Position Summary

This summary describes the organization, duties, and requirements of a State of Michigan vacancy. The official position description for this position is available from the HR office for the agency.

Position Code: TRNTCHSSA73R

Civil Service Class and Level: TRANSPORTATION TECHNICIAN-SS

Working Title (What the agency calls the position): Geotechnical Laboratory Staff Specialist

Name and Position Code Description of Direct Supervisor: PEUSE, ERRON J; ENGINEER MANAGER LICENSED-3

Department/Agency: TRANSPORTATION CENTRAL OFFICE

Work Area: Structure Project Division

Work Location/Hours of Work: 8885 Ricks Road, Lansing, MI 48917 / Monday - Friday 7:30 am - 4:00 pm (hours may vary)

General Summary of Function/Purpose of Position: This position is responsible for administering the Michigan Department of Transportation (DOT) central Geotechnical Laboratory Testing Program. This Laboratory provides the sole statewide resource for classification, consolidation, and strength testing of soils, as well as index testing for geosynthetic materials. American Association of State Highway and Transportation Officials (AASHTO) accreditation of the laboratory is required per the Code of Federal Regulations CFR 627.209 (3). This position is responsible for maintaining technician proficiency and testing apparatus to a level necessary for AASHTO accreditation. This program is essential for transportation facility design, construction, and material quality assurance on major transportation infrastructure projects. This position provides vital testing services to region field engineering staff, Construction Division project offices, the Design Division, the Foundation Analysis Engineer, and other bureaus and departments. This position is responsible for technician training, budgeting, developing specifications and test procedures, procurement of equipment, special investigations, and routine administrative duties.

This position requires possession of a valid driver's license to perform various field testing/investigations.

Assigned duties and tasks for each duty.

Duty 1 **Percentage: 30**

Provide Laboratory testing services for classification and acceptance of MDOT standard earthwork materials. These include Embankment; Structure Embankment; Sound Earth; Swamp Backfill; Class I, II, and III granular materials; and non-Frost Heave Textured Materials.

- Test aggregate sources for select structure backfills proposed for use in Mechanically Stabilized Earth Walls (MSEW). This testing is used by construction managers as a basis for payment and/or corrective action decisions.
- Prioritize and schedule work to meet customer deadlines.
- Evaluate samples and specifications to determine proper testing requirements.
- Train and oversee routine soil testing for classification in accordance with the Unified Soil Classification System (USCS). Tests include Mechanical Analysis, Hydrometer Analysis, Liquid Limit, Plastic Limit, Shrinkage Limit, Moisture Content, and Specific Gravity.
- Perform specialized electrochemical and strength testing on soil samples from aggregate sources proposed for Select Backfill. In addition to Mechanical Analysis, specialized soil tests include pH, Chlorides, Sulfates, and Direct Shear.
- Evaluate and interpret test data to determine values for final report.
- Prepare test reports using the geotechnical data management software, BoreDM, and/or vendor specific software.
- Maintain records database for tracking and archive purposes.
- Lead regular sub-unit meetings for open discussion and information.
- Promote efficiency and teamwork.

Duty 2 **Percentage: 25**

Provide specialized testing services to the Foundation Analysis Engineer for statewide geotechnical design and analysis of structure foundations. The strength and consolidation tests necessary require significant experience and judgment. Accuracy is critical as the Foundation Analysis Engineer will rely on these results to predict the behavior of foundation soils under load.

- Perform soil testing in accordance with recognized reference standards on undisturbed soil specimens to measure shear strength, friction angle, and consolidation behavior. Given the critical and specialized nature of this work, this testing is only performed in the central geotechnical laboratory.
- Prioritize and schedule work to meet customer deadlines.
- Examine soil samples to assess continuity, degree of disturbance, and consistency.
- Perform visual classification. Based upon visual classification, consistency, and sample continuity, determine appropriateness of strength, friction, and consolidation test methods and select proper parameters within specified ranges for each selected standard test method.
- Perform test procedures in strict accordance with referenced test standards.
- Examine tested specimen to assess failure characteristics and assess need for retesting.
- Using manual methods, BoreDM, and vendor specific software, plot and interpret test data to determine soil strength and consolidation values (Unconfined Compression Shear Strength, friction angle, Coefficient of Consolidation, Compression Index) and ensure validity of test results.
- Perform erosion testing on cohesive soils for scour calculations..
- Prepare test reports using BoreDM.
- Maintain records database for tracking and archive purposes.

Duty 3 **Percentage: 25**

Provide index testing of Geosynthetic products for Certification/Verification (CV) or acceptance. Products include geotextile blankets, liners, separators, stabilization fabrics, high strength geotextiles, wick drains, geogrids, and Prefabricated Drainage Systems (PDS). Index testing is used to assess a materials suitability for pertinent functions such as Separation, Filtration, Drainage-Transmission, Reinforcement, Fluid Barrier, etc.

- Prioritize and schedule work to meet customer deadlines.
- Evaluate samples and specifications to determine proper testing requirements.
- Train technicians and oversee routine geosynthetic testing such as Grab and Trapezoidal Tear Strength, Puncture and Mullen Burst strength, Apparent Opening Size (AOS), and Permittivity.
- Setup specialized apparatus and perform wide-width strength tests on high strength fabrics and geogrids used for critical reinforcement applications.
- Evaluate and interpret test data to determine values for final report.
- Prepare test reports using vendor specific software.
- Maintain records database for tracking and archive purposes.

Duty 4 **Percentage: 20**

Conduct program administrative functions necessary to maintain AASHTO accreditation and fulfill Geotechnical Laboratory Testing Program responsibilities.

This duty requires possession of a valid driver’s license to perform various field testing/investigations.

- Train permanent personnel to fulfill program responsibilities.
- Participate with Geotechnical engineers in the development of new test procedures and equipment and in the preparation of subsoil analyses, including plotting of boring logs using BoreDM.
- Prepare operation manuals for newly established test methods and new equipment.
- Oversee calibration and maintenance of equipment.
- Maintain laboratory safety records and material safety data sheets.
- Perform routine quality assurance documentation for BoreDM.
- Perform routine soils testing quality assurance exercises in conjunction with AASHTO resource (formerly AMRL).
- Assist Geotechnical engineering staff in implementation of special field investigations such as pile load tests, vane shear tests, inclinometer installations, settlement monitors, etc. Participate in development, assembly, and installation of instruments, methods, and equipment. Collect and record data as necessary. Analyze and validate data as necessary. Input or download data to specialized geotechnical computer software systems. Process data for analysis by geotechnical engineers.
- Provide testing services to the Environmental Section in the Bureau of Development for environmental remediation projects.
- Provide testing services as requested for various bureaus and other departments (e.g. Aeronautics, Department of Natural Resources (DNR), Department of Environment, Great Lakes, and Energy (DEGLE)) for soil, aggregate, and geosynthetic materials for testing.
- Provide expert technical assistance to customers, as requested.
- Provide testing services to the Design Division for wetland mitigation studies, design of structures for scour prevention, and for evaluating erosion control materials.

Types of decisions made independently and whom or what those decisions affect: Prioritize work schedule to meet customer needs - affects project deadlines department wide.

Select appropriate tests necessary to determine specification conformance of soils, aggregates, and geosynthetics - affects engineering design decisions and acceptance of materials on statewide department projects.

Formulate test regimen for strength, consolidation, and friction angle; select test parameters; interpret and ensure validity of test results and determine design shear strength envelope based upon correlation of test results and soil layers from boring logs - affects safety of statewide structure foundations and the safety of the motoring public.

Whenever possible, identify, recommend, and implement improvements in the work methods and materials.

Types of decisions that require the supervisor's review: Modifications to standard test methods when necessary.

Physical effort used to perform this job and environmental conditions of this position: The job duties require the ability to remain in an upright position for extended periods of time while reaching for various items, as well as working in confined spaces, traversing uneven terrain, utilizing ladders ; working under stressful conditions; and transport heavy objects up to 50 pounds, including soil materials and heavy equipment for testing. Extended hours, nights, or altered shift hours with little notice may occur. This position may be exposed to inclement weather, noise, dirt, heavy laboratory equipment, highway construction activity, and traffic. This position may require safely and properly using hazardous chemicals and working in presence of low-level radiation from density gauges on a year-round basis. This position may require availability outside normal working hours based on operational needs.

Names and classes and levels of employees whom this position immediately supervises:

Essential functions of this position: This position is responsible for administering the Michigan Department of Transportation (DOT) central Geotechnical Laboratory Testing Program. This Laboratory provides the sole statewide resource for classification, consolidation, and strength testing of soils, as well as index testing for geosynthetic materials. American Association of State Highway and Transportation Officials (AASHTO) accreditation of the laboratory is required per the Code of Federal Regulations CFR 627.209 (3). This position is responsible for maintaining technician proficiency and testing apparatus to a level necessary for AASHTO accreditation. This program is essential for transportation facility design,

construction, and material quality assurance on major transportation infrastructure projects. This position provides vital testing services to region field engineering staff, Construction Division project offices, the Design Division, the Foundation Analysis Engineer, and other bureaus and departments. This position is responsible for technician training, budgeting, developing specifications and test procedures, procurement of equipment, special investigations, and routine administrative duties.

Function of the work area: The AASHTO accredited central Geotechnical Laboratory is a subunit of the Geotechnical Services Section. In a controlled environment, specialized tests are performed to measure the engineering behavior of soils, aggregates, and geotextiles. This position is responsible for administration of all testing functions that are conducted solely by the central office laboratory. Responsibilities include specialized laboratory testing of strength and compressibility characteristics of soils to be used for geotechnical engineering analysis and design, providing laboratory testing services to customers department-wide for material acceptance or Certification/Verification, reporting and maintaining records of all testing operations, and providing expert technical assistance to all customers, as necessary.

Education, experience, and credentials typically needed to perform the position's essential functions [Equivalent combinations of education and experience can also be evaluated on an individual basis for applications providing sufficiently detailed descriptions of the other experience.]:

EDUCATION:
Possession of an Associate’s degree in concrete technology, civil technology, construction technology, surveying technology, construction management, mathematics, or computer science.

EXPERIENCE:

Transportation Technician 12
Four years of experience equivalent to a Transportation Technician, including two years equivalent to a Transportation Technician E10 or one year equivalent to a Transportation Technician 11.

Alternate Education and Experience

Transportation Technician 8 - 12
Possession of a Bachelor’s degree or higher in an Applied Science or Science with 16 semester hours (24 term) credits in job specific or related course work qualifies for the Transportation Technician E10 level.

OR

Completion of 60 semester (90 term) credits including 24 semester (36 term) credits in any combination of course work in the following areas: structures, materials, soils, hydrology, surveying, design, drafting, bituminous, concrete, aggregate, chemistry, physics, geology, environmental science, computer science, highway or traffic technology, construction management, engineering, or mathematics may be substituted for the associate's degree.

OR

Four years of technician level experience consisting of quality control inspections, drafting, materials and testing, surveying, or traffic may be substituted for the Associate's degree.

OR

Current certification in bituminous (hot mix), concrete, density testing, or aggregate gradation and one year of technician level field experience may be substituted for the associate's degree.

OR

Current certification in bituminous (hot mix), concrete, density testing, or aggregate gradation and three years experience equivalent to a Transportation Maintenance Worker 9 may be substituted for the associate's degree.

OR

Current certification in bituminous (hot mix), concrete, density testing, or aggregate gradation and two years experience equivalent to an Engineering Assistant may be substituted for the associate's degree.

OR

Current certification in bituminous (hot mix), concrete, density testing, or aggregate gradation and completion of 16 semester (24 term) credits in any combination of course work in the following areas: structures, materials, soils, hydrology, surveying, design, drafting, bituminous, concrete, aggregate, chemistry, physics, geology, environmental science, computer science, highway or traffic technology, construction management, engineering, or mathematics may be substituted for the Associate's

degree.

KNOWLEDGE, SKILLS, AND ABILITIES:

Knowledge of:

- Subsurface investigation techniques.
- Specification requirements for highway construction materials.
- Algebra, geometry, and the ability to graph and chart data.

Ability to:

- Organize and coordinate work activities, determine work priorities, and assign work to employees.
- Use computerized spreadsheets and database programs.
- Communicate effectively.
- Use sophisticated testing apparatus.
- Adapt to new technology and methods to increase program effectiveness.
- Maintain records and prepare reports.

CERTIFICATES, LICENSES, REGISTRATIONS:
Possession of a valid driver's license is required and must maintain throughout employment in the position.

Possession of the MDOT Density Certification within 12 months of the date of hire into the position and must maintain throughout employment in the position.