REQUEST FOR PROPOSALS

Special Inspection and Testing Services

REQUEST NUMBER: 2322

DUE DATE: June 9, 2023

DUE TIME: 2:00 pm (local)

Contents

INTRODUCTION

The Gerald R. Ford International Airport Authority (GFIAA) is requesting proposals for Special Inspection and Structural Testing as part of a quality assurance program intended to ensure that the work is performed in accordance with the Contract Documents for the construction of the Consolidated Rental Car Facility (ConRAC) project.

The Gerald R. Ford International Airport is the second busiest airport in Michigan, serving business and leisure travelers with nonstop and connecting flights on six airlines. The Ford Airport is managed and operated by the Gerald R. Ford International Airport Authority.

SOLICITATION AND PROJECT SCHEDULE

ACTIVITY	DATE
RFP Issue Date	May 25, 2023
Question Deadline	June 2, 2023
Submission Due Date	June 9, 2023 at 2 pm
Contract Start Date	July 1, 2023

GFIAA reserves the right to modify the deadline set forth in the above table in its sole discretion. Any such modifications will be stated in an addendum.

WORK SCOPE

GENERAL

Special Inspection and Structural Testing shall be in accordance Chapter 17 of the Building Code of Michigan 2015. The program of Special Inspection and Structural Testing is a quality assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

SPECAIL INSPECTION AND TESTS

Required inspections and tests are described in the attached Statement of Special Inspections and Tests and the individual specification Sections for the items to be inspected or tested attached as Exhibit A.

The Special Inspector, his agents, and the Independent Testing Laboratory (ITL) shall perform, but not be limited to, the project testing and inspection services as indicted in the attached Statement of Special Inspection and Tests.

QUALIFICATIONS

The Special Inspector shall be a licensed Professional or Structural Engineer or International Code Council (ICC) Certified Special Inspector who is approved by the Owner, Structural Engineer of Record (SER) and Building Code Enforcement Official (BCEO). The Special Inspector may be an employee of the Testing Laboratory or an independent firm in a joint venture. Special Inspections shall be performed by inspectors qualified as per the Michigan Building code section 1704.2.1.

The Testing Laboratory and individual technicians shall be approved by the Owner, SER, and BCEO. The Testing Laboratory shall maintain a full-time ICC Certified Special Inspector on staff who shall certify all test reports. This individual shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.

The Special Inspector and Testing Laboratory shall submit, to the Owner, SER and BCEO, for review a copy of their qualifications, which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.

The Special Inspector and Testing Laboratory shall disclose any past or present business relationship or potential conflict of interest with the Architect (Fishbeck), Contractor (Turner Construction Company), or any of the Subcontractors whose work will be inspected or tested.

SPECIAL INSPECTION TESTING

Specific items to be tested and the frequency as to which the tests are to be performed are as noted in this document and on the Statement of Special Inspections and Tests.

The Testing Laboratory shall make tests necessary to assure compliance with the plans and specifications and local building codes and label all test samples and cylinders with identifying marks. Testing Laboratory shall inspect and/or test assemblies, specimens, work performed, and techniques as specified.

Testing Laboratory shall coordinate scheduling and cooperate with Contractor and provide qualified personnel. Testing Laboratory shall promptly notify Contractor and SER of observed irregularities, deficiencies in work, and report any test results that fail to comply with the requirements of the Contract Documents.

Testing Laboratory shall promptly process and distribute all copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay to the progress of the work. When laboratory testing or inspections suggest materials are not in conformance with the project documentation, the Architect and Contractor shall be notified within 24 hours. The testing laboratory shall

provide a written report within three days related to every project test and inspection except daily reports are required for concrete testing. Electronic distribution of reports shall include each of the following:

- Owner
- Contractor
- Engineer/Architect
- Building Code Official, as requested

Each report shall include:

- Date issued.
- Project title and number.
- Testing Laboratory name, address, and telephone number.
- Name of Special Inspector and/or Testing Laboratory inspector and job number.
- Date and time of sampling or inspection.
- Record of temperature and weather conditions.
- Date of test.
- Identification of specification section.
- Location of sample or test in the project.
- Type of inspection or tests.
- Interpretation of test results.
- Each report shall have testing laboratory written comments stating that the test results comply with the specified requirements and/or identify retest instructions given to the Contractor and require follow-up test reports that are identified as the retest reports. The retest reports shall identify the original test report.

The Testing Laboratory is not authorized to release, revoke, alert or enlarge on requirements of Contract Documents. The Testing Laboratory is not authorized to perform any duties of the Contractor.

The Testing Laboratory shall not have control over the Contractor's means and methods of construction. The Testing Laboratory shall not be responsible for construction site safety. The Testing Laboratory has no authority to stop the work.

TESTING LABORATORY INSURANCE REQUIREMENTS

Provide comprehensive and general liability insurance with limits of liability of not less than five hundred thousand dollars ($500,000) for property damage per occurrence.

Provide statutory worker's compensation insurance and employer's liability insurance with applicable maximum coverage as required by governing law.

Provide excess liability insurance, umbrella form, in the amount of five hundred thousand dollars ($500,000).

Provide errors and omissions professional liability insurance in the amount of one million dollars ($1,000,000).

REPORT OF SPECIAL INSPECTIONS

The special inspector shall notify the Architect / Engineer of nonconforming items observed within 24 hours of the observation.

Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

- A summary of the work performed during the reporting time frame.
- Changes and/or discrepancies with the drawings and specifications that were observed during the reporting period.
- Discrepancies which were resolved or corrected
- A list of nonconforming items requiring resolution.
- All applicable test results including nondestructive testing.

The Special Inspector shall not have control over the Contractor's means and methods of construction. The Special Inspector shall not be responsible for construction site safety. The Special Inspector has no authority to stop the work.

FINAL REPORT OF SPECIAL INSPECTIONS

The Final Report of Special Inspections shall be completed by the Special Inspector and /or the Testing Laboratory and be submitted to the Owner, SER, and BCEO prior to issuance of a Certificate of Use and Occupancy.

CONSTRUCTION DOCUMENTS

Access Project Schedule and Construction Project Manual documents at the following Dropbox Link:
https://www.dropbox.com/scl/fo/ddpld47v65suxaouvwlpg/h?dl=0&rlkey=redu77bahlgrmz9iznskflcvv

REQUESTS FOR INFORMATION

Questions regarding this solicitation are to be submitted in writing to *purchasing@grr.org* prior to 2 p.m. on June 2, 2023.

GFIAA reserves the right to publish and respond to an inquiry, respond directly to the inquirer without publishing or not respond to the inquiry at its sole discretion. Unless otherwise indicated, all questions will be complied into one document and answers will be issued as a Questions & Answers document within 4 days after the question deadline.

It is the firm's responsibility to become familiar with and fully informed regarding the terms, conditions, and specifications of this solicitation. Lack of understanding or misinterpretation of any portions of this

solicitation shall not be cause for withdrawal after opening or for subsequent protest of award.

Addendums will only be published by the GFIAA Purchasing Department and available for review at www.grr.org.

SUBMISSION FORMAT AND EVALUATION CRITERIA

Submissions should include and will be evaluated on the elements outlined below:

1. Company overview:
Summarize your firm's strong points and describe how your experience, particularly with similar projects, will benefit GFIAA in its construction of the Project Elevate Concourse A expansion and widening. State the full name and address of the organization and, if applicable, the branch office, consultants, or other subordinate elements that will provide or assist in providing the service. Include phone number(s), email address(s) and Respondent's website address.

2. Cost:
Provide hourly rate schedule and a total budgeted Not-To-Exceed price for all testing on your standard form (not to exceed 6 pages).
Not to Exceed price shall consider general working hours of 7a.m. to 5 p.m. Monday through Friday.
Time and Expense will serve as the basis of payment for this contract.

3. Experience:
Provide a minimum of three (3) relevant references, preferably for projects of similar scope and complexity. Include the names of the projects, location, completion date, project cost, and specific challenges; identify project team members and references for each project including telephone numbers and email addresses.

REQUEST FOR PROPOSAL SUBMISSION

Responses may be delivered physically or electronically. To be considered, complete submissions must be received prior to the due date and time specified (local time).

- Hard copy responses can be mailed or otherwise delivered to the address below.

  Submission address:

  Attn: AJ Nye, Procurement Specialist

  Gerald R Ford International Airport Authority

  5500 44th St SE

  Grand Rapids, MI 49512

- Electronic responses can be securely uploaded as a single pdf document to:

https://www.dropbox.com/request/Is88tqmv1bOIC0W9GOjW

Electronic submissions shall be named with a form or portion of the firm's name as part of the document name.

The firm certifies the response submitted has not been made or prepared in collusion with any other respondent and the prices, terms or conditions thereof have not been communicated by or on behalf of the respondent to any other respondent prior to the official opening of this request. This certification may be treated for all purposes as if it were a sworn statement made under oath, subject to the penalties for perjury. Moreover, it is made subject to the provisions of 18 U.S.C. Section 1001, relating to the making of false statements.

Submissions may be withdrawn by written request only if the request is received on or before the opening date and time.

Submissions not meeting these criterions may be deemed non-responsive.

GFIAA is not liable for any costs incurred by any prospective firm prior to the awarding of a contract, including any costs incurred in addressing this solicitation.

TERMS AND CONDITIONS

GFIAA reserves the right to require that its standard terms and conditions apply to any actual order placed in response to a firm's submission. No attempt to modify GFIAA's Standard Terms and Conditions shall be binding, absent agreement on such modification in writing and signed by GFIAA.

No payment shall be made to the Respondent for any extra material or services, or of any greater amount of money than stipulated to be paid in the contract, unless changes in or additions to the contract requiring additional outlay by the Respondent shall first have been expressly authorized and ordered in writing by contract amendment or otherwise furnished by the GFIAA.

The intent of these specifications is to solicit a properly designed and all-inclusive response. Any requirements not in the specifications, but which are needed for such a response, are to be included in the submission.

The Gerald R Ford International Airport Authority, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged

business enterprises and airport concession disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

The Respondent shall not discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status, or disability that is unrelated to the individual's ability to perform the duties of a particular job or position.

The Respondent shall observe and comply with all applicable federal, state, and local laws, ordinances, rules and regulations at all times during the completion of any contract with the GFIAA.

The terms of this request shall be interpreted, construed and enforced pursuant to the laws of the State of Michigan, and the Parties irrevocably consent to the jurisdiction of the federal and state courts presiding in Michigan.

The GFIAA is tax-exempt and a regional airport authority organized under 2015 P.A. 95, being MCL 259.137 et. seq.

Vendor Representation and Warranty Regarding Federal Excluded Parties List: The Respondent acknowledges that the GFIAA may be receiving funds from or through the Federal Government; such funds may not be used to pay any Respondent on the Federal Excluded Parties List (EPLS). The Respondent represents and warrants to the GFIAA that it is not on the Federal EPLS. If the Respondent is in non-compliance at any time during execution or term of this agreement (including any extensions thereof), the Respondent shall be in breach and the GFIAA shall be entitled to all remedies available to it at law or equity, specifically including but not limited to recovery of all moneys paid to the Respondent, all consequential damages (including the loss of grant funding or the requirement that grant funding be returned), and attorney fees (including the costs of in-house counsel) sustained as a result of the Respondent's non- compliance with this warranty and representation.

Pursuant to the Michigan Iran Economic Sanctions Act, 2012 P.A. 517, by submitting a bid, proposal or response, Respondent certifies, under civil penalty for false certification, that it is fully eligible to do so under law and that it is not an “Iran linked business,” as that term is defined in the Act.

Insurance requirements are posted on the Documents and Forms page of the GFIAA website within the Purchasing Terms and Conditions document.

Termination For Cause: Should the firm fail to perform the Work as required by and in accordance with the schedule or time requirements, or otherwise violate any of the terms set forth in the Solicitation Request, it shall constitute breach of the Contract. Other than in force majeure situations, Respondent shall have five (5)

calendar days to cure a breach of the Contract (the "Cure Period") following issuance of GFIAA written notice. Failure to cure a breach of the Contract within said Cure Period shall allow the GFIAA to, without further notice to the Respondent, declare the Contract terminated and proceed with the replacement of the Respondent and the GFIAA shall be entitled to all remedies available to it at law or in equity including a claim against any required payment/performance bonds.

Termination Without Cause: Notwithstanding any other provision, at any time and without cause, GFIAA shall have the right, in its sole discretion, to terminate the contract by giving sixty (60) days written notice.

Although it is the intent to contract with one provider, the GFIAA reserves the right to contract with alternate sources if the Respondent is unable or unwilling to service its obligation, or it is deemed by GFIAA to be in its best interest to use alternate sources.

Assignment: Neither party shall assign or delegate any of its rights or obligations under this Agreement without the prior written consent of the other party.

Respondent warrants that they are an authorized provider of products or services of his/her submission.

MICHIGAN FREEDOM OF INFORMATION ACT

Information submitted in this solicitation is subject to the Michigan Freedom of Information Act and may not be held in confidence after the Respondent's submission is opened. A submission will be available for review after the project has been awarded.

GFIAA cannot assure that all of the information submitted as part of or peripheral to the Respondent's submission will be kept confidential. Any Respondent submission language designated as confidential is considered automatically invalid and void. GFIAA is subject to the Michigan Freedom of Information Act, which prohibits it from concealing information on or associated with responses, successful or unsuccessful, once they are opened.

EVALUATION, STATUS UPDATES/AWARD NOTIFICATION

The Authority reserves the right to request additional information it may deem necessary after the submissions are received.

As part of the evaluation process, Respondents may be requested to make an oral presentation, at the Respondent's expense, to an evaluation committee. Key staff to be assigned to this project must participate in this presentation unless otherwise waived by the Authority. The presentation may be followed by a question-and-answer session.

The Authority reserves the right at its discretion to waive irregularities of this solicitation process.

In the event of extension errors, the unit price shall prevail and the Respondent's total offer will be corrected accordingly. In the event of addition errors, the extended totals will prevail and the Respondent's total will be corrected accordingly. Respondent must check their submission where applicable. Failure to do so will be at the Respondent's risk. Submissions having erasures or corrections must be initialed in ink by the Respondent. Respondents are cautioned to recheck their submissions for possible errors.

The Respondent shall not be allowed to take advantage of error, omissions or discrepancies in the specifications.

The Authority, at its sole discretion, reserves the right to award to the Respondent whose response is deemed most advantageous to the Authority. The Authority, at its sole discretion, shall select the most responsive and responsible Respondent and evaluate all responses based on the requirements and criterion set forth in this solicitation while reserving the right to weigh specifications and other factors in the award. The Authority reserves the right to reject any and all submissions as a result of this solicitation.

The Authority reserves the right to award by line item when applicable and to accept or reject any or all parts of a submission.

Accelerated discounts should be so stated at the time of submission. If quick-pay discounts are offered, The Authority reserves the right to include that discount as part of the award criterion. Prices must, however, be based upon payment in thirty (30) days after receipt, inspection, and acceptance. In all cases, quick-pay discounts will be calculated from the date of the invoice or the date of acceptance, whichever is later.

Award notifications are posted on the Authority website. It is the Respondent’s responsibility to monitor the website for status updates.

SECTION 01 45 34 – SPECIAL INSPECTIONS AND TESTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes provisions for special inspections as follows and includes the Statement of Special Inspections.
   1. Special inspections of structures.
   2. Special inspections within structures.
   3. Special inspections of underground components within 5-feet outside of the footprints of structures.

B. Special inspection services for which Owner will contract and pay directly and will be performed by a special inspector or inspectors selected by Owner:
   1. Steel construction.
   2. Concrete construction.
   3. Masonry construction.
   4. Soils.
   5. Sprayed fire-resistant materials.
   6. Fire-resistant penetrations and joints.
   7. Travel expense of the special inspector.

C. Include the following testing, special inspections and certifications in the Contractor’s Base Bid:
   1. Inspections and tests required by codes or ordinances or by an authority having jurisdiction and made by a legally constituted authority.
   2. Inspections, testing services and certifications including, but not limited to, the following:
      a. Pipe leakage tests.
      b. Tank leakage tests.
      c. Pile load tests and test piles.
      d. Tank welding tests.
      e. Welder certifications.
      f. Structural steel yield strength mill tests.
      g. Pipe material yield strength tests.
      h. Manufacturer’s certificate of compliance for high-strength bolts.
      i. Manufacturer’s certificate of compliance for weld filler metal.
      j. Manufacturers' certification tests for cement.
      k. Supplier’s certification tests for fine and coarse aggregate.
      l. Aggregate alkali reactivity testing.
      m. Chloride ion penetration testing.
      n. Supplier’s certification tests for bedding material.
      o. Manufacturer’s certified test reports of material, yield strength and gage for cold-formed steel deck and cold-formed metal framing.
      p. Testing in connection with the Engineer's review of materials and equipment proposed by Contractor to be incorporated into the Work.
      q. Testing performed for the Contractor's convenience.

D. Special Inspection of Load-Bearing Fabrications:
   1. Fabricators: Registered and approved in accordance with the Building Code so that special inspection of the fabrication of Project load-bearing components on the fabricator’s premises will not be required.

E. Owner Paid Items: Owner may elect to inspect or to employ either Engineer or a special inspector to inspect materials or systems on the Project other than those specified herein. The cost of this inspection will be paid for by Owner.

F. Special inspection services are required to verify compliance with the Contract Documents and with the requirements of the Building Code. These services do not relieve Contractor of responsibility for verification of compliance with Contract Document requirements.

1.3 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. AASHTO:
      a. T259 - Method of Test for Resistance of Concrete to Chloride Ion Penetration.
      b. TP 23 - Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
   2. ACI - American Concrete Institute:
      a. 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
      b. 301 - Specification for Structural Concrete.
      c. 318 - Building Code Requirements for Reinforced Concrete.
      d. 530 - Building Code Requirements for Masonry Structures.
      e. 530.1 - Specifications for Masonry Structures.
   3. AISC:
      a. 341 - Seismic Provisions for Structural Steel Buildings.
      b. 360 - Specification for Structural Steel Buildings.
   4. ASTM Standards:
      a. C31 - Practice for Making and Curing Concrete Test Specimens in the Field.
      b. C33 - Specification for Concrete Aggregates Including Appendix XI.
      c. C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
      d. C42 - Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
      e. C138 - Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete.
      f. C140 - Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
      g. C143 - Test Method for Slump of Hydraulic-Cement Concrete.
      h. C157 - Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
      i. C172 - Practice for Sampling Freshly Mixed Concrete.
      j. C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
      k. C192 - Practice for Making and Curing Concrete Test Specimens in the Laboratory.
      l. C231 - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
      m. C295 - Guide for Petrographic Examination of Aggregates for Concrete.
      n. C1019 - Test Method for Sampling and Testing Grout.
      o. C1077 - Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
      p. C1202 - Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
      q. C1218 - Test Method for Water-Soluble Chloride in Mortar and Concrete.
      r. D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
      s. D1556 - Test Method for Density and Unit Weight of Soil In Place by Sand-Cone Method.
      t. D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
      u. D1586 - Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.
      v. D2166 - Test Method for Unconfined Compressive Strength of Cohesive Soil.
      w. D2167 - Test Method for Density and Unit Weight of Soil In Place by the Rubber Balloon Method.
      x. D2937 - Test Method for Density of Soil in Place by Drive-Cylinder Method.
      y. D6938 - Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
      z. E2174 - Practice for On-Site Inspection of Installed Firestops.
      aa. E2393 - Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
   5. AWS:
      a. D1.1 - Structural Welding Code - Steel.
      b. D1.3 - Structural Welding Code - Sheet Steel.
   6. Michigan Building Code.
   7. RCSC - Research Council on Structural Connections: Specification for Structural Joints Using High-Strength Bolts.
   8. SDI - Steel Deck Institute: QA/QC – Quality Control and Quality Assurance for Installation of Steel Deck.

9. MDOT:
    a. Standard Specifications for Construction.
    b. Density Testing and Inspection Manual.

1.4 DEFINITIONS

A. Terms:
1. Building Code: The building code plus amendments, if any, legally adopted for the location in which the Project is located.
2. Special Inspection: Inspection and testing as herein required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise of one or more approved special inspectors in order to ensure compliance with the Building Code and the Contract Documents.
3. Testing Agency; Independent Testing Agency: Special inspector.

1.5 PERFORMANCE REQUIREMENTS

A. Special Inspector Qualifications:
1. Qualified in accordance with the Building Code and by local building official.
2. Objective, competent and independent from the contractor performing the work to be inspected.
3. Familiar with Building Code requirements for special inspections.
4. Having adequate equipment, periodically calibrated as required, to perform the special inspections.
5. Employing experienced personnel educated in conducting, supervising and evaluating special inspections similar in complexity to that required for the Project.
6. Weld Inspectors: Certified in accordance with AWS D1.1 and D1.3 as applicable.
7. Submission of Qualifications:
    a. Special Inspector: Provide to the building official written documentation as required to demonstrate competence, objectivity and experience or training.
    b. Disclose possible conflicts of interest.

B. Perform special inspections in accordance with:
1. Laws and Regulations.
2. Reference procedures and requirements.
3. Building Code.
4. Contract Documents.
5. Manufacturer’s requirements, as applicable.
6. Reviewed submittals for the Project, as applicable.

C. Testing Outside a Structure Footprint: In accordance with Division 01 Section “Testing for Buried Utilities, Roadways, and Site Projects.”

1.6 REINSPECTION COSTS

A. Reinspection:
1. When initial special inspections of items except soil compaction indicate noncompliance with the Contract Documents, subsequent special inspections occasioned by the noncompliance shall be performed by the same special inspection agency, and the costs thereof will be deducted by the Owner from the Contract Sum.
2. Soil Compaction:
    a. The first retesting of soil compaction shall be paid for in accordance with the provisions of the Contract Documents.
    b. The second and subsequent retesting for soil compaction due to noncompliance with the Contract Documents shall be performed by the same special inspection agency, and the costs thereof will be deducted by the Owner from the Contract Sum.

B. Uncovering Costs: Paid for as described in the General Conditions.

1.7 REPORTS AND SUBMISSIONS

A. Special Inspection Reports:
   1. Special Inspector: Keep records of special inspections in accordance with the Building Code.
   2. Records: Indicate that work inspected was or was not completed in conformance with the Contract Documents.
   3. Report and reinspect non-conformances until they are in conformance with the Contract Documents.
   4. Final Report:
      a. Prepare and submit a final report at the completion of the special inspections.
      b. Document the completion of specified special inspections and correction of discrepancies.
      c. Submit as specified for inspection reports.
   5. Provide typed electronic copies of reports to:
      a. Owner.
      b. Engineer.
      c. Contractor.
      d. Building official.
   6. Discrepancies: Bring to immediate attention of Contractor, and, if not corrected, to attention of Engineer and building official.

1.8 SCHEDULES FOR SPECIAL INSPECTIONS

A. Establishing Schedule: By advance discussion between special inspector and Contractor, determine the time required to perform special inspection and to issue findings.

B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate such changes of schedule with the special inspector.

C. Adherence to Schedule: When the special inspector is ready according to the determined schedule, but is prevented from performing special inspection due to incompleteness of the Work, extra costs attributable to the delay may be charged to Contractor and shall not be borne by Owner.

1.9 CONTRACTOR'S DUTIES

A. Cooperate with Special Inspector:
   1. Schedule the Work so that special inspector is allowed a reasonable schedule and amount of time to access and view the components requiring special inspection before being obscured by subsequent construction.
   2. Notify special inspector 24 hours minimum prior to expected time when special inspection services will be required.
   3. Provide the following as necessary for special inspector to properly perform its functions:
      a. Access to the Work.
      b. Facilities for access to the Work.
      c. Tools.
      d. Storage.
      e. Assistance as requested.

B. Submission of Written Statements:
   1. To be submitted by each contractor responsible for construction of a seismic force resisting system or seismic resisting component listed in the Statement of Special Inspections.
      a. Submit to building official, Owner, and Engineer, prior to commencement of construction on the respective system or component.
      b. Acknowledging awareness of the special inspections specified herein.
   2. Each fabricator, at the completion of their respective fabrication, shall submit a certificate of compliance to the building official and Engineer stating that the fabrication was performed in accordance with the Contract Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 STATEMENT OF SPECIAL INSPECTIONS

A. Frequency of Special Inspections:
   1. The minimum frequency of the special inspections (periodic vs. continuous) shall be as indicated in the Building Code.
   2. Quality assurance inspections performed in accordance with standards referenced herein shall conform to the frequency requirements indicated in those standards.

B. Steel Construction:

   1. Inspect and verify structural steel in accordance with the quality assurance requirements of AISC 360 and the Contract Documents.
   2. Steel Construction Other Than Structural Steel:
      a. Inspect and verify cold formed steel floor and roof deck in accordance with the quality assurance inspection requirements of SDI QA/QC.
      b. Cold-Formed Metal Framing:
         1) Inspect load bearing members and connections.
         2) Verify member sizes and connection configurations conform to the Contract Documents and reviewed submittals.
         3) Verify that screwed connections are not stripped, and members are pulled into firm contact.

C. Concrete Construction:
   1. Special Inspections:
      a. Except for material testing, perform special inspections in accordance with Table 1705.3 of the Building Code and this Specification for all concrete.
      b. Inspect and verify:
         1) Reinforcing steel and placement.
         2) Post-Tensioned Structure prior to concrete placement:
            a) Reinforcement and post-tensioning are shipped, handled, and stored as specified.
            b) Excessive sheathing is not stripped at fixed end.
            c) Plastic sheathing is of sufficient and uniform thickness.
            d) Strand is free of corrosion where sheathing and grease are removed at stressing ends.
            e) Anchorage castings are properly cast with smooth wedge holes.
            f) Wedges are new, with undeformed teeth; free of rust and steel shavings; of consistent quality, and pairs are matched.
            g) Mill reports and certifications are available for prestressing steel and other components.
            h) Tendon high and low points are at the correct elevation.
            i) Tendon profiles are smooth and correctly shaped (parabolic or straight without localized reverse curves) between reference points.
            j) Tendons do not have excessive horizontal wobble.
            k) Damaged sheathing has been repaired with at least two layers of specified moisture-proof tape.
            l) Encapsulation system for tendons and anchors (dead, intermediate, and stressing ends) is watertight.
            m) Tie wire, chair, and support systems (location, spacing, material).
            n) Stressing anchorages are securely fastened to form with stainless steel nails and appropriate pocket formers. (Pocket former tips should be coated before insertion in wedge cavity.)
            o) Bursting steel is installed at the anchorages.
            p) Epoxy coating for conventional reinforcement is free of damage and damaged coating is repaired in conformance with Contract Documents.
            q) Conventional steel is correctly placed, including proper number, location, cover, supports, and splices.

r) Tendons are installed with proper cover.

3) Post-Tensioned Structure during concrete placement:
   a) Forms are clean, free of cut bars, tie wire, saw dust, debris, etc. before concrete placement.
   b) Inserts, sleeves, and blockouts for mechanical, electrical, and precast concrete work are installed at proper location and sizes.
   c) Expansion joint blockouts at proper location and size.
   d) Concrete placement does not displace position of reinforcement or tendons and pump lines are independently supported.
   e) Concrete is properly consolidated, especially in areas of reinforcement congestion and tendon anchorage to eliminate voids and honeycombing. Verify vibrators are not laid on tendons and reinforcement.
   f) Water is not added to concrete trucks at job site without prior approval of Engineer.
   g) Spraying of water directly on slab surface does not occur during fogging operations.
   h) Concrete placement and finishing procedures are in compliance with Contract Documents and as agreed during prepour meeting.
   i) Cold weather and hot weather concreting practices are followed as specified.
   j) Finishing and jointing procedures are followed as specified.
   k) Wet cure practices are followed as specified.

4) Post-Tensioned Tendon Stressing:
   a) Only trained, qualified personnel should be allowed in immediate vicinity of equipment during use. Personnel doing stressing and inspectors must remain clear of tendon being stressed. Never stand in immediate vicinity of jack or between jack and pump while stressing.
   b) Test reports of concrete cylinder strengths will be sent by email to Contractor to allow for expediting of post-tensioning.
   c) Verify that tensioning operations do not begin until tests of concrete cylinders cured under job site conditions indicate that concrete in members has attained minimum compressive strength specified at time of stressing, but stressing will be done as soon as possible within specified time frames.
   d) Measure tendon elongations concurrently with stressing. If variations between calculated and actual consistently exceed tolerance, stressing should cease until cause is determined.
   e) Measure elongation (distance from edge of concrete to a paint mark applied to tendon, less a constant reference dimension used to mark tendons). On double end stressing, add elongation of each end together to obtain total elongation.
   f) Elongation should be plus or minus 7 percent of values indicated on shop drawings. Elongation measurements should be to an accuracy of 1/8-inch. If there are discrepancies consistently exceeding 7 percent tolerance, tensioning will cease until problem is identified and corrected.
   g) Keep stressing records and submit for review and approval, copies of actual field records within four days promptly upon completion of tensioning for each concrete pour. Certify that stressing process and records have been reviewed, and that forces specified have been provided. Record on each report following:
   h) Name of project.
   i) Level number and pour number, tendon identification mark.
   j) Date of stressing.
   k) Name and signature of stressing Operator.
   l) Signature of Contractor for certification of their review of stressing records and that specified forces have been provided.
   m) Identification number of jacking equipment.
   n) Calculated elongation.
   o) Actual field elongation.
   p) Calculated gauge pressure and jacking force applied to each tendon.
   q) Actual gauge pressures and jacking force applied to each tendon.
   r) Required concrete strength at time of jacking.
   s) Actual concrete strength at time of jacking.
   t) Verify fixed end wedges are evenly and adequately seated in anchorage.
   u) Verify tendons are not cut until elongation records are reviewed and approved by Engineer.

v) Verify tendon cutting operations do not damage coating on anchors nor damage assembly required to provide a waterproof anchorage.

5) Anchor rods prior to and during placing of concrete.
6) Anchors post-installed in hardened concrete.
7) Proper use of required design mix.
8) Proper placement of concrete.
9) Maintenance of specified curing techniques and temperatures.
10) For elevated structural slabs, in place concrete strengths prior to stressing of post-tensioned tendons, removal of forms and placement of reshores.
11) Concrete formwork for proper shape, location and dimension.
12) Fabricated Hardware:
    a) Verify proper installation prior to concrete placement.
    b) At start of fabrication, review and verify welding procedures.
    c) At mid schedule of production, randomly select and inspect 25 percent of pieces fabricated. Visually inspect welds, provide magnetic particle examination if required. If greater than or equal to 2 percent of welds are unacceptable, increase random sampling frequencies to 50 percent. If greater than or equal to 5 percent are unacceptable, inspect all pieces.
    d) Last visit prior to shipping and installation review uninspected pieces per guidelines of mid schedule visit.
    e) Report will include:
        (1) Date of inspection
        (2) Description of pieces or procedure reviewed
        (3) Status (approval, rejection)
        (4) Remedial work required, date carried out, date of final passing inspection
        (5) Any comment or observations regarding condition

2. Concrete Material Testing:
    a. Perform material testing in accordance with Table 1705.3 of the Building Code and this Specification for all concrete.
    b. Point of sampling and the method of securing the Samples:
        1) Determined by special inspector.
        2) In accordance with ASTM C172.
    c. Slump Tests:
        1) Perform slump tests in accordance with ASTM C143.
        2) Perform one slump test on the Site for each truckload or every 10 cubic yards of concrete placement.
        3) When water reducing admixtures or high range water reducing admixtures are added at job site, test concrete slump prior to addition of admixtures.
        4) At Engineer's request, also perform slump tests at batch plant before adding water reducer.
        5) Perform more slump tests if deemed necessary by Engineer.
    d. Air Content Testing:
        1) Perform 1 air-entraining test in accordance with ASTM C231 or C173 for each truckload or every 10 yards of concrete placed, whichever is more frequent.
        2) Sample and test following placement and screeding at rate of one per every 10 batches of air-entrained concrete delivered to project.
        3) Upon request from Engineer, core and test hardened concrete slab for air content per ASTM C 457 at rate of one core per 15,000 square feet of supported slab.
            a) If concrete consistently meets requirements of Specification and mix design and placement procedures remain unchanged, Engineer may reduce frequency or waive requirements for testing hardened concrete.
            b) If concrete consistently fails to meet requirements of Specification and mix design and placement procedures remain unchanged, Engineer may require additional testing of hardened concrete for air content per ASTM C 457.
            c) Should the additional tested hardened concrete meet these Specifications, Owner will pay for coring, testing, and patching. Should tested hardened concrete not meet these Specifications, the Contractor will pay for coring, testing, and patching of hardened concrete.
    e. Test the concrete unit weight in accordance with ASTM C138 or C567, as applicable.

f. Test and record ambient air temperature and composite concrete sample temperature for each batch of concrete in accordance with ASTM C 1064.

g. Concrete Cylinder Testing:
   1) In accordance with ASTM C31 and C39.
   2) Compression test sample size will be 6-inch x 12-inch cylinders or 4-inch x 8-inch cylinders.
   3) Take a minimum number of test cylinders as listed for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one day.
      a) 6-inch x 12-inch Cylinders: 4 cylinders (6 cylinders for post-tensioned concrete).
      b) 4-inch x 8-inch Cylinders: 6 cylinders (7 cylinders for post-tensioned concrete).
   4) Compression Tests:
      a) Test 2 cylinders at 2 or 3 days for post-tensioned concrete only
      b) Test 1 cylinders at 7 days.
      c) Test 2 cylinders at 28 days (3 cylinders for 4-inch x 8-inch cylinders).
      d) Hold 1 cylinder in reserve for use as the Engineer directs.
   5) After 56 days, unless notified by the Engineer to the contrary, reserve cylinders may be discarded without being tested for specimens meeting 28 day strength requirements.
   6) Contractor shall be responsible for having additional pairs of cylinders taken and tested, if required to demonstrate adequate concrete strengths at ages earlier than 28 days if Contractor's schedule requires form removal from load-bearing concrete prior to 28 days.
   7) Handle cylinders carefully.
   8) On Site Storage:
      a) 12 hours, minimum, 48 hours maximum.
      b) At a temperature range of 60 to 80 degrees F and in a moist environment.
      c) Shielded from direct sunlight and radiant heat.
      d) The Contractor shall construct heated or water bath enclosures, as applicable, if conditions require.
      e) Cylinders Samples taken to establish adequate strength for stressing post-tensioning tendons or form removal earlier than 28-days shall be cured in locations that represent the conditions under which the structural concrete will be cured.
   9) Laboratory Curing:
      a) For duration of curing after on Site storage.
      b) Does not include cylinders taken to establish adequate strength for stressing post-tensioning tendons or form removal earlier than 28-days.
   10) Acceptance and evaluation of the concrete shall be based on ACI 301.

h. Water Content Testing:
   1) Water content of freshly mixed concrete will be tested on a random basis during placement in accordance with AASHTO TP 23, Proposed Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
   2) Test shall be run once per post-tensioned concrete pour or whenever directed by Engineer.
   3) An alternative test method may be used if acceptable to both Testing Laboratory and Concrete Supplier and approved by Engineer.

i. Corrosion Inhibitor Testing:
   1) Concrete Producer shall have corrosion inhibitor Manufacturer/Supplier perform following:
      a) Install a "Low Level pump cutoff device" in the dedicated Calcium Nitrate tank. Device will shut off dispenser pump in event of insufficient product in tank
      b) Install a visual reference (such as a bottle or other approved device) for dispensing Calcium Nitrite corrosion inhibitor. Visual reference shall be accessible to Independent Testing Laboratory, Manufacturer/Supplier's Representative, and Engineer.
      c) Calibrate dispensing system at initial equipment installation and annually thereafter. Install tamper proof seals after each calibration of system.
      d) Alternative dispensing and monitoring methods may be submitted to the Engineer by the admixture supplier for review and approval.
   2) Concrete plant operator shall perform following:
      a) Verify contents of visual reference (such as a bottle or other approved device) prior to discharge of product for each batch. If visual reference does not indicate specified amount of corrosion inhibitor, concrete plant operator shall stop production and notify corrosion inhibitor Manufacturer/Supplier immediately.

3) Independent Testing Laboratory shall perform following:
   a) Prior to and after each pour, take volume readings of corrosion inhibitor tank, correlate to size of pour, and report results to Engineer, corrosion inhibitor Manufacturer/Supplier, and concrete supplier. Volume used should be within ± 10% of specified amount.
   b) Test plastic corrosion inhibitor concrete for presence of corrosion inhibitor in accordance with test method indicated in Part 3 herein. Test each concrete sample used for concrete compression test cylinders at rate of one test for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one day.
   c) Upon request from Engineer, core and test hardened corrosion inhibitor concrete for corrosion inhibitor content using cores taken following air content testing specified herein under "Air Content Testing" at rate of one test per 15,000 square feet of supported slab. Testing of hardened concrete for Corrosion Inhibitor content will be performed following procedure documented in State of North Carolina Test Procedure #C-20.0, "Determination of Calcium Nitrite in Concrete."
      (1) If concrete consistently meets requirements of Specification and mix design and placement procedures remain unchanged, Engineer may reduce frequency or waive requirements for testing hardened concrete.
      (2) If concrete consistently fails to meet requirements of Specification and mix design and placement procedures remain unchanged, Engineer may require additional testing of hardened concrete for corrosion inhibitor per North Carolina Test Procedure.
      (3) Should additional tested hardened concrete meet these Specifications, Owner will pay for coring, testing, and patching. Should tested concrete not meet these Specifications, Contractor will pay for coring, testing, and patching of hardened concrete.

D. Masonry Construction:
   1. Inspect and verify masonry in accordance with the quality assurance requirements of TMS 402/ACI 530/ASCE 5, TMS 602/ACI 530.1/ASCE 6 and the Contract Documents.
      a. In addition, also inspect and verify:
         1) Anchor rods prior to and during placing of masonry.
         2) Anchors post-installed in hardened masonry.
      b. Verification of masonry compressive strength f'_m shall follow the provisions for the unit strength method.
      c. Comply with Level B special inspection.

E. Soils:
   1. Inspect and verify in accordance with Table 1705.6 of the Building Code and this Specification.
   2. Inspect and verify:
      a. Soil Below Shallow Foundations:
         1) Verify materials and compaction are suitable to support the structures at the design soil bearing value indicated on the Drawings with acceptable anticipated settlement.
      b. Excavations are extended to proper depth and reached proper material.
      c. Classification of structure fill and backfill material.
      d. Classification of utility backfill material.
      e. Use of proper fill and backfill materials, lift thicknesses and compaction.
      f. Prior to placement of fill, subgrade material and preparation, and subgrade compaction.
      g. Minimum Frequency of Soil Compaction Verification:
         1) Within Footprint of Structures:
            a) One test per 2,500 square feet of subgrade for each layer of fill.
            b) One test per 100 feet of utility trench for each layer of fill.
      h. Perform more frequent testing when necessary because of Site conditions and approved by Owner.

F. Sprayed Fire-Resistant Materials:
   1. Inspect for conformance with the Contract Documents and the Manufacturer's requirements.
   2. Base special inspections on samples retrieved from specific floor, roof and wall assemblies (as applicable) after mechanical, plumbing, fire protection, electrical and ceiling suspension rough-ins (as applicable) have been completed.

3. Inspect and verify:
   a. Physical and visual conditions and tests as indicated in the Building ode.
   b. Structural member surface conditions.
   c. Application.
   d. Thickness.
   e. Density.
   f. Bond strength.
   g. Condition of the finished application.

G. Fire-Resistant Penetrations and Joints:
   1. Perform inspections of penetration firestops in accordance with ASTM E2174 to verify the firestop is appropriate for the application and that it has been installed in conformance with its listing.
   2. Perform inspections of fire resistant joint systems in accordance with ASTM E2393 to verify the joint system is appropriate for the application and that it has been installed in conformance with its listing.

END OF SECTION 01 45 34

SECTION 01 45 35 – TESTING SERVICES FOR BURIED UTILITIES, ROADWAYS, AND SITE PROJECTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes testing services as follows:
   1. Testing services which will be contracted and paid for directly by the Owner and performed by an independent testing agency selected by the Owner:
      a. Soil compaction tests.
      b. Verification of soil bearing capacity.
      c. Base and subbase compaction tests.
      d. Pavement compaction tests.
      e. Collecting and transporting soil samples to the independent testing agency's laboratory.
      f. Laboratory soil proctor tests.
      g. Concrete slump and air entrainment tests.
      h. Concrete cylinder compressive strength tests.
      i. Travel expense of the independent testing agency.
      j. Making concrete cylinders.
      k. Transporting cylinders to testing agency's laboratory and performing tests.
   2. Testing services and certifications which will not be contracted and paid for directly by Owner and should be included in the Contractor’s base Bid:
      a. Pipe leakage and pressure tests.
      b. Pipe material tests.
      c. Fill material from onsite and offsite.
      d. Fine and coarse aggregate certification tests.
      e. Bedding material certification tests.
      f. Bituminous pavement materials.
      g. Testing performed for the Contractor's convenience.
   3. Owner Paid Items:
      a. The Owner may elect to inspect or test or to employ either the Engineer or an independent testing agency to test materials on the Project other than those specified herein.
      b. The cost of this testing will be paid for by the Owner.

B. Testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for verification of compliance with Contract Document requirements.

1.3 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
   1. AASHTO: Provisional Standard - TP 23 Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
   2. ASTM Specifications, Tests and Test Methods:
      a. C31 - Making and Curing Concrete Test Specimens in the Field.
      b. C33 - Specification for Concrete Aggregates Including Appendix XI.
      c. C39 - Test for Compressive Strength of Cylindrical Concrete Specimens.
      d. C42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
      e. C138 - Test for Unit Weight, Yield and Air Content of Concrete.
      f. C143 - Test for Slump of Portland Cement Concrete.
      g. C172 - Sampling Fresh Concrete.
      h. C173 - Test for Air Content of Freshly Mixed Concrete by the Volumetric Method.
      i. C192 - Making and Curing Concrete Test Specimens in the Laboratory.

j. C227 - Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
k. C231 - Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
l. C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
m. C295 - Standard Guide for Petrographic Examination of Aggregates for Concrete.
n. C567 - Unit Weight of Structural Lightweight Concrete.
o. C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
p. D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort.
q. D1188 - Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.
r. D1556 - Density of Soil In Place by the Sand-Cone Method.
s. D1557 - Moisture-Density Relations of Soils and Soils Aggregate Mixture Using 10 Pound Rammer and 18-Inch Drop.
t. D1586 - Penetration Test and Split Barrel Sampling of Soils.
u. D1883 - CBR (California Bearing Ratio) of Laboratory Compacted Soils.
v. D2166 - Unconfined Compressive Strength of Cohesive Soil.
w. D2167 - Density of Unit Weight of Soil In Place by the Rubber Balloon Method.
x. D2922 - Density of Soil and Soil Aggregates by Nuclear Methods.
y. D2937 - Density of Soil in Place by Drive Cylinder Method.
z. D2950 - Test Methods for Density of Bituminous Concrete in Place by Nuclear Methods.
aa. D3666 - Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
bb. D3740 - Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.

3. ACI - American Concrete Institute:
   a. 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
   b. 211.1R - Report on Alkali-Aggregate Reactivity.
   c. 301 - Specification for Structural Concrete for Buildings.
   d. 318 - Building Code Requirements for Reinforced Concrete.
4. MDOT Standards: Michigan Cone Test for Determination of Maximum Unit Weight of Granular Soils.

1.4 TEST REQUIREMENTS

A. In accordance with:
   1. Laws and Regulations.
   2. Sections of these Specifications.
   3. Reference procedures and requirements.
   4. Pertinent standards for testing.

B. Testing Agency Qualifications:
   1. Approved by authorities having jurisdiction.
   2. Agency meeting the requirements of ASTM C1077, D3666, and D3740.
   3. Agency whose primary business is materials and construction testing.
   4. Approved by the Engineer or the Owner.
   5. Objective, competent and independent from the Contractor performing the work to be inspected.
   6. Having adequate equipment, periodically calibrated as required, to perform the special inspections.
   7. Employing experienced personnel educated in conducting, supervising and evaluating special inspections similar in complexity to that required for the Project.

1.5 RETESTING COSTS

A. Retesting:
   1. When initial special inspections of items except soil compaction indicate noncompliance with the Contract Documents, subsequent special inspections occasioned by the noncompliance shall be performed by the same special inspection agency, and the costs thereof will not be reimbursed.
   2. Soil Compaction:
      a. The first retesting of soil compaction shall be paid for in accordance with the provisions of the Contract Documents.
      b. The second and subsequent retesting for soil compaction due to noncompliance with the Contract Documents shall be performed by the same special inspection agency, and the costs thereof will not be reimbursed.

1.6 REPORTS

A. Provide the Engineer's field representative and Contractor's superintendent with a draft copy of the daily report prior to leaving the Project Site each day on which testing is performed on the Site.

B. Provide typed copies of testing agency reports, inspections, and certifications within 5 business days to:
   1. The Engineer's Office: One copy.
   2. The Contractor's Office: One copy.

1.7 SCHEDULING TESTING

A. Coordinate and schedule the work of the independent testing agency.
   1. Notify the Engineer and the independent testing agency 48 hours prior to the expected time when testing services will be required.
   2. Provide access to the Work as necessary for the agency to properly perform its functions.

B. Establishing Schedule: By advance discussion with the Engineer and independent testing agency, determine the time required to perform tests and to issue findings.

C. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the independent testing agency as required.

D. Adherence to Schedule: When the independent testing agency is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be paid by the Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TESTING REQUIREMENTS

A. Fine and Coarse Aggregate and Bedding Material:
   1. Sieve test to ensure compliance with the materials specifications.
   2. Provide 1 test for each source of imported materials as directed by the Engineer.

B. Fill Material from Onsite and Offsite Sources: Sieve test to ensure compliance with the materials specifications.

C. Soil Compaction:
   1. Minimum Frequency of Testing:
      a. Within the Building Footprint: See Division 01 Section “Special Inspections and Tests.”
      b. Outside a Building Footprint: One test per 5,000 square feet of subgrade for each layer of fill.
      c. Utility Trenches: One test for every 200 linear feet of trench length at each lift.
      d. Utility Structures: One test under each manhole, vault or other structure.
      e. Curb and Gutter: One test for every 100 linear feet.
      f. Pavement Subgrade, Base Grade:
         1) One test for every 2,500 square feet for road construction.
         2) One test at every driveway or curb cut location.
         3) One test for every 500 square feet for road intersections.
   2. Predominately Granular Soils:
      a. Perform necessary laboratory and field testing required to verify compaction of fill, bedding, trench backfill and structure backfill in accordance with ASTM D1557 or Michigan Cone.
      b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D1557 or Michigan Cone.
   3. Predominately Cohesive Soils:
      a. Perform necessary laboratory and field testing required to verify compaction of fill trench backfill and structure backfill in accordance with ASTM D698.
      b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D698.
   4. Independent testing agency shall inform the Engineer and the Contractor's onsite supervisor immediately of onsite test results.
   5. Place no additional fill in areas where compaction results do not meet Specification requirements.

D. Testing Bituminous Paving:
   1. The testing agency shall provide quality control and testing services that will be monitored by the Engineer’s field representatives continuously during paving.
   2. The testing agency shall take 1 mixture sample per day and 1 test per 1,000 tons of material placed.
      a. This sample shall be taken randomly from the back of the hauling unit.
      b. This sample shall be large enough to provide the Contractor, testing agency, and Engineer with an equal split of the sample.
      c. The testing agency shall test the samples for the following:
         1) 50 blow Marshall bulk specific gravity or a 50 gyration gyratory compactor bulk specific gravity (G_{mb}).
         2) Theoretical Maximum Density (TMD) (AASHTO T209) or maximum specific gravity of paving mixture (no air voids) (G_{mm}).
         3) % Asphalt binder.
         4) Aggregate gradation and % crushed aggregate.
      d. With the above information and the mix design aggregate effective specific gravity, calculate the following:
         1) Mixture air voids.
         2) Mixture voids in the mineral aggregate (VMA) using bulk specific gravity of aggregate (Gsb).
         3) % Asphalt binder.
   3. The results of these tests shall be compared to the approved mix design and must be within the tolerances indicated below or all additional truck loads of non-compliant material shall be removed from the Site.
      a. The material supplier shall then make recommendations to the Engineer of how the mixture will be revised to meet the Specifications.
      b. The results of these tests and the split samples must be presented to the Engineer before mixture production begins the following day.
      c. If the Engineer wishes to test the split samples, they may use the supplier’s laboratory and equipment.
      d. The Engineer reserves the right to work with the supplier and modify the supplier’s mix design to ensure the product meets the Drawings and Specification requirements.
      e. This may include increasing asphalt content and adjusting aggregate gradations within the bituminous mixture composition specification.

Testing/Verification Tolerances			
Parameter	Single test	Average of 2 or more tests	Comments
Air Voids	±1.00%	-1.0%+0.5%	
VMA	±1.20%	±1.20%	
TMD (G_{mm})	±0.019	±0.015	
Asphalt Binder	±0.4%	±0.3%	>0.4% less than JMF may be subject to reduced payment
%Fines/% Asphalt	Max 1.6	Max 1.6	Result must be less than 1.6
#4 sieve	±5.0%	±3.0%	
#30 sieve	±4.0%	±3.0%	
#200 sieve	2.0%	±1.0%	
Crushed Particles	±10%	±10%	>10% less than JMF may be subject to reduced payment

4. The Contractor shall have the testing agency's density technician and a density gage available whenever paving is occurring. This technician and gage shall monitor placement and compaction of asphalt to verify the maximum density possible is being achieved.
5. Density gage readings shall be taken at core locations prior to coring.
6. The testing agency shall take 1 core on each 25,000 square feet of new parking lot.
    a. The percent compaction of these cores shall be calculated using the TMD of the approved mix design (JMF) unless otherwise directed and the results used for determining compliance with this Specification.
    b. The daily average in place density:
        1) Low/medium Volume Roads: 95.0% of the mixture's TMD or greater with a minimum density of 94% of TMD.
        2) Heavy Volume Roads: 94% of the mixtures TMD or greater with a minimum density of 93% TMD.
    c. Areas that are not compacted to the specified daily average will be evaluated by the Engineer and may either be removed or subject to a price reduction.
7. Thickness: In place compacted thickness tested in accordance with ASTM D3549.
8. Surface Smoothness:
    a. Test finished surface of each hot mix asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area, or by measuring depths of bird baths immediately after a rain.
9. Workmanship:
    a. Finished Surfaces, Especially in High Visibility Areas: Smooth, free of cracks, raveling or spalling holes, rake or roller marks and depressions, or bird baths.
    b. Problem Areas Identified: Correct by removing, paving or reheating and re-rolling if possible.
10. Test Reports:
    a. Summarize the results of the bituminous paving using the "Report of Verification/Acceptance Testing & Core Density."
    b. Electronically submit this document to the Project team on a daily basis prior to the placement of any subsequent pavement.

E. Concrete Testing:
1. Point of sampling and the method of securing the Samples:
    a. Determined by the independent testing agency.
    b. In accordance with ASTM C172.
2. Slump Tests:
    a. Perform slump tests in accordance with ASTM C143.
    b. Perform 1 slump test on the Site for each truckload of concrete.
    c. At the Engineer's request, also perform slump tests at batch plant before adding water reducer.
    d. Perform more slump tests if deemed necessary by the Engineer.
3. Perform 1 air-entraining test in accordance with ASTM C231 or C173 for each truckload of concrete.
4. Test the concrete unit weight in accordance with ASTM C138 or C567, as applicable.
5. Test the air content and fresh concrete temperature of each set of concrete cylinders.
6. Concrete Cylinder Testing:

a. In accordance with ASTM C31 and C39.
b. Take concrete cylinder Sample set as follows:
    1) Once for each 150 cubic yards (or fraction thereof) of each class of concrete placed each day, nor less than.
    2) Once for each 2,500 square feet of sidewalk or paving surface area placed each day.
c. Concrete Cylinder Sample Set: Consist of 4 standard 6-inch cylinders.
d. Handle cylinders carefully.
e. Onsite Storage:
    1) Handle cylinders carefully.
    2) 12 hours, minimum, 48 hours maximum.
    3) Store at a temperature range of 60 to 80 degrees F and in a moist environment.
    4) Shield from direct sunlight and radiant heat.
    5) Construct heated or water bath enclosures, as applicable, if conditions require.
    6) Cylinder samples taken to establish adequate strength for form removal earlier than 28 days shall be cured in locations that represent the conditions under which the structural concrete will be cured.
f. Laboratory Curing: For duration of curing after onsite storage.
g. Test 1 of the cylinders at 7 days and 2 cylinders at 28 days. Save 1 cylinder as a spare.
h. Acceptance and evaluation of the concrete shall be based on ACI 301.

END OF SECTION 01 45 35