<th>Size</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch</td>
<td>10</td>
</tr>
<tr>
<td>2 inch</td>
<td>20</td>
</tr>
<tr>
<td>1 1/2 inch</td>
<td>40</td>
</tr>
<tr>
<td>1 inch</td>
<td>60</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>140</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>200</td>
</tr>
<tr>
<td>No. 4</td>
<td></td>
</tr>
</tbody>
</table>

Optionally, the following sieves may be used:

<table>
<thead>
<tr>
<th>Size</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch</td>
<td>16</td>
</tr>
<tr>
<td>1 1/2 inch</td>
<td>30</td>
</tr>
<tr>
<td>1 inch</td>
<td>50</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>200</td>
</tr>
<tr>
<td>No. 8</td>
<td></td>
</tr>
</tbody>
</table>

Additionally, the following sieves are required:

- No. 10 for ASTM D854, Specific Gravity
- No. 40 for ASTM D422, Liquid Limit

B. The following would be considered an acceptable set of sieves for soils and concrete testing:

<table>
<thead>
<tr>
<th>Size</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch</td>
<td>10</td>
</tr>
<tr>
<td>2 1/2 inch</td>
<td>16</td>
</tr>
<tr>
<td>2 inch</td>
<td>20</td>
</tr>
<tr>
<td>1 1/2 inch</td>
<td>30</td>
</tr>
<tr>
<td>1 inch</td>
<td>40</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>50</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>60</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>200</td>
</tr>
<tr>
<td>No. 8</td>
<td></td>
</tr>
</tbody>
</table>
EXHIBIT 6: MFRI Report Format and Sample Wording

(Date)

Accreditation Review No (#)

REPORT OF MATERIALS REVIEW AND FACILITIES INSPECTION

Performed in conjunction with an Accreditation Review of (name of laboratory, address)

This report has been prepared by the Laboratory Accreditation Team (LAT) Captain (name) on behalf of (name) (LAT Member), (name) (LAT Novice Member) and (name) (Outside Observer).

BACKGROUND

At the request of LAT, (name of laboratory) submitted a number of written materials relevant to engineering laboratory quality control. A list of materials submitted is appended hereto. These materials were distributed for review to the entire LAT that met on (date of Materials Review Meeting) to discuss them. Selected pages form these documents which have been commented upon by the reviewers are appended hereto. The balance of materials have been destroyed.

On (date), the LAT inspected the facilities of (name of laboratory), relying in part on WACEL-developed worksheets. The original worksheets used at that time, indicating the judgments of those who employed them, are attached to this report.

FINDINGS
Findings can be segregated into three distinct categories: strengths, tolerable weaknesses, and deficiencies.

**Strengths**

Strengths are defined as those activities or materials which are subject to judgmental evaluation and demonstrate excellence or which require no improvement. In the opinion of the LAT, the following activities and materials demonstrated excellence:

1. 
2. 
3. 
4. 
5. 

The following, reported in general terms, are good and require no immediate improvement.

1. 
2. 
3. 
4. 
5. 

**Tolerable Weaknesses**

A tolerable weakness comprises material or activity which in its current form is marginally acceptable. The nature of the weakness is not so serious as to degrade quality to an unacceptable level, but improvement is strongly encouraged. The items involved, and generally stated suggestions for improvement, are as follows:

1. 

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E -33 WACEL Laboratory Accreditation Program Exhibits
Deficiencies
A deficiencies occurs when material or activity in its current form is not acceptable. A given deficiency may comprise one or several distinct items or it may comprise a number of tolerable weaknesses which, taken together, create a deficiency.

In the opinion of the LAT, tolerable weaknesses listed as items 3, 4, and 5 above are interrelated. While any one on its own is tolerable, as indicated, the interaction between the three is such that it creates a deficiency. Accordingly, improvement of tolerable weakness 3, 4, and 5 is listed as deficiency item no. 1, below, followed by other specific deficiencies.

1. Comment
   2. Comment
   3. Comment
CONCLUSION

Given the deficiencies cited, the LAT cannot accredit (name of laboratory) either for soils or for concrete.

RECOMMENDATION

Deficiencies nos. 1, 2 and 3 all relate to written materials which affect both soils and concrete. It is not necessary to reinspect the facility in order to evaluate whether or not improvements made are sufficient. Accordingly, it is suggested that these improvements be made and that, when complete (name of laboratory) forward to (name of LAT Captain) two copies of each item, one for his own review and one for review by (name of LAT Member or Senior Member). Assuming the revised materials are found acceptable, the LAT can recommend accreditation in the field of soils.

Deficiencies nos. 4 and 5 both relate to improvement of concrete testing equipment. Reinspection is required before accreditation can be accorded. Reinspection will be performed by (name of LAT Member or Senior Member). As soon as the laboratory is ready for reinspection, (name of LAT Member or Senior Member) should be contacted: (Name of LAT Member's or Senior Member's firm, address, telephone).
NOTE: IMPROVEMENTS MUST BE MADE WITHIN THREE MONTHS FROM THE DATE OF THIS REPORT. We strongly suggest they be made well before that date. Failure to make the changes within three months, or failure to notify either (name of LAT Captain) or (name of LAT member or Senior Member) of changes within three months, results in automatic and irrevocable termination of this accreditation engagement.

COMMENT

(name of LAT Captain) will be pleased to communicate with a responsible representative of (name of laboratory) relative to findings, conclusions, and recommendations.

COPIES

Copies of this document and its attachments have been furnished to Messrs. (other LAT participants). Messrs. (LAT Novice Member) and (LAT Outside Observer) have been advised to read this document for checking purposes. If they do not concur with the findings, they are required to document their differences in writing to the LAT Captain and the WACEL PA within one week of receiving the report. If they agree with the findings, they are to maintain their copies until such time as the Accreditation Review process has been completed, and then they shall destroy their copies and other materials related to this Accreditation Review. A copy also has been furnished to the WACEL Program Administrator, who will deal with the copy as specified in the Program Guide.

Respectfully submitted,

WACEL, Inc.
(Name), Captain

Laboratory Accreditation Team No. (#)

Enclosure: Selected materials pages
          Checklists

pc: (Name of LAT Member)
    (Name of LAT Novice Member)
    (Name of Outside Observer)
    (Name of WACEL PA)
EXHIBIT 7: APPLICATION TO PARTICIPATE ON A LABORATORY ACCREDITATION TEAM

PLEASE PRINT OR TYPE

Name:__________________________________________________________

Company Affiliation:____________________________________________

Address: _____________________________________________________________________
_______________________________________________ ZIP __________________________

Phone: _________________________________ FAX________________________

E-Mail_______________________________________________________________________

Position in organization/title:_______________________________________________

Licenses held:___________________________________________________________

Area of expertise (check all that apply)  _____Soil   _____Concrete   _____Lab Management
_____ Business Management
_____ Other____________________________________________

Are you a principal of your organization?  ______Yes   ______No

Please identify training you have received in the areas of quality assurance, assessment and calibration:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

How many laboratory accreditation teams are your willing to serve on annually?  ______1
_____2-3   _____4-5?

I hereby certify that I am familiar with the requirements of the WACEL Laboratory Accreditation Program and agree to comply with Program rules described in the WACEL Quality Assurance Laboratory Accreditation Program Guide, including those relating to
confidentiality. I also agree not to serve on an accreditation team where I have any commercial or financial or other interest that could compromise my objectivity.

Signed: ______________________________________________________________________

Complete and return along with a copy of your resume to: WACEL, 7508 Wisconsin Avenue, 4th Floor, Bethesda, MD 20814; FAX: 301-907-9326; email mike@wacel.org.