DEXTER COMMUNITY SCHOOLS

2022 SITEWORK PROJECTS
BID PACKAGE #1

SPECIFICATIONS
for
BIDS

Documents Issued for Bids:
February 11, 2022

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SECTION 00 0110 - TABLE OF CONTENTS

END OF SECTION 00 0110

SECTION 00 0115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Cover page of the separately bound drawing set titled DEXTER COMMUNITY SCHOOLS – 2022 SITEWORK PROJECTS, issued for BID PACKAGE #1 – BIDS, and dated FEBRUARY 11, 2022 (02.11.2022), as modified by subsequent Addenda and Contract modifications.

END OF SECTION 00 0115

SECTION 00 3119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

A. This Section with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for the Contractor's convenience and are intended to supplement rather than serve in lieu of the Contractor's own investigations. They are made available for Contractor's convenience and information, but are not a warranty of existing conditions.

B. Existing Condition drawings contained in the project drawings are based on aerial photography and design drawings for previous construction at the Project sites. The Architect and the Owner make no warranty of their completeness or accuracy related to the current as-built condition. Contractor shall conduct pre-construction investigations it deems necessary to avoid damage to existing improvements, including below-grade utilities that may be inaccurate or not represented on the Existing Conditions drawings. Repair of existing improvement damage resulting from the Contractor's operations shall be at the Contractor's expense.

C. Limited as-built information is available for Project site utilities and other site improvements. Upon request, the Owner will provide the successful Bidder with all available information for the Contractor's convenience. The Owner makes no warranty for completeness or accuracy of the as-built information. Contractor shall conduct pre-construction investigations it deems necessary to avoid damage to existing improvements, including below-grade utilities that may be inaccurate or not represented on the Existing Conditions drawings. Repair of existing improvement damage resulting from the Contractor's operations shall be at the Contractor's expense.

D. Contractor shall utilize MISS DIG and RESA Power locating services to validate and supplement available existing conditions information.

END OF SECTION 00 3119

SECTION 00 3132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

C. A geotechnical investigation report for Project, prepared by G2 Consulting Group, dated February 8, 2022, is available for viewing as appended to this Document.
   1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
   2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

END OF DOCUMENT 00 3132

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. RFIs.
   3. Digital project management procedures.
   4. Project meetings.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.

6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
   1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date.
   4. Name of Contractor.
   5. RFI number, numbered sequentially.
   6. RFI subject.
   7. Specification Section number and title and related paragraphs, as appropriate.
   8. Drawing number and detail references, as appropriate.
   9. Field dimensions and conditions, as appropriate.
   10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   11. Contractor's signature.
   12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
   1. The following Contractor-generated RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Requests for coordination information already indicated in the Contract Documents.
      e. Requests for adjustments in the Contract Time or the Contract Sum.
      f. Requests for interpretation of Architect's actions on submittals.
      g. Incomplete RFIs or inaccurately prepared RFIs.
   2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architectof additional information.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were returned without action or withdrawn.

5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
   1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Responsibilities and personnel assignments.
      b. Tentative construction schedule.
      c. Phasing.
      d. Critical work sequencing and long lead items.
      e. Designation of key personnel and their duties.
      f. Lines of communications.
      g. Use of web-based Project software.
      h. Procedures for processing field decisions and Change Orders.
      i. Procedures for RFIs.
      j. Procedures for testing and inspecting.
      k. Procedures for processing Applications for Payment.
      l. Distribution of the Contract Documents.
      m. Submittal procedures.
      n. Preparation of Record Documents.
      o. Use of the premises.
      p. Work restrictions.
      q. Working hours.
      r. Owner's occupancy requirements.
      s. Responsibility for temporary facilities and controls.
      t. Procedures for moisture and mold control.
      u. Procedures for disruptions and shutdowns.
      v. Construction waste management and recycling.
      w. Parking availability.
      x. Office, work, and storage areas.
      y. Equipment deliveries and priorities.
      z. First aid.
      aa. Security.
      bb. Progress cleaning.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at biweekly intervals.
   1. Coordinate dates of meetings with preparation of payment requests.
   2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in

planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      1) Review schedule for next period.
   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.
      2) Sequence of operations.
      3) Status of submittals.
      4) Access.
      5) Site use.
      6) Temporary facilities and controls.
      7) Progress cleaning.
      8) Quality and work standards.
      9) Status of correction of deficient items.
      10) Field observations.
      11) Status of RFIs.
      12) Status of Proposal Requests.
      13) Pending changes.
      14) Status of Change Orders.
      15) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:
1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Other necessary identification.
14. Remarks.
15. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include

relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
   3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Resubmittal Review: Allow 7 days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's catalog cuts.
      b. Manufacturer's product specifications.
      c. Standard color charts.
      d. Statement of compliance with specified referenced standards.
      e. Testing by recognized testing agency.
      f. Application of testing agency labels and seals.

g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams that show factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products.
      b. Schedules.
      c. Compliance with specified standards.
      d. Notation of coordination requirements.
      e. Notation of dimensions established by field measurement.
      f. Relationship and attachment to adjoining construction clearly indicated.
      g. Seal and signature of professional engineer if specified.

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

D. Certificates:
   1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
   2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
   3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
   4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
   5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
   6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

E. Test and Research Reports:
   1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
   2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
   3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
    1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
    1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3300

SECTION 12 6313 - STADIUM AND ARENA BENCH SEATING

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. Section includes fixed, continuous bench-type metal seating and elevated viewing platforms.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of components, and finishes for seating.

B. Shop Drawings: For bench seating.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Seating Layout: Show seating layout, aisle widths, aisle-end alignment or stepping, accessible feature details, and row-lettering scheme.
   3. Structural calculations and certification by licensed engineer registered in the State of Michigan.

C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
   1. Aluminum Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
   2. Exposed Fasteners: Full-size units of each type.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Product Certificates: For each type of bench seating.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For bench seating to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of bench seating that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including bench seating and attached components.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Periods: Five years for entire bleacher systemfrom date of Substantial Completion. Twenty-five years for aluminum planking against loss of structural strength or failure of clear anodized finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of bench seating required, including accessories and mounting components, from single source from single manufacturer.

B. Bleacher system shall be manufactured by Southern Bleachers, or approved equal.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Bench seating shall withstand the effects of gravity and other loads within limits and under conditions indicated.
   1. Vertical Live Load: 120 lb/ft., minimum.
   2. Horizontal Sway Loads: 24 lb/ft. parallel to bench and 10 lb/ft. perpendicular to bench, minimum.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

C. Regulatory Requirements: Bleacher system and installation shall comply with all local, State, and Federal regulations, ordinances, and established codes including:
   1. NFPA97, Current BOCA, SBCC, ANSI, ASTM.
   2. State, Federal and Local Building and Fire Codes.
   3. Federal and State ADA requirements.

2.3 BENCH SEATING

A. Description: Plank-type seating in permanent arrangement as indicated on Drawings.
   1. Basis of Design Product: Southern Bleacher (800-433-0912) Silver Edition non-elevated angle frame bleachers configured as follows:
      a. 135' long x ten (10) rows configured as indicated on drawings
      b. Approximate 720 seat capacity (18" seats) with eight (8) barrier free spaces
      c. Welded galvanized steel angle frames
      d. Semi-closed decking system
      e. Clear anodized aluminum seat boards and risers
      f. Mill finish aluminum foot planks

B. Framework: Welded hot-dip galvanized steel as designed by manufacturer for specified loading. No aluminum framework structure will be accepted.

C. Tread Planks: Horizontal, continuous plank components on which spectators walk.

1. Material: One-piece fluted aluminum extrusion, approximately 11 inches wide by 2 inches thick, minimum 0.094" wall thickness.
2. Finish: Mill finish.
3. End-Cap Finish: Mill finish.

D. Seat Planks: Horizontal, continuous bench components on which spectators sit.
1. Material: One-piece fluted aluminum extrusion, approximately 10 inches wide by 2 inches thick, minimum 0.094" wall thickness.
2. Finish: Clear anodic finish.
3. End-Cap Finish: Clear anodic finish.

E. Seat-Plank Support Brackets: Manufacturer's standard one-piece, welded-aluminum or welded-steel brackets that support and raise the seating off the supporting substrate, as indicated on Drawings.

F. Accessories:
1. Channel End Caps: Aluminum 6063 T-6, clear anodized 204R1, AA10C22A31, Class II.
2. Hardware: Bolts and nuts hot-dipped galvanized, hold down clip assembly aluminum 6061 – T6.
3. Guardrails: Anodized aluminum tube 1 5/8" O.D. with black PVC coated chain link fence.
4. Crossbraces: Angles to be center bolted for added rigidity.
5. Aisle Nose: Aluminum 6063-T6, black powder coat finish.
6. Aisle Rails: Aisle to be 4' – 6" wide with 34" handrail and intermediate rail at approximately 22" above the tread. Handrails with rounded ends are discontinuous to allow access to seating through a 24" wide space. Aluminum tread nosing of contrasting color on aisle steps.

2.4 ELEVATED VIEWING PLATFORMS

A. Description: Plank-type viewing platform and access ramps in permanent arrangement as indicated on Drawings.
1. Basis of Design Product: Southern Bleacher (800-433-0912) Silver Edition elevated angle frame viewing platform configured as follows:
a. 12' x 30' elevated platform configured as indicated on drawings
b. Platform elevated height: 36" above ground level
c. Access ramps and level landings configured as indicated on drawings
d. Welded galvanized steel angle frames
e. Semi-closed decking system
f. Mill finish aluminum foot planks

B. Framework: Welded hot-dip galvanized steel as designed by manufacturer for specified loading. No aluminum framework structure will be accepted.

C. Tread Planks: Horizontal, continuous plank components on which spectators walk.
1. Material: One-piece fluted aluminum extrusion, approximately 11 inches wide by 2 inches thick, minimum 0.094" wall thickness.
2. Finish: Mill finish.
3. End-Cap Finish: Mill finish.

D. Accessories:
1. Channel End Caps: Aluminum 6063 T-6, clear anodized 204R1, AA10C22A31, Class II.
2. Hardware: Bolts and nuts hot-dipped galvanized, hold down clip assembly aluminum 6061 – T6.
3. Guardrails: Anodized aluminum tube 1 5/8" O.D. with black PVC coated chain link fence.
4. Crossbraces: Angles to be center bolted for added rigidity.
5. Ramp Rails: 34" handrail and intermediate rail at approximately 22" above the ramp.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.

B. Steel: Hot-dip galvanized after fabrication.

C. Fasteners: Aluminum, hot-dip galvanized steel, or stainless steel. Use fasteners of the same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal joined.
   1. Use concealed fasteners for interconnecting metal components and for attaching them to other work unless exposed fasteners are unavoidable.
   2. For exposed fasteners, use tamper-resistant screws of head profile flush with metal surface unless otherwise indicated.
   3. Finish heads of exposed fasteners to match finish of metal fastened unless otherwise indicated.
   4. Do not use power-actuated fasteners for concrete substrates.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.8 FABRICATION

A. Seat-Plank Assembly: Assemble seat plank sections end to end to form continuous benches of lengths indicated on Drawings. Provide tightly fitting aluminum end caps, interior joint sleeves at splices, and welded mounting plates for attaching support brackets.

B. Shop-Fabricated Connections: Welded according to AWS standards by AWS-certified welders.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pavement, risers, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install seating in locations indicated and fasten to substrates according to manufacturer's written installation instructions unless otherwise indicated.

B. Install seating level, with uniform bench height above walking surface, and without sharp edges.

C. Attach end caps tightly abutting ends of seat planks, with exposed end-cap contour aligned with contour of seat planks.

D. Space and attach seat-plank support brackets only to substrate concrete or structural components of metal substrates.

E. Install accessories in visual alignment.

3.3 ADJUSTING

A. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.

B. Replace damaged and malfunctioning components that cannot be acceptably repaired.

END OF SECTION 12 6313

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Protecting existing vegetation to remain.
   2. Removing above- and below-grade site improvements.
   3. Temporary erosion and sedimentation control.

1.2 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where directed by Owner. Refer to plans for irrigation components to be salvaged to Owner.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 01 5639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction.

3.4 EXISTING UTILITIES

A. Locate, identify, and protect all site utilities.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 150 mm in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Sawcut existing pavements at removal limits, or further as required for stable edge condition matching existing jointing. Protect sawcut edges after removals or, if damaged, provide new sawcut immediately prior to installation of new work.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31 1000

SECTION 31 2000 - EARTH MOVING

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. Section Includes:
   1. Excavating and backfilling.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
   1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
   3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

D. Fill: Soil materials used to raise existing grades.

E. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
   1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom; measured according to SAE J-1179.
   2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

G. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
   1. Classification according to ASTM D 2487.
   2. Laboratory compaction curve according to ASTM D 1557.

B. Shop Drawings: Location and dimensions of Contractor's proposed bore pits.

C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify "Miss Dig" for area where Project is located before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 31 1000 "Site Clearing," are in place.

D. Do not commence earth moving operations until plant-protection measures specified in Section 01 5639 "Temporary Tree and Plant Protection" are in place.

E. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or other digging unless otherwise indicated.
   7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Engineered Fill: MDOT Class II granular material

E. Bituminous Pavement Sub-base: MDOT Class II granular material

F. Bituminous Pavement Base: MDOT 21AA Limestone

G. Concrete Pavement Base: MDOT 21AA Limestone

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

   1. Survivability: Class 2; AASHTO M 288.
   2. Survivability: As follows:

      a. Grab Tensile Strength: 157 lbf; ASTM D 4632.
      b. Sewn Seam Strength: 142 lbf; ASTM D 4632.
      c. Tear Strength: 56 lbf; ASTM D 4533.
      d. Puncture Strength: 56 lbf; ASTM D 4833.

   3. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
   4. Permittivity: 0.5 per second, minimum; ASTM D 4491.
   5. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

   1. Survivability: Class 2; AASHTO M 288.
   2. Survivability: As follows:

      a. Grab Tensile Strength: 247 lbf; ASTM D 4632.
      b. Sewn Seam Strength: 222 lbf; ASTM D 4632.
      c. Tear Strength: 90 lbf; ASTM D 4533.
      d. Puncture Strength: 90 lbf; ASTM D 4833.

3. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
4. Permittivity: 0.02 per second, minimum; ASTM D 4491.
5. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

C. Geogrid Reinforcement: Triaxial geogrid, Tensar TX8 or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Groundwater and surface water which is free of contamination and sediment may be discharged to a storm drain. Drains must be protected from sediment by using filter fabric or silt sacks. However, if field indicators indicate possible contamination the water cannot be discharged. Note: suspect contaminated groundwater may exhibit chemical or unusual odors, unusual coloring, sheen, and/or contain man-made debris.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction.

B. Suspect Contaminated Soil, Groundwater, or other Unknown Material:
1. During work activities if suspect contaminated soil, groundwater, or other unknown material is encountered contact the Owner immediately. Suspect contaminated soil may exhibit chemical or unusual odors, staining, unusual coloring, and/or contain man-made

debris. Suspect contaminated groundwater may exhibit chemical or unusual odors, unusual coloring, and/or sheen.

2. Immediately cease all excavation, dewatering, transport, or disturbance of the suspect material until given direction by the Owner.

3.5 BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Backfill voids with satisfactory soil while removing shoring and bracing.

C. Place and compact backfill of subbase material, free of particles larger than 1 inch in any dimension, in maximum 4-inch lifts.

D. Place and compact final backfill of 6-inch topsoil lift to final subgrade elevation.

3.6 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.7 COMPACTION OF BACKFILLS

A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under paved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

D. Compact base materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under paved areas, compact each layer of base material in maximum 6-inch lefts at 98 percent.

3.8 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

3.9 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
   1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
   2. Determine that fill material and maximum lift thickness comply with requirements.
   3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.10 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including topsoil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 2000

SECTION 32 1216 - ASPHALT PAVING

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. Section Includes:
1. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.

B. Related Requirements:
1. Section 31 1000 "Site Clearing" for demolition and removal of existing asphalt pavement.
2. Section 31 2000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
3. Section 32 1373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
3. Job-Mix Designs: For each job mix proposed for the Work.

B. Samples for Verification: For the following product, in manufacturer's standard sizes unless otherwise indicated:
1. Paving Fabric: 12 by 12 inches minimum.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.

B. Material Certificates: For each paving material.

C. Material Test Reports: For each paving material, by a qualified testing agency.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by MDOT.

B. Testing Agency Qualifications: Qualified according to ASTM D3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of MDOT for asphalt paving work.
   1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
   1. Tack Coat: Minimum surface temperature of 60 deg F.
   2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
   3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
   1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D242/D242M, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: ASTM D6373 binder designation PG 64-22.

B. Tack Coat: ASTM D977 emulsified asphalt, or ASTM D2397/D2397M cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

C. Water: Potable.

D. Undersealing Asphalt: ASTM D3141/D3141M; pumping consistency.

2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material.

B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

C. Sand: ASTM D1073, Grade No. 2 or No. 3.

D. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

E. Joint Sealant: ASTM D6690, Type IV, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

A. Recycled Asphalt Content:
   1. Surface Course Limit: Recycled content no more than 17 percent by weight.

B. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by MDOT and complying with the following requirements:
   1. Base Course: MDOT 4EML.
   2. Leveling Course: MDOT 4EML
   3. Surface Course: MDOT 5EML

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
   1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
   3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.3 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
   1. Mill to a depth as indicated on the drawings.
   2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
   3. Control rate of milling to prevent tearing of existing asphalt course.
   4. Repair or replace curbs, driveway aprons, manholes, and other construction damaged during cold milling.
   5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
   6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
   7. Handle milled asphalt material according to approved waste management plan required in Section 01 7419 "Construction Waste Management and Disposal."
   8. Keep milled pavement surface free of loose material and dust.
   9. Do not allow milled materials to accumulate on-site.

3.4 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.
   1. Undersealing: Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
   2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd..
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.5 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
   1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth as indicated on the drawings.
   1. Clean cracks and joints in existing hot-mix asphalt pavement.
   2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
   3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.6 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
   1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Cutback Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

D. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

E. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.7 PAVING GEOTEXTILE INSTALLATION

A. Apply tack coat uniformly to existing pavement surfaces at a rate of 0.20 to 0.30 gal./sq. yd..

B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches.

C. Protect paving geotextile from traffic and other damage, and place hot-mix asphalt overlay the same day.

3.8 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
   1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
   2. Place hot-mix asphalt surface course in single lift.
   3. Spread mix at a minimum temperature of 250 deg F.
   4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
   5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
   2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.9 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
   3. Offset transverse joints, in successive courses, a minimum of 24 inches.
   4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
   5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
   6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.10 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
   1. Average Density: 96 percent of reference laboratory density according to ASTM D6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.
   2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D2041/D2041M, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.11 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
   1. Base and Leveling Course: Plus or minus 1/2 inch.
   2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
   1. Base and Leveling Course: 1/4 inch.
   2. Surface Course: 1/8 inch.
   3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

C. Asphalt Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch of height indicated above pavement surface.

3.12 SURFACE TREATMENTS

A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.

B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D3910 and allow to cure.
   1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D3549/D3549M.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D979/D979M or AASHTO T 168.
   1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041/D2041M, and compacted according to job-mix specifications.
   2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D1188 or ASTM D2726/D2726M.
      a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
      b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726/D2726M.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.14 WASTE HANDLING

A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 01 7419 "Construction Waste Management and Disposal."

END OF SECTION 32 1216

SECTION 32 1313 - CONCRETE PAVING

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. Section Includes:
   1. Concrete sidewalks and pavements.

B. Related Sections:
   1. Section 32 1373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: As required in project documents.

C. Other Action Submittals:
   1. Design Mixtures: For each concrete paving and curb mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer.

B. Material Certificates: For the following, from manufacturer:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Fiber reinforcement.
   4. Admixtures.
   5. Curing compounds.
   6. Applied finish materials.
   7. Bonding agent or epoxy adhesive.
   8. Joint fillers.

C. Shop Drawings: For layout and cutting of Detectable Warning Tiles at each sidewalk ramp.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. ACI Publications: Comply with ACI 301unless otherwise indicated.

1.7 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
   1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from galvanized-steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.

E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

F. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.

G. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.

H. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.

I. Plain-Steel Wire: ASTM A 82/A 82M, galvanized.

J. Deformed-Steel Wire: ASTM A 496/A 496M.

K. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, deformed.

L. Dowel Placement System: Speed Dowel by Sika Greenstreak, or approved equal.

M. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.

N. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain-steel bars.

O. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

P. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

Q. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

R. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

S. Zinc Repair Material: ASTM A 780.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
1. Portland Cement: ASTM C 150, gray portland cement Type I/II. Mix designs may be supplemented with the following subject to Architect's review and approval:
   a. Fly Ash: ASTM C 618, Class C or Class F.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
2. Blended Hydraulic Cement: ASTM C 595, Type IP, portland-pozzolan cement.

B. Normal-Weight Aggregates: ASTM C 33, , uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.4 FIBER REINFORCEMENT

A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Monofilament Fibers:
         1) Axim Italcementi Group, Inc.; FIBRASOL II P.
         2) Euclid Chemical Company (The), an RPM company; Fiberstrand 100, Fiberstrand 150.
         3) Grace, W. R. & Co. - Conn.; Grace MicroFiber.
         4) Metalcrete Industries; Polystrand 1000.
         5) QC Construction Products; QC FIBERS.

2.5 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. Curing compound product to be compatible with mortar setting bed for bluestone and be documented to no inhibit mortar bond to concrete.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
   2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:
   1. Compressive Strength (28 Days): 4000 psi
   2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
   3. Slump Limit: 4 inches plus or minus 1 inch

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
   1. Air Content: 6 percent plus or minus 1.0 percent for 1-inch nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Limit percentage by weight of cementitious materials other than portland cement according to ACI 301requirements as follows:

1. Fly Ash or Pozzolan: 25 percent.
2. Ground Granulated Blast-Furnace Slag: 50 percent.
3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

G. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Test subgrades and subbase for specified compaction.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Reinforcement shall be held in place by chairs, spacers, or other devices commercially manufactured specifically for that purpose. Bricks, blocks, rocks, or use of other construction debris will not be accepted. Hooking or pulling reinforcement into place will not be allowed.

E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

3.5 JOINTS

A. General: Form expansion, isolation, and control joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
   1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Expansion Joints: Set expansion joints at locations indicated on plans.
   1. Locate expansion joints as indicated on the drawings.
   2. Install dowel bars and support assemblies at joints where indicated. Use speed dowel assemblies to prevent concrete bonding to one side of joint.
   3. Extend joint fillers full width and depth of joint.
   4. Terminate joint filler at height indicated on plans to allow for installation of bluestone and joint sealant. Protect exposed joint filler until installation of mortar setting bed and bluestone.
   5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
   1. Locate expansion joints as indicated on the drawings.
   2. Extend joint fillers full width and depth of joint.
   3. Terminate joint filler at height indicated on plans to allow for installation of bluestone and joint sealant. Protect exposed joint filler until installation of mortar setting bed and bluestone.
   4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

D. Control Joints: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
   1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/8-inch radius. Repeat grooving of control joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
   1. When air temperature has fallen to or is expected to fall below 40 deg F uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg Fand not more than 80 deg F at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

K. Hot-Weather Placement: Comply with ACI 301and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by curing compound as follows:
   1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 CONCRETE WASHOUT

A. Do not discharge concrete washout into storm drains, catch basins or to the sanitary sewer system. Perform washing of concrete trucks in designated areas or an approved offsite location.
   1. Designated areas should be clearly labeled. They should be in a pit to prevent run-off of waste water. Place designated areas a minimum of 50 feet from storm drains, bodies of water and ditches. All designated areas should be lined to prevent seepage and should have a barrier.
   2. Alternative to a designated area: Provide a concrete box. If only a small amount of concrete washing is to occur, one option is to line a roll-off box. For very small projects this could be done with a drum.

B. Once concrete washout has hardened, break up and dispose of properly. Disposal of hardened concrete should occur on a regular basis.

C. Washout facilities must be cleaned, or new facilities provided once the washout area is 75% full.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each ready mix load or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.12 WASTE MANAGEMENT

A. Separate and recycle waste materials, packaging, and all other materials in accordance with the Waste Management Plan and to the maximum extent possible, send to reuse or recycle centers.

B. Concrete Washout:
   1. Do not discharge concrete washout into storm drains, catch basins or to the sanitary sewer system. Perform washing of concrete trucks in designated areas or offsite.
      a. Designated areas should be clearly labeled. They should be in a pit to prevent run-off of waste water. Place designated areas a minimum of 50 feet from storm drains, bodies of water and ditches. All designated areas should be lined to prevent seepage and should have a barrier.
      b. Alternative to a designated area: Provide a concrete box. If only a small amount of concrete washing is to occur, one option is to line a roll-off box. For very small projects this could be done with a drum.
   2. Once concrete washout has hardened, break up and dispose of properly. Disposal of hardened concrete should occur on a regular basis.

C. Washout facilities must be cleaned, or new facilities provided once the washout area is 75% full.

END OF SECTION 32 1313

SECTION 32 1373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to areas outside building footprint and includes:
   1. Cold-applied joint sealants.
   2. Hot-applied joint sealants.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers samples of materials that will contact or affect joint sealants. Use ASTM C 1087 manufacturer's standard test method to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each kind and color of joint sealant required.

C. Pavement-Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

D. Product certificates.

E. Product test reports.

F. Preconstruction compatibility and adhesion test reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021.

B. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: To match color of new concrete and as selected by Architect from manufacturer's full range.

2.2 COLD-APPLIED JOINT SEALANTS

A. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant for Concrete: ASTM C 920, Type M, Grade P, Class 25, for Use T.

2.3 JOINT-SEALANT BACKER MATERIALS

A. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

2.4 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Cleaning of Joints: Clean out joints immediately before installing joint sealants.

C. Protection: Protect bluestone and other adjacent materials to prevent sealant spills, drips, strings, or other surface blemishes.

D. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

E. Install joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of joint-sealant backings.
   2. Do not stretch, twist, puncture, or tear joint-sealant backings.
   3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

F. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place joint sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
   1. Remove excess joint sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

H. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

I. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 32 1373

SECTION 32 1723 - PAVEMENT MARKINGS

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. Section includes painted markings applied to asphalt pavement.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include technical data and tested physical and performance properties.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design".

2.2 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than three minutes.
   1. Color: Match existing. Contractor to document prior to demolition.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Document existing pavement markings prior to project demolition. Record layout, dimensions, color, graphic symbols, lettering, and other information required to restore existing markings following paving operations.

B. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

C. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
   1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to pavement. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 32 1723

SECTION 32 3110 – POST AND CHAIN FENCES

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. Section Includes:
   1. Post and chain fences.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Post and chain fence assemblies.

B. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:
   1. Full post and chain assembly, including hot dip galvanizing.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify layout information for post and chain fences shown on Drawings in relation to curb and accessible ramp landings. Verify dimensions by field measurements.

1.5 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and post and chain fences that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to comply with performance requirements.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      c. Failure of welded connections or fasteners.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FENCE FRAMEWORK

A. Posts: Provide members with minimum dimensions and wall thickness according to ASTM F1043 or ASTM F1083 based on the following:
   1. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40. 2 inches nominal pipe size (2.375 inches actual OD).
   2. Metallic Coating for Steel Framework:
      a. Hot-dip galvanize post assemblies, including hardware, after fabrication.
      b. Comply with ASTM A123/A123M for hot-dip galvanized railings.
      c. Comply with ASTM A153/A153M for hot-dip galvanized hardware.

d. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
e. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

2.2 FITTINGS

A. Chains: Provide welded link chain with minimum dimensions according to ASTM A413 or ASTM A413M-21 based on the following:
1. High Test Chain Material: Grade 43, Type 304 Stainless Steel.
2. Size: 3/8-inch chain.

A. Carabiners: Provide carabiners with minimum specifications according to ASTM F1956 based on the following:
1. Material: Type 304 Stainless Steel.
2. Shape: Oval.
3. Closure: Screw-nut.
4. Size: 3/8-inch chain link.

PART 3 - EXECUTION

3.1 PREPARATION

A. Mark locations of fence posts. Do not exceed 6-feet O.C. spacing. Indicate locations of utilities, lawn sprinkler system, and underground structures.

3.2 POST AND CHAIN FENCE INSTALLATION

A. Post Excavation: Core drill existing pavement. Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
a. Exposed Concrete: Shape and smooth to shed water.

C. Chain: Install chain and carabiner fasteners after post concrete is fully cured. Install all chain segments to have equal sag. Sag dimension to be reviewed and approved by Architect on-site prior to chain installation.

END OF SECTION 32 3110

SECTION 32 3113 - CHAIN LINK FENCES AND GATES

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. Section Includes:
   1. Relocation of existing chain-link fences.
   2. Relocation of existing swing gates.
   3. Relocation of existing horizontal-slide gates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Fence and gate posts, rails, and fittings.
      b. Chain-link fabric, reinforcements, and attachments.
      c. Gates and hardware.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify layout information for gate relocations shown on Drawings in relation to existing and proposed site improvements. Verify dimensions by field measurements and confirm with Owner and Architect.

1.5 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to comply with performance requirements.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      c. Faulty operation of relocated gates.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.

B. Post Size: Determine according to ASTM F1043 for existing post spacing and gate sizes, for Material Group IA, ASTM F1043, Schedule 40 steel pipe.
   a. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

2.2 CHAIN-LINK FENCE FABRIC

A. General: Salvage and reuse existing fence fabric. If new fabric is required due to damage, provide to match existing.
   1. Fabric Height:
      a. Track Fence: 36 inches.
      b. Perimeter Fence: 96 inches.
   2. Steel Wire for Fabric: Match existing (0.192 inch).
      a. Mesh Size: Match existing (2-1/8 inches).
      b. Zinc-Coated Fabric: Match existing ASTM A392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating applied after weaving.
      c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
   3. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 or ASTM F1083 based on the following:
   1. Fence Height:
      a. Track Fence: 36 inches.
      b. Perimeter Fence: 96 inches..
   2. Track and Perimeter Fence Post Material: Light-Industrial-Strength Group IC-L, round steel pipe, electric-resistance-welded pipe.
      a. Track Fence Line Post: Match existing (2.375 inches in diameter).
      b. Perimeter Fence Line Post: Match existing (2.875 inches in diameter).
      c. Track Fence End Gate Posts: Match existing (2.875 inches in diameter), or as otherwise required by Contractor's structural engineer.
   3. Perimeter Fence Material: Heavy-Industrial-Strength Material Group IA, round steel pipe, Schedule 40.
      a. Perimeter Fence End Gate Posts: Match existing (6.625 inches in diameter), or as otherwise required by Contractor's structural engineer.
   4. Horizontal Framework Members: Top rails according to ASTM F1043.
      a. Top Rail: Match existing (2.375 inches in diameter).
   5. Metallic Coating for Steel Framework:
      a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A123/A123M or 4.0-oz./sq. ft. zinc coating according to ASTM A653/A653M.

2.4 TENSION WIRE

A. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire according to ASTM A817 or ASTM A824, with the following metallic coating:
   1. Type II: Zinc coated (galvanized) by hot-dip process, with the following minimum coating weight:
      a. Matching chain-link fabric coating weight.

2.5 SWING GATES

A. General: Salvage and reuse existing track fence gates.

B. Hardware: Salvage and reuse existing track fence gate hardware. If new hardware is required due to damage, provide to match existing.

2.6 HORIZONTAL-SLIDE GATES

A. General: Salvage and reuse existing perimeter fence gate.

B. Hardware and track accessories: Salvage and reuse existing perimeter fence gate hardware and track accessories. If new hardware is required due to damage, provide to match existing.

2.7 FITTINGS

A. General: Match existing track and perimeter fence fittings where they cannot be salvaged and reused. This includes post caps, braces, rail fittings, tie wires, clips, etc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
   1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated by Contractor's structural engineer, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Concealed Concrete: Place top of concrete 2 inches below gradeto allow covering with surface material.

D. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
   1. Extended along bottom of fence fabric. Install bottom tension wire within 4 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

E. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

F. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

G. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
   1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

3.4 GATE INSTALLATION

A. Install gates to match pre-existing gate construction and configuration, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.5 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

END OF SECTION 32 3113

SECTION 33 4600 **-** SUBDRAINAGE

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. Section Includes:
   1. Perforated-wall pipe and fittings.
   2. Geotextile filter fabrics.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Drainage pipe and fittings.
   2. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:
   1. NPS 6 and Smaller: AASHTO M 252, Type CP; corrugated, for coupled joints.
   2. Couplings: Manufacturer's standard, band type.

2.2 SOIL MATERIALS

A. Soil materials are specified in Section 31 2000 "Earth Moving."

2.3 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.

B. Structure Type: Nonwoven, needle-punched continuous filament.
   1. Survivability: AASHTO M 288 Class 2.
   2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

B. If subdrainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.

C. Verify that drainage panels installed as part of foundation wall waterproofing is properly positioned to drain into subdrainage system.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 2000 "Earth Moving."

3.3 PAVEMENT EDGE DRAINAGE INSTALLATION

A. Provide trench width to allow installation of drainage conduit. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.

B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches.

D. Install drainage conduits as indicated in Part 3 "Piping Installation" Article for landscaping subdrainage with horizontal distance of at least 6 inches between conduit and trench walls. Wrap drainage conduits without integral geotextile filter fabric with flat-style geotextile filter fabric before installation. Connect fabric sections with adhesive or tape.

E. Add drainage course to top of drainage conduits.

F. After satisfactory testing, cover drainage conduit to within 12 inches of finish grade.

G. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.

H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.

I. Fill to Grade: Place pavement base materials over drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

3.4 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
   1. Pavement Edge Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 24 inches unless otherwise indicated.
   2. Lay perforated pipe with perforations down.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

3.5 PIPE JOINT CONSTRUCTION

A. Join perforated PE pipe and fittings with couplings according to ASTM D 3212 with loose banded, coupled, or push-on joints.

B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.6 CONNECTIONS

A. Comply with requirements for piping specified in Section 33 4100 "Storm Utility Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.7 IDENTIFICATION

A. Arrange for installation of green warning tapes directly over piping. Comply with requirements for underground warning tapes specified in specified in Section 31 2000 "Earth Moving."
   1. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
   2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

B. Drain piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.9 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 33 4600

Appendix A

Geotechnical Report
Dexter Community Schools
2022 Sitework Projects

CONSULTING GROUP

Report of Geotechnical Investigation

Dexter Community Schools Pavement Improvements Dexter, Michigan

Prepared for:

Dexter Community Schools
2704 Baker Road
Dexter, Michigan 48130

G2 Project No. 223014
February 8, 2022

g2consultinggroup.com

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CONSULTING GROUP

February 8, 2022

Mr. Brain Barrick, PLA, ASLA
Principal
Beckett & Raeder, Inc.
c/o Dexter Community Schools
2704 Baker Road
Dexter, Michigan 48130

Re: Report of Geotechnical Investigation
Dexter Community Schools Pavement Improvements
Dexter High School, Jenkins Early Education Center, Wylie Elementary School, and Mill Creek Middle School
Dexter, Michigan 48130
G2 Project No. 223014

Dear Mr. Barrick:

We have completed the geotechnical pavement investigation for the proposed pavement improvements to be constructed at four (4) separate schools within the Dexter Community School District located within the City of Dexter, Michigan. This report presents the results of our observations and analyses and includes recommendations and construction considerations relative to the proposed pavement rehabilitation/reconstruction at the four schools.

As always, we appreciate the opportunity to be of service to Dexter Community Schools and Beckett & Raeder, Inc., and look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding our report or any other matter pertaining to the project, please contact us.

Sincerely,

G2 Consulting Group, LLC

Jeffrey M. Hayball, P.E.
Project Engineer

Noel J. Hargrave-Thomas, P.E.
Principal

Jason B. Stoops, P.E.
Project Manager/Associate

JMH/NJHT/JBS/ljv

Enclosures

EXECUTIVE SUMMARY

We understand the project consists of rehabilitation/reconstruction the bituminous concrete pavements within four (4) schools as part of the Dexter Community School District located within the City of Dexter, Michigan. The proposed pavement improvements include complete pavement reconstruction, pavement surface reconstruction, and pulverizing the existing pavements at Dexter High School; complete pavement reconstruction at Jenkins Early Childhood Learning Center; pavement surface reconstruction along with pavement mill and overlay 2 inches at Wylie Elementary School, and complete pavement reconstruction within the northwest parking lot and portions of the southeast parking lot at Mill Creek Middle School. The proposed pavement improvements were determined by Beckett & Raeder, Inc. for each site. The north bus loop at Dexter High School is considered a heavy duty pavement based on daily bus traffic. The remaining pavements at the schools are considered standard duty.

The existing bituminous concrete ranges in thickness from 3 to 6 inches at the soil boring locations. The underlying aggregate base generally ranges in thickness 4 to 11 inches thick. The underlying aggregate base material at each school generally does not meet gradation requirements for MDOT 21AA or MDOT 22A aggregate base. However, the existing aggregate base is generally suitable for support of a new bituminous concrete pavement provided successful completion of a proof compaction evaluation. Silty sand fill underlies the pavement section within boring B-17 and extends to an approximate depth of 2-1/2 feet. Native granular soils and sandy clay are present below the pavement section within the remaining borings and extend to the explored depth of 5 feet. Groundwater was observed during and upon completion within boring B-03 at an approximate depth of 3 feet. No measurable groundwater was observed within the remaining borings during or upon completion of drilling operations.

We recommend the north bus loop at Dexter High School be completely reconstructed or pulverized in place. The existing pavements at Jenkins Early Childhood Learning Center are in poor condition and it appears to have reached the end of their serviceable life. Therefore, we recommend these pavements be completely reconstructed, which will provide 20 years of serviceable life. It is our understanding that half of the northwest parking lot at Middle Creek Middle School will be milled 2 inches and overlaid. However, the pavement within this area is generally only 3 inches thick, as most of the existing pavement will be removed or damaged during a 2-inch milling process. Therefore, we recommend the entire parking lot pavement surface be reconstructed. Alternately, we recommend performing a 1-1/2 thick mill and overlay within this area. The remaining pavement areas at Dexter High School, Wylie Elementary School and Mill Creek Middle School should have the existing pavement surface be reconstructed after successful completion of a proof compaction evaluation of the existing aggregate base. Please refer to the Soil Boring Location Plan, Plate Nos. 2 through 5 for detail locations of the different proposed pavement.

Based on the results of our analyses, we recommend a minimum heavy duty pavement section consisting of 2 inches of MDOT 5EML bituminous concrete wearing course supported by 3 inches of MDOT 4EML bituminous concrete leveling course (placed in two equal lifts) supported on a minimum of 8 inches of MDOT 21AA aggregate base or the existing aggregate base. We recommend a minimum standard duty pavement section consisting of 2 inches of MDOT 5EML bituminous concrete wearing course supported by 2 inches of MDOT 4EML bituminous concrete leveling course, supported the existing aggregate base or on a minimum of 8 inches of MDOT 21AA aggregate base. We recommend the proposed overlay at Mill Creek Middle School consist of 1-1/2 inches of MDOT 5EML bituminous concrete wearing course. After milling and full depth patching, as required, a bituminous tack coat must be placed prior to placement of the overlays. All wearing courses should have a binder from RAP limited to less than 17 percent of the total binder and using a binder of PG 64-22.

This summary is not to be considered separate from the entire text of this report with all the conclusions and qualifications mentioned herein. Details of our analysis and recommendations are discussed in the following sections and in the Appendix of this report.

PROJECT DESCRIPTION

We understand the project consists of rehabilitation/reconstruction the bituminous concrete pavements within four (4) schools as part of the Dexter Community School District located within the City of Dexter, Michigan. The following schools are included as part of the proposed project:

- Dexter High School: 2200 N. Parker Road, Dexter, Michigan 48130
- Jenkins Early Childhood Learning Center: 2801 Baker Road, Dexter, Michigan 48130
- Wylie Elementary School: 3060 Kensington Street, Dexter, Michigan 48130
- Mill Creek Middle School: 7305 Dexter Ann Arbor Road, Dexter, Michigan 48130

Pavement areas at Dexter High School include the north bus loop, portions of the west parking lot/access drive, and southwest access drive/unloading area. A small parking lot is present at Jenkins Early Childhood Learning Center. The pavement areas at Wylie Elementary School consist of the north parking lot/student drop off loop. Mill Creek Middle School has two parking lots, one to the northwest and the other to the southeast. Based on review of Google Earth Historical Aerial Photographs, it appears the pavements were originally constructed sometime prior to 1999. It is our understanding the north bus loop at Dexter High School receives 38 busses per day during the school year. The southwest access drive/unloading area at Dexter High School receives 3 to 6 small delivery trucks per day during the school year. We anticipate the remaining pavement areas at the four schools will service primary car traffic.

The proposed pavement improvements include complete pavement reconstruction, pavement surface reconstruction, and pulverizing the existing pavements at Dexter High School; complete pavement reconstruction at Jenkins Early Childhood Learning Center; pavement surface reconstruction along with pavement mill and overlay 2 inches at Wylie Elementary School, and complete pavement reconstruction within the northwest parking lot and portions of the southeast parking lot at Mill Creek Middle School. The north bus loop at Dexter High School is considered heavy duty. The remaining pavement areas within the four schools are considered standard duty. The proposed pavement improvements were determined by Beckett & Raeder, Inc. for each site.

The purpose of our investigation is to determine and evaluate the general pavement and subsurface conditions within the pavements and develop general recommendations for rehabilitation/reconstruction of the existing pavements.

SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under the direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering. Our scope of services for this project is as follows:

1. We drilled a total of eighteen (18) soil borings for the proposed project, extending to a depth of 5 feet each. Soil borings B-01 through B-07 were drilled at Dexter High School. Soil borings B-08 through B-10 were performed at Jenkins Early Childhood Learning Center. Soil borings B-11 through B-14 were drilled at Wylie Elementary School. Soil borings B-15 through B-18 were performed at Mill Creek Middle School. We measured the existing pavement section materials (bituminous concrete and aggregate base) and identified the type and condition of subgrade soils.

2. We performed laboratory testing on representative samples obtained from the soil borings. Laboratory testing included visual engineering classification, grain size distribution, natural moisture content, and unconfined compressive strength determinations.

3. We prepared this engineering report. Our report includes recommendations for existing pavement rehabilitation/reconstruction.

FIELD OPERATIONS

Beckett & Raeder, Inc., in conjunction with G2 Consulting Group, LLC, selected the number, depth, and location of the soil borings. The soil boring locations were determined in the field by use of GPS assisted mobile technology and measuring from known surface features using conventional taping methods by a G2 staff engineer. The approximate soil boring locations are shown on the Soil Boring Location Plan, Plate Nos. 2 through 5. Ground surface elevations were not available upon completion of this report.

The soil borings were drilled using a truck-mounted rotary drilling rig. Continuous flight, 4-inch outside diameter, solid-stem augers were used to advance the boreholes to the explored depths. Soil samples were obtained at intervals of 2-1/2 feet. These samples were obtained by the Standard Penetration Test method (ASTM D 1586), which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). Blow counts for each 6-inch increment and the resulting N-values are presented on the individual soil boring logs.

Soil samples were placed in sealed containers in the field and brought to our laboratory for testing and classification. During field operations, the drilling crew maintained logs of the encountered subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring logs are based on the field logs supplemented by laboratory soil classification and test results. After completion of drilling operations, the boreholes were backfilled with auger cuttings and capped with cold patch.

LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to pavement design and site preparation. An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System.

Laboratory testing included grain size distribution, natural moisture content, and unconfined compressive strength determinations. Grain size distribution was determined in general conformance with ASTM C 136 method of testing. The unconfined compressive strengths were determined by using a spring-loaded hand penetrometer. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the moisture content and unconfined compressive strength laboratory tests are indicated on the soil boring logs at the depths the samples were obtained. The grain size analyses are presented in the Appendix as Grain Size Distribution, Figure Nos. 19 through 22. We will hold the soil samples for 60 days from the date of this report. If you would like the samples, please let us know.

EXISTING PAVEMENT AND SUBSURFACE CONDITIONS

Dexter High School (Borings B-01 through B-07)

The existing pavements consist of bituminous concrete and an underlying aggregate base. The bituminous concrete ranges in thickness from 3 to 6 inches. The underlying aggregate base consist of crushed limestone gravelly sand with little to some silt and measures 4 to 7 inches in thickness. A grain size analysis was performed on a sample of the aggregate base obtained from borings B-03 and B-06. Test results indicate the aggregate base does not meet the gradation requirements for MDOT 21AA

aggregate base due to an excessive material finer than the No. 200 sieve (silt and clay). However, the existing aggregate base course is generally suitable for support of a new pavement section provided successful completion of a proof roll or proof compacting evaluation.

High severity fatigue and block cracking is present along most of the pavement surface of the north bus loop, west access drive/parking lot, and southwest access drive/unloading area. The pavements along the north half of the bus loop are crowned, allowing surface runoff water to drain into the adjacent greenbelt. The pavements within the south half of the bus loop are sloped to drain into catch basins present along the Portland cement concrete curb line or sidewalks present along the pavement edge. The pavements within the west parking lot and southwest loading/unloading area are sloped to drain into catch basins generally located within the middle of these pavement areas. Segments of the existing curbs and sidewalk appear to have cracked and/or settled and should be replaced in conjunction with the proposed pavement improvements. The catch basins appear to be brick and mortar construction atop of pre-cast concrete structures and are in fair condition with some minor mortar joint cracking observed during our site visit.

Native granular soils, consisting of sand, silty sand, gravelly sand, and clayey sand, are present below the pavement section within the borings and extend to depths ranging from 2 to 3-1/2 feet within borings B-06 and B-07 and the explored depths of 5 feet within borings B-01 through B-05. Native sandy clay is present below the native granular soils within borings B-06 and B-07 and extends to the explored depth of 5 feet.

The native granular soils are medium compact to compact with Standard Penetration Test (SPT) N-values ranging from 18 to 37 blows per foot (bpf). The native sandy clay is stiff to very stiff in consistency with natural moisture contents ranging from 15 to 21 percent and unconfined compressive strengths ranging from 3,000 to 5,000 pounds per square foot (psf).

Groundwater was observed during and upon completion within boring B-03 at an approximate depth of 3 feet. No measurable groundwater was observed within the remaining borings during or upon completion of drilling operations. Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation.

Jenkins Early Childhood Learning Center (Borings B-08 through B-10)

The existing pavements consist of bituminous concrete and an underlying aggregate base. The bituminous concrete generally measures 3 inches thick at the boring locations. The underlying aggregate base consist of natural gravelly sand with little silt and measures 5 to 6 inches in thickness. A grain size analysis was performed on a sample of the aggregate base obtained from boring B-10. Test results indicate the aggregate base does not meet the gradation requirements for MDOT 22A aggregate base due to an excessive material finer than the No. 200 sieve (silt and clay). The existing aggregate base course is generally suitable for support of a new pavement section provided successful completion of a proof roll or proof compacting evaluation.

High severity fatigue and block cracking is present along most of the pavement surface. The pavements are sloped to sheet drain to a catch basin at the west end of the pavement area. Portland cement concrete curbs and sidewalks are present along the pavement edge. Some segments of the existing curbs and sidewalk appear to have cracked and/or settled and should be replaced in conjunction with the proposed pavement improvements. The catch basin appears to be brick and mortar construction atop of pre-cast concrete structures and are in fair to poor condition with many cracks observed within the mortar portion of the catch basin during our site visit.

Native granular soils, consisting of gravelly sand, silty sand, and clayey sand, are present below the pavement section within the borings and extend to the explored depth of 5 feet. The native gravelly sand within the upper 3 to 4 feet of the soil boring is very compact with a SPT N-value of 50 blows per 6

inch drive. The native granular soils present below the gravelly sand are loose in compactness with SPT N-values ranging from 9 to 10 bpf.

No measurable groundwater was observed within the borings during or upon completion of drilling operations. Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation.

Wylie Elementary School (Borings B-11 through B-14)

The existing pavements consist of bituminous concrete and an underlying aggregate base. The bituminous concrete ranges in thickness from 3 to 4-1/2 inches. The underlying aggregate base consist of natural gravelly sand with little to some silt and measures 7 to 25-1/2 inches in thickness. A grain size analysis was performed on a sample of the aggregate base obtained from borings B-13. Test results indicate the aggregate base does not meet the gradation requirements for MDOT 22A aggregate base due to an excessive material finer than the No. 200 sieve (silt and clay). However, the existing aggregate base course appears suitable for support of a new pavement section provided successful completion of a proof roll or proof compacting evaluation.

Low to moderate severity transverse and longitudinal cracking is present along less than half of the pavement surface. However, areas of moderate to high severity fatigue cracking are present to a lesser extent. The pavements are sloped to drain into catch basins present along the Portland cement concrete curb line or sidewalks present along the pavement edge. Some segments of the existing curbs and sidewalk appear to have cracked and/or settled and should be replaced in conjunction with the proposed pavement improvements. The catch basins appear to be brick and mortar construction atop of pre-cast concrete structures and are in fair to poor condition with some mortar joint cracking observed during our site visit.

Native granular soils, consisting of silty sand, gravelly sand, and clayey sand, are present below the pavement section within the borings and extend to the explored depth of 5 feet. The gravelly sand aggregate base within boring B-13 is very compact with a SPT N-value of 50 blows per inch drive. The native granular soils are loose to medium compact with SPT N-values ranging from 7 to 16 blows per foot (bpf).

No measurable groundwater was observed within the borings during or upon completion of drilling operations. Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation.

Mill Creek Middle School (Borings B-15 through B-18)

The existing pavements consist of bituminous concrete and an underlying aggregate base. The bituminous concrete measures approximately 3 inches at the soil boring locations. The underlying aggregate base consist of natural gravelly sand with little silt and measures 9 to 11 inches in thickness. A grain size analysis was performed on a sample of the aggregate base obtained from borings B-17. Test results indicate the aggregate base does not meet the gradation requirements for MDOT 21AA aggregate base due to an excessive material finer than the No. 200 sieve (silt and clay). The existing aggregate base course is generally suitable for support of a new pavement section provided successful completion of a proof roll or proof compacting evaluation.

Moderate to high severity transverse, longitudinal, fatigue and block cracking is present along most of the pavement surface of the south half of the northwest parking lot and portions of the southeast parking lot. Low to moderate severity transverse and longitudinal cracking is present along less than half of the pavement surface within the north half of the northwest parking lot.

The pavements within the parking lots are sloped to drain into catch basins located within the middle of the two parking lots. Portland cement concrete curbs and sidewalks are present along the pavement edge within the two parking lots. Segments of the existing curbs and sidewalk appear to have cracked and/or settled and should be replaced in conjunction with the proposed pavement improvements. The catch basins appear to be brick and mortar construction atop of pre-cast concrete structures and are in fair condition with some minor mortar joint cracking observed during our site visit.

Gravelly sand fill is present below the pavement section within boring B-17 and extends to an approximate depth of 2-1/2 feet. Native sandy clay is present below the pavement section and/or gravelly sand fill within the borings and extends to the explored depth of 5 feet.

The gravelly sand fill is medium compact with a SPT N-value of 26 bpf. The native sandy clay is very stiff to hard in consistency with natural moisture contents ranging from 12 to 18 percent and unconfined compressive strengths ranging from 5,000 to 9,000 pounds per square foot (psf).

No measurable groundwater was observed within the borings during or upon completion of drilling operations. Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should also be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

General

The stratification depths shown on the soil boring logs represent the soil conditions at the boring locations. Variations may occur between borings. Additionally, the stratigraphic lines represent the approximate boundaries between soil types. The transition may be more gradual than what is shown. We have prepared the boring logs on the basis of laboratory classification and testing as well as field logs of the soils encountered.

The Vicinity Plan, Plate No. 1, Soil Boring Location Plan, Plate Nos. 2 through 5, Soil Boring Logs, Figure Nos. 1 through 18, Grain Size Distribution, Figure Nos. 19 through 22, and Photographic Documentation, Figure Nos. 23 through 32 are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring locations. General Notes defining the nomenclature used on the boring logs and elsewhere in this report are presented on Figure No. 33.

PAVEMENT EVALUATION AND RECOMMENDATIONS

General

Most of the pavement within the evaluated areas at Dexter High School is in poor condition. It is our understanding that portions the north bus loop will be completely reconstruction, pulverized in place, or have the surface reconstructed. The existing bituminous concrete thickness within the north bus loop is approximately 3 to 3-1/2 inches thick, which is not suitable for support of the anticipated bus traffic of 38 busses during the school year. Therefore, we recommend the north bus loop surface be reconstructed. The remaining pavement areas, consisting of portions of the west access drive/parking lot and southwest access drive/loading area, are in poor condition and should be replaced. However, the underlying aggregate base course is suitable for support of a new pavement section provided successful completion of a proof compaction evaluation. Therefore, we recommend the pavement surface be reconstructed.

The existing pavements at Jenkins Early Childhood Learning Center are in poor condition and it appears to have reached the end of their serviceable life. Therefore, we recommend these pavements be completely reconstructed, which will provide 20 years of serviceable life.

The pavements within the parking lot/student drop off area at Wylie Elementary School are proposed to have the pavement surface reconstructed. The exposed aggregate base should be proof compacted and evaluated for stability.

Bituminous pavement is 3 inches thick at Mill Creek Middle School and the aggregate base thickness is 9 to 11 inches thick. It is our understanding that half of the northwest parking lot at Middle Creek Middle School will be milled and overlaid 2 inches. However, based on the existing pavement thickness, consideration should be given to replace the pavement surface across the entire pavement and after proof compacting the aggregate base. Alternatively, we recommend performing a 1-1/2 thick mill and overlay within this area within the north half of the northwest parking lot. Please refer to the Soil Boring Location Plan, Plate Nos. 2 through 5 for detail locations of the different proposed pavement improvements.

Pavement Reconstruction Recommendations

In areas of proposed complete reconstruction, the existing pavements and underlying aggregate base should be completely removed within the pavement limits. We recommend the exposed subgrade be cut down to the proposed pavement subgrade elevation, graded to promote effective subsurface drainage, and proof-rolled. Once a rough grade has been achieved, the exposed subgrade should be evaluated for stability. We recommend subgrade soils be proof rolled using a fully loaded tri-axle dump truck. Any unstable or unsuitable areas noted should be improved by additional compaction or removed and replaced with engineered fill.

Given the existing cohesive subgrade conditions at Mill Creek Middle School, we anticipate some subgrade treatment by undercut may be required during construction operations. We recommend construction operations be performed during the summer months and the exposed subgrade is not left exposed to rain events.

Subgrade undercuts, if required, should be evaluated by a qualified engineering technician to determine if subgrade stabilization is necessary. We recommend undercut excavations, where required, be backfilled MDOT 21AA dense graded aggregate base placed in an engineered manner. Lift thicknesses should not exceed 9 inches. All engineered fill should be compacted to a density of at least 95 percent of the maximum density determined by the Modified Proctor (ASTM D 1557) method of testing. All engineered fill material should be placed and compacted at approximately the optimum moisture content. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade.

Pavement Surface Reconstruction Recommendations

In these areas, we recommend completely removing the existing bituminous concrete. The exposed aggregate base should be graded to promote effective drainage and then compacted. Once a rough grade has been achieved, the exposed aggregate base should be evaluated for stability and proof compacted with a vibratory roller. The vibratory roller should make a minimum of 10 passes across the aggregate base in two perpendicular directions, where practical. Any unstable or unsuitable areas noted should be improved by additional compaction or removed and replaced with engineered fill.

Pavement Pulverization Recommendations

In general, we recommend the bus loop pavement section at Dexter High School be replaced and the area proposed for pulverization omitted. If pulverization is to be performed, the existing bituminous concrete pavement should be thoroughly pulverized and mixed in accordance with Section 305 HMA

Base Crushing and Shaping of the MDOT 2020 Standard Specifications for Construction (Standard Specifications), graded to promote effective drainage, and compacted. Once a rough grade has been achieved, the exposed pulverized material should be evaluated for stability and compacted with a vibratory roller. unstable or unsuitable areas noted should be improved by additional compaction or removed and replaced with engineered fill. Pulverized base should be compacted to at least 98 percent of the maximum unit weight as determined by methods outlined in the latest version of the MDOT Density Testing and Inspection Manual.

Milling and Overlay Recommendations

If the milling alternative is performed, the existing bituminous concrete at Mill Creek Middle School within the north half of the northwest parking lot should be milled 1-1/2 inches across the entire mill area. Prior to the overlay, any existing cracks in the pavement surface wider than 1/8 inch should be cleaned, covered with emulsified tack, then fill with a hand patching bituminous concrete mix. Any areas of the pavement that exhibit excessive fatigue cracking or deterioration should have the remaining bituminous concrete removed to expose the underlying aggregate base. We recommend placing the same thickness of bituminous concrete that is removed within any potential full depth replacement patch.

For full depth patches, the bituminous concrete should be saw-cut a minimum 2 feet laterally from the distressed area to be removed. Prior to placing the full-depth patch, a tack coat should be applied to the sides of the saw-cut pavement. The exposed aggregate base should be evaluated for stability. Any unstable or unsuitable areas noted should be improved by compaction or removed and replaced with properly compacted engineered fill.

Pavement Design

We performed pavement design analyses in accordance with the "AASHTO Guide for Design of Pavement Structures". The subgrade soils will generally consist of granular soils at Dexter High School, Jenkins Early Childhood Learning Center, and Wylie Elementary School and sandy clay at Mill Creek Middle School. Based on the existing subgrade soils, we have provided design pavement sections based on an effective subgrade resilient modulus of 9,000 pounds per square inch (psi) for the existing granular soils and 6,000 for the existing sandy clay.

It is our understanding the site includes a north bus loop at Dexter High School which is designated as heavy-duty pavement area and the remaining pavement areas for each of the four schools are designated as standard duty pavement areas. Traffic within the heavy-duty pavement areas are to accommodate up to 38 busses per day during the school year as the standard duty pavement areas is primarily cars and the occasional traffic delivery truck and garbage truck. We have designed the heavy-duty pavement section on an estimated of 365,000 18-kip equivalent single-axle loads (ESALs) over a 20-year design life. The standard duty pavement section is designed on an estimated ESALs of 50,000 over a 20-year design life. For evaluation purposes, we have utilized a serviceability loss of 2.0, a standard deviation of 0.49 for flexible pavements, and a reliability factor of 0.95.

For evaluation purposes of bituminous mill/overlay at Mill Creek Middle School, we estimated the remaining life of the pavement at 35 percent with a condition factor of 0.81 with an existing pavement structural number of 2.2. We anticipate the overlay design life will be 10 years. If additional traffic volume information becomes available, G2 Consulting Group should be notified so we can reevaluate our recommendations.

Based on the results of our analyses, we recommend a minimum heavy duty pavement section consisting of 2 inches of MDOT 5EML bituminous concrete wearing course supported by 3 inches of MDOT 4EML bituminous concrete leveling course (placed in two equal lifts) supported on a minimum of 8 inches of MDOT 21AA aggregate base or existing aggregate base. We recommend a minimum

standard duty pavement section consisting of 2 inches of MDOT 5EML bituminous concrete wearing course supported by 2 inches of MDOT 4EML bituminous concrete leveling course, supported the existing aggregate base or on a minimum of 8 inches of MDOT 21AA aggregate base.

We recommend the proposed overlay at Mill Creek Middle School consist of 1-1/2 inches of MDOT 5EML bituminous concrete wearing course. After milling and full depth patching, as required, a bituminous tack coat must be placed prior to placement of the overlays. All pavement wearing course should have binder from RAP limited to less than 17 percent of the total binder and using a binder of PG 64-22.

All pavement materials are specified within the 2012 Standard Specifications for Construction from the Michigan Department of Transportation. The aggregate materials for the subbase are described in Section 902. The bituminous pavement materials are described in Section 501 and can be assigned a structural coefficient number of 0.42. The existing aggregate base course can be assigned a structural coefficient number of 0.10. Any imported MDOT 21AA material can be assigned a structural coefficient number of 0.14.

Pavement Drainage and Maintenance

The pavement should be properly sloped to promote effective surface drainage and prevent water from ponding. Regular timely maintenance should be performed on the bituminous pavement to reduce the potential deterioration associated with moisture infiltration through surface cracks. The owner should continue to seal the cracks with a hot-applied elastic crack filler as soon as possible after cracking develops and as often as necessary to block the passage of water to the subgrade soils.

GENERAL COMMENTS

We have formulated the evaluations and recommendations presented in this report relative to site preparation and pavement construction on the basis of data provided to us relating to the general location for the proposed pavement improvements. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsurface conditions.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the pavements and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

We have based the analyses and recommendations submitted in this report upon the data from soil borings performed at the approximate locations shown on the Soil Boring Location Plans, Plate Nos. 2 through 5. This report does not reflect variations that may occur between the actual boring locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

Soil conditions at the site could vary from those generalized on the basis of soil borings made at specific locations. It is, therefore, recommended that G2 Consulting Group, LLC be retained to provide soil engineering services during the site preparation and pavement construction phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations. Also, this allows design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.

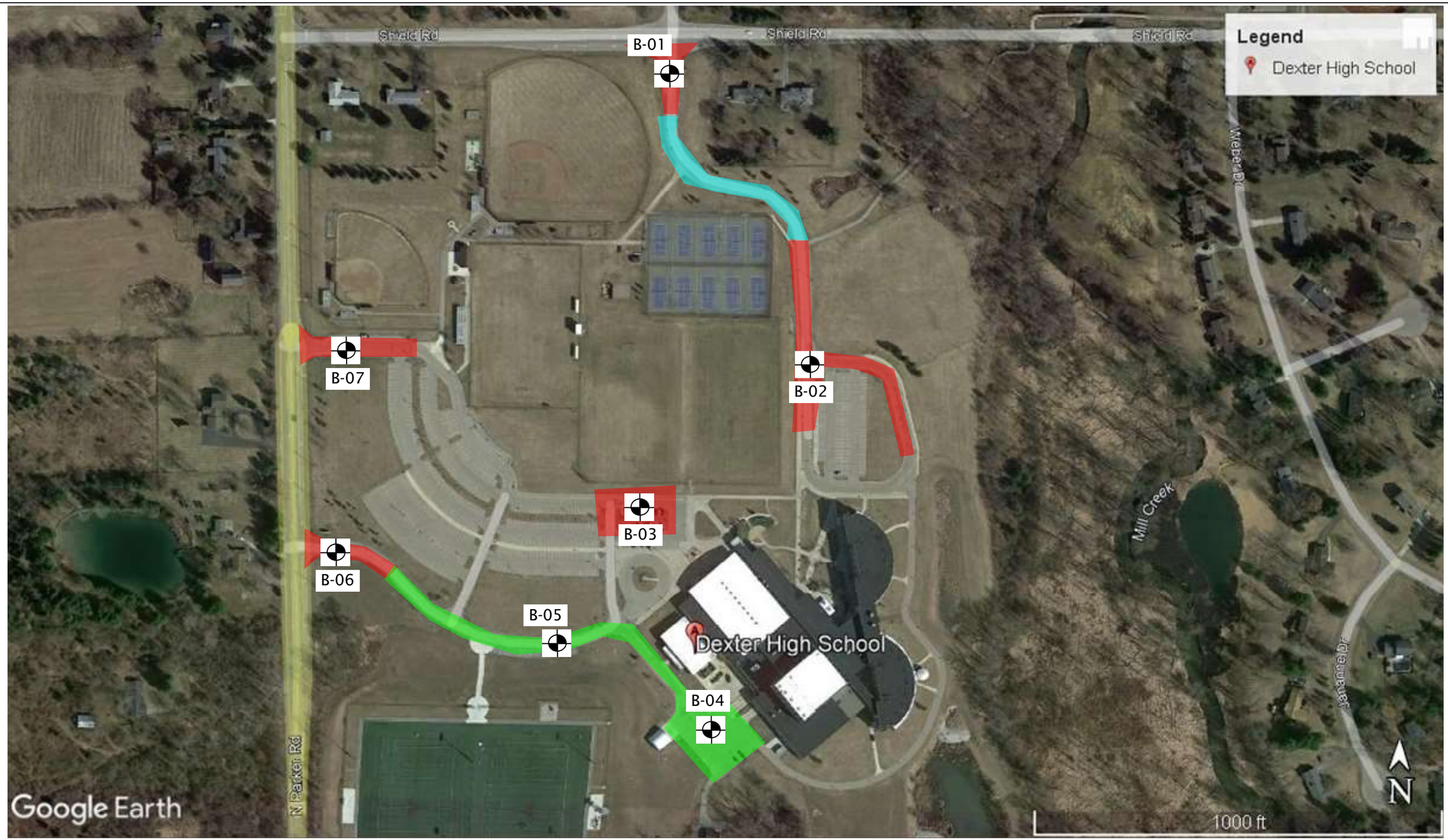
APPENDIX

Vicinity Plan

Dexter Community Schools
Pavement Improvements
Dexter, Michigan

2G CONSULTING GROUP

Project No. 223014	
Drawn by: ZRL	
Date: 2/7/22	Plate No. 1
Scale: NTS	



Legend

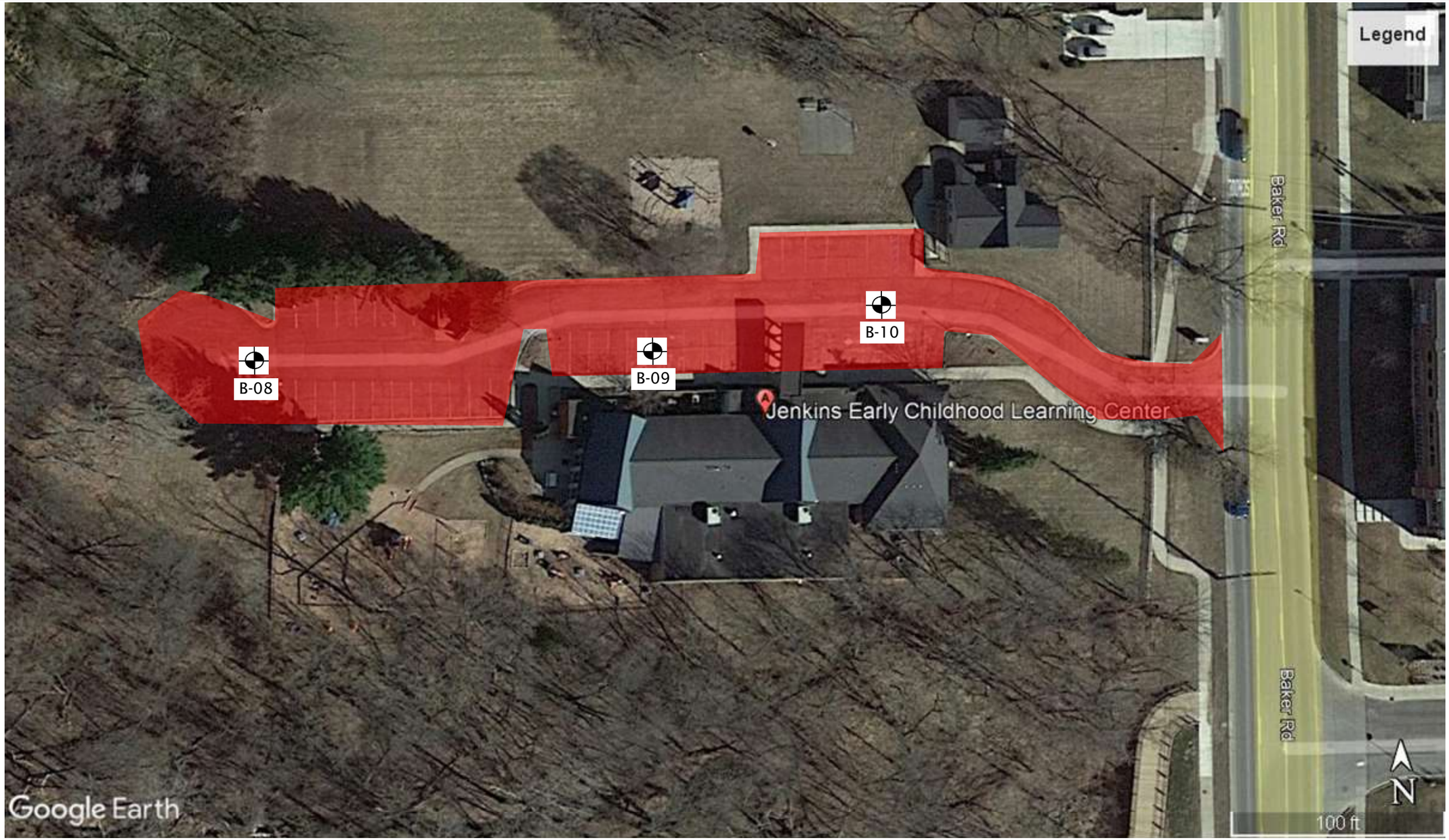
- Soil Borings performed by Strata Drilling on January 30 and 31, 2022
- Approximately Area of Proposed Complete Pavement Reconstruction
- Approximate Area of Proposed Pavement Surface Reconstruction
- Approximate Area of Proposed Pavement Pulverization

Soil Boring Location Plan

Dexter High School Pavements
2200 N. Parker Road
Dexter, Michigan 48130

2G CONSULTING GROUP

Project No. 223014	
Drawn by: JMH	
Date: 2/7/22	Plate No. 2
Scale: NTS	



Legend

Soil Borings performed by Strata Drilling on January 30 and 31, 2022

Approximately Area of Proposed Complete Pavement Reconstruction

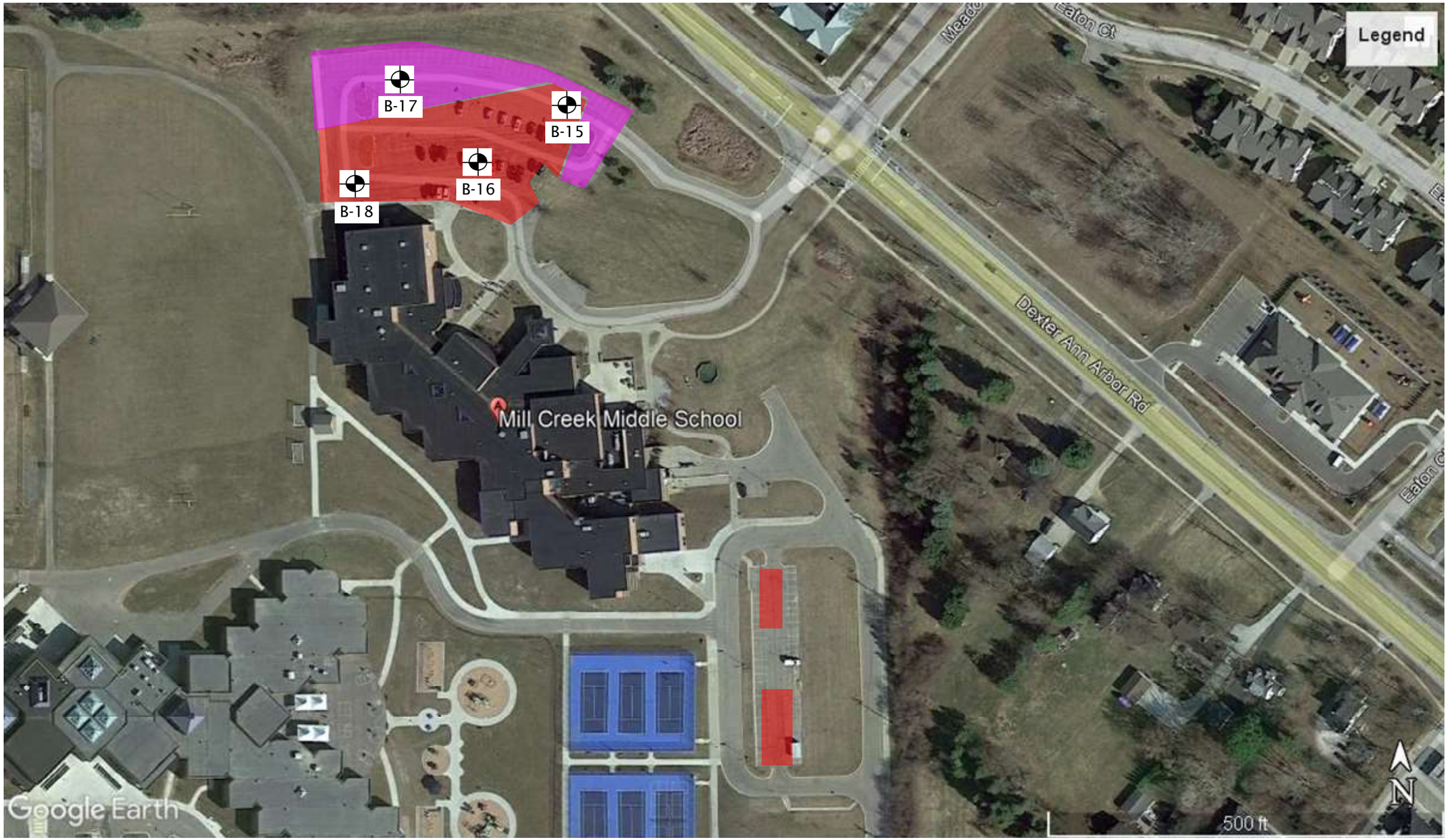
Soil Boring Location Plan		
Jenkins Early Education Center Pavements 2801 Baker Road Dexter, Michigan 48130		
2G CONSULTING GROUP	Project No. 223014	
	Drawn by: JMH	
	Date: 2/7/22	Plate No. 3
	Scale: NTS	

Legend

Soil Borings performed by Strata Drilling on January 30 and 31, 2022

Approximately Area of Proposed Pavement Surface Reconstruction

Soil Boring Location Plan		
Wylie Elementary School Pavements 3060 Kensington Street Dexter, Michigan 48130		
2G CONSULTING GROUP	Project No. 223014	
	Drawn by: JMH	
	Date: 2/7/22	Plate No. 4
	Scale: NTS	



Legend

Soil Borings performed by Strata Drilling on January 30 and 31, 2022

Approximately Area of Proposed Complete Pavement Reconstruction

Approximately Area of Proposed Pavement Mill and Overlay

Soil Boring Location Plan

Mill Creek Middle School Pavements
7305 Dexter-Ann Arbor Road
Dexter, Michigan 48130

2G CONSULTING GROUP

Project No. 223014	
Drawn by: JMH	
Date: 2/7/22	Plate No. 5
Scale: NTS	

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. **B-01**

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3-1/2 inches) 0.3							
		Crushed Limestone Aggregate Base: Gray Gravelly Sand with little silt (7 inches) 0.9		BS-01					
		Compact Brown Sand with trace silt and gravel 2.5		S-02	24 21 11	32			
5		Medium Compact Brown and Gray Clayey Sand with trace gravel 5.0	5	S-03	8 11 13	24			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 1

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-02

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Crushed Limestone Aggregate Base: Gray Gravelly Sand with little silt (7 inches) 0.8		BS-01					
				S-02	33 24 13	37			
		Medium Compact to Compact Brown Clayey Sand with trace gravel							
5		5.0	5	S-03	11 14 15	29			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 2

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-03

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3-1/2 inches) 0.3							
		Crushed Aggregate Base: Gray Gravelly Sand with little silt (6 inches) 0.8		BS-01					
		Medium Compact Brown Silty Sand with trace gravel		S-02	31 21 9	30			
		3.0							
		Medium Compact Brown Gravelly Sand with trace silt 4.0							
		Medium Compact Brown Silty Sand with trace gravel							
5		5.0	5	S-03	8 10 8	18			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
3 feet during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 3

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. **B-04**

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (4 inches) 0.3							
		Crushed Limestone Aggregate Base: Gray Gravelly Sand with little silt (5 inches) 0.8		BS-01					
		Compact Brown Silty Sand with trace gravel		S-02	29 21 11	32			
		3.5							
5		Medium Compact Brown Gravelly Sand with trace silt 5.0	5	S-03	8 12 14	26			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 4

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-05

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (4-1/2 inches) 0.4							
		Crushed Limestone Aggregate Base: Gray Gravelly Sand with little silt (4-1/2 inches) 0.8		BS-01					
		Compact Brown Silty Sand with trace gravel 2.5		S-02	30 24 10	34			
5		Medium Compact Brown Gravelly Sand with trace silt 5.0	5	S-03	9 10 10	20			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 5

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-06

G2 CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)							
		0.5							
		Crushed Aggregate Base: Gray Gravelly Sand with some silt (4 inches)		BS-01					
		0.8							
		Medium Compact Brown Sand with trace silt and gravel							
		2.0		S-02	28 20 7	27	17.1		3000*
		Stiff Mottled Gray and Brown Sandy Clay with trace silt and gravel							
		3.5							
		Very Stiff Brown Sandy Clay with trace silt and gravel							
5		5.0	5	S-03	5 5 5	10	21.2		5000*
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 6

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-07

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (6 inches)							
		0.5							
		Crushed Aggregate Base: Gray Gravelly Sand with little silt (5 inches)		BS-01					
		0.9							
		Medium Compact Brown Silty Sand with trace clay and gravel		S-02	23 14 7	21			
		3.5							
		Stiff Mottled Brown and Brown Sandy Clay with trace silt and gravel		S-03	4 6 6	12	15.1		3000*
5		5.0	5						
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 30, 2022
Inspector:
Contractor: Strata Drilling, Inc.
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 7

SOIL / PAVEMENT BORING 223014A.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Comm Schools Pavement Improvements:
Jenkins Early Childhood Learning Center

Project Location: 2801 Baker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. **B-08**

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Brown Gravelly Sand with little silt (6 inches) 0.8		BS-01					
		Very Compact Brown Gravelly Sand with trace silt and clay		S-02	50/6	---			
		4.0							
		Loose Brown Clayey Sand with trace silt							
5		5.0	5	S-03	7 5 5	10			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 8

SOIL / PAVEMENT BORING 223014B.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Comm Schools Pavement Improvements:
Jenkins Early Childhood Learning Center

Project Location: 2801 Baker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. **B-09**

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Brown Gravelly Sand with little silt (5 inches) 0.7		BS-01					
		Very Compact Brown Gravelly Sand with trace silt and clay		S-02	50/6	---			
		3.0							
		Loose Brown Silty Sand with trace gravel			3				
5		5.0	5	S-03	4 6	10			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 9

SOIL / PAVEMENT BORING 223014B.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Comm Schools Pavement Improvements:
Jenkins Early Childhood Learning Center

Project Location: 2801 Baker Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-10

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Brown Gravelly Sand with little silt (6 inches) 0.8		BS-01					
		Very Compact Brown Gravelly Sand with trace silt and clay		S-02	50/6	---			
		3.0							
		Loose Brown Silty Sand with trace gravel							
5		5.0	5	S-03	4 4 5	9			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 10

SOIL / PAVEMENT BORING 223014B.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22

Project Name: Dexter Community Schools Pavement Improvements: Wylie Elementary School

Project Location: 3060 Kensington Street
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-11

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with some silt (7 inches) 0.8		BS-01					
		Medium Compact Brown Gravelly Sand with trace clay		S-02	13 9 7	16			
		3.0							
		Medium Compact Gray Silty Sand with trace gravel							
5		5.0	5	S-03	7 6 5	11			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 11

SOIL / PAVEMENT BORING 223014C.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Improvements: Wylie Elementary School

Project Location: 3060 Kensington Street
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-12

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (4 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with some silt (8 inches) 1.0		BS-01					
				S-02	7 7 5	12			
		Loose to Medium Compact Brown Clayey Sand with trace silt and gravel							
5		5.0	5	S-03	3 4 3	7			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 12

SOIL / PAVEMENT BORING 223014C.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Improvements: Wylie Elementary School

Project Location: 3060 Kensington Street
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-13

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (4-1/2 inches) 0.4							
		Natural Aggregate Base: Very Compact Dark Brown Gravelly Sand with some silt (25-1/2 inches)		BS-01					
		2.5		S-02	50/4 --- ---	---			
		Loose Brown Gravelly Sand with trace clay 4.5							
5		Loose Brown and Gray and Brown Clayey Sand with trace silt and gravel 5.0	5	S-03	5 5 4	9			
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 13

SOIL / PAVEMENT BORING 223014C.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Improvements: Wylie Elementary School

Project Location: 3060 Kensington Street
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-14

CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

DEPTH (ft)	PRO-FILE		DEPTH (ft)
		Bituminous Concrete (4 inches) 0.3	
		Natural Aggregate Base: Dark Brown Gravelly Sand with some silt (9 inches) 1.1	
		Medium Compact Brown Silty Sand with trace gravel 3.0	
5		Loose Brown Clayey Sand with trace silt and gravel 5.0	5
		End of Boring @ 5 ft	

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
S-02	13 9 7	16			
S-03	4 4 6	10			

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Water Level Observation:
Dry during and upon completion

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Drilling Method:
4-inch outside diameter solid-stem augers

Figure No. 14

SOIL / PAVEMENT BORING 223014C.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Investigation: Mill Creek Middle School

Project Location: 7305 Dexter Ann Arbor Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-15

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with little silt (9 inches) 1.0		BS-01					
		Hard Brown Sandy Clay with trace silt and gravel		S-02	50/6 --- ---	---	13.3		8000*
		3.5							
		Very Stiff Mottled Brown and Gray Sandy Clay with trace silt and gravel		S-03	5 7 7	14	15.0		5000*
5		5.0	5						
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 15

SOIL / PAVEMENT BORING 223014D.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Investigation: Mill Creek Middle School

Project Location: 7305 Dexter Ann Arbor Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-16

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with little silt (11 inches) 1.2		BS-01					
		Hard Gray Sandy Clay with trace silt and gravel		S-02	11 13 15	28	16.1		9000*
		3.0							
5		Very Stiff Brown Sandy Clay with trace silt and gravel 5.0	5	S-03	5 6 7	13	18.4		6000*
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 16

SOIL / PAVEMENT BORING 223014D.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Investigation: Mill Creek Middle School

Project Location: 7305 Dexter Ann Arbor Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. B-17

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with little silt (10 inches) 1.1		BS-01					
		Fill: Medium Compact Brown Gravelly Sand with trace clay; intermixed asphalt millings 2.5		S-02	9 12 14	26			
5		Very Stiff Mottled Brown and Gray Sandy Clay with trace silt gravel 5.0	5	S-03	7 7 7	14	15.0		5000*
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 17

SOIL / PAVEMENT BORING 223014D.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

Project Name: Dexter Community Schools Pavement Investigation: Mill Creek Middle School

Project Location: 7305 Dexter Ann Arbor Road
Dexter, Michigan 48130

G2 Project No. 223014

Latitude: N/A Longitude: N/A

Soil Boring No. **B-18**

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Bituminous Concrete (3 inches) 0.3							
		Natural Aggregate Base: Dark Brown Gravelly Sand with little silt (9 inches) 1.0		BS-01					
				S-02	7 9 11	20	18.0		5000*
		Very Stiff to Hard Mottled Brown and Gray Sandy Clay with trace silt and gravel							
5		5.0	5	S-03	6 9 8	17	11.8		8000*
		End of Boring @ 5 ft							

Total Depth: 5 ft
Drilling Date: January 31, 2022
Inspector:
Contractor: Strata Drilling, Inc
Driller: B. Sienkiewicz

Drilling Method:
4-inch outside diameter solid-stem augers

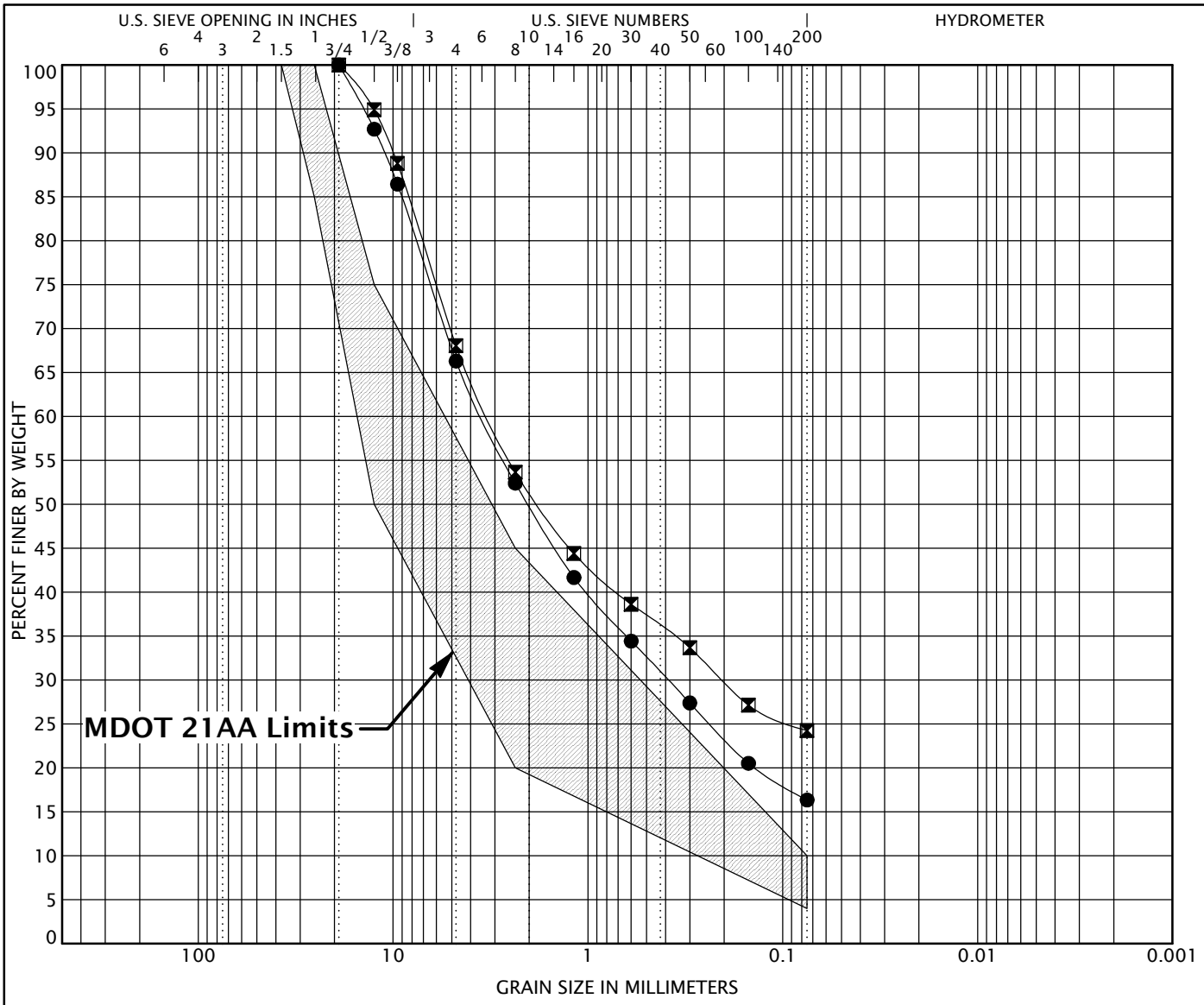
Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings and capped with cold patch

Figure No. 18

SOIL / PAVEMENT BORING 223014D.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	B-03 BS-01	Gray Gravelly Sand with little silt					
⊠	B-06 BS-01	Gray Gravelly Sand with some silt					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03 BS-01	19	3.459	0.388		33.7	50.0	16.3	
⊠	B-06 BS-01	19	3.213	0.203		32.0	43.8	24.2	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

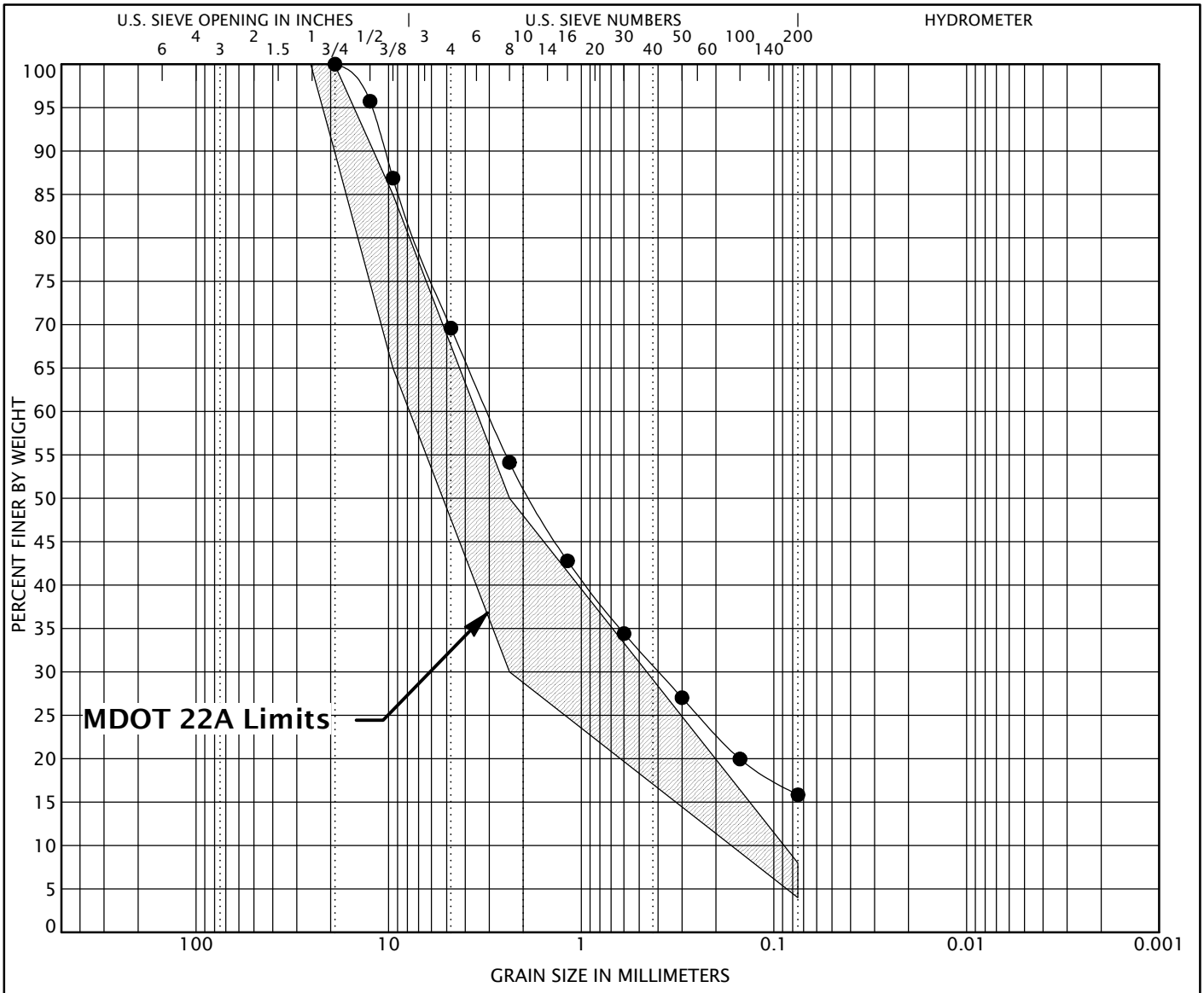
Project Name: Dexter Community Schools Pavement Improvements: Dexter High School

Project Location: 2200 N. Parker Road
Dexter, Michigan 48130

G2 Project No.: 223014

Figure No. 19

US_GRAIN_SIZE_MDOT_21AA 223014A.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/7/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	B-10 BS-01	Brown Gravelly Sand with little silt					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10 BS-01	19	3.078	0.397		30.4	53.7	15.8	

US_GRAIN_SIZE_MDOT_22A 223014B.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

G2 CONSULTING GROUP

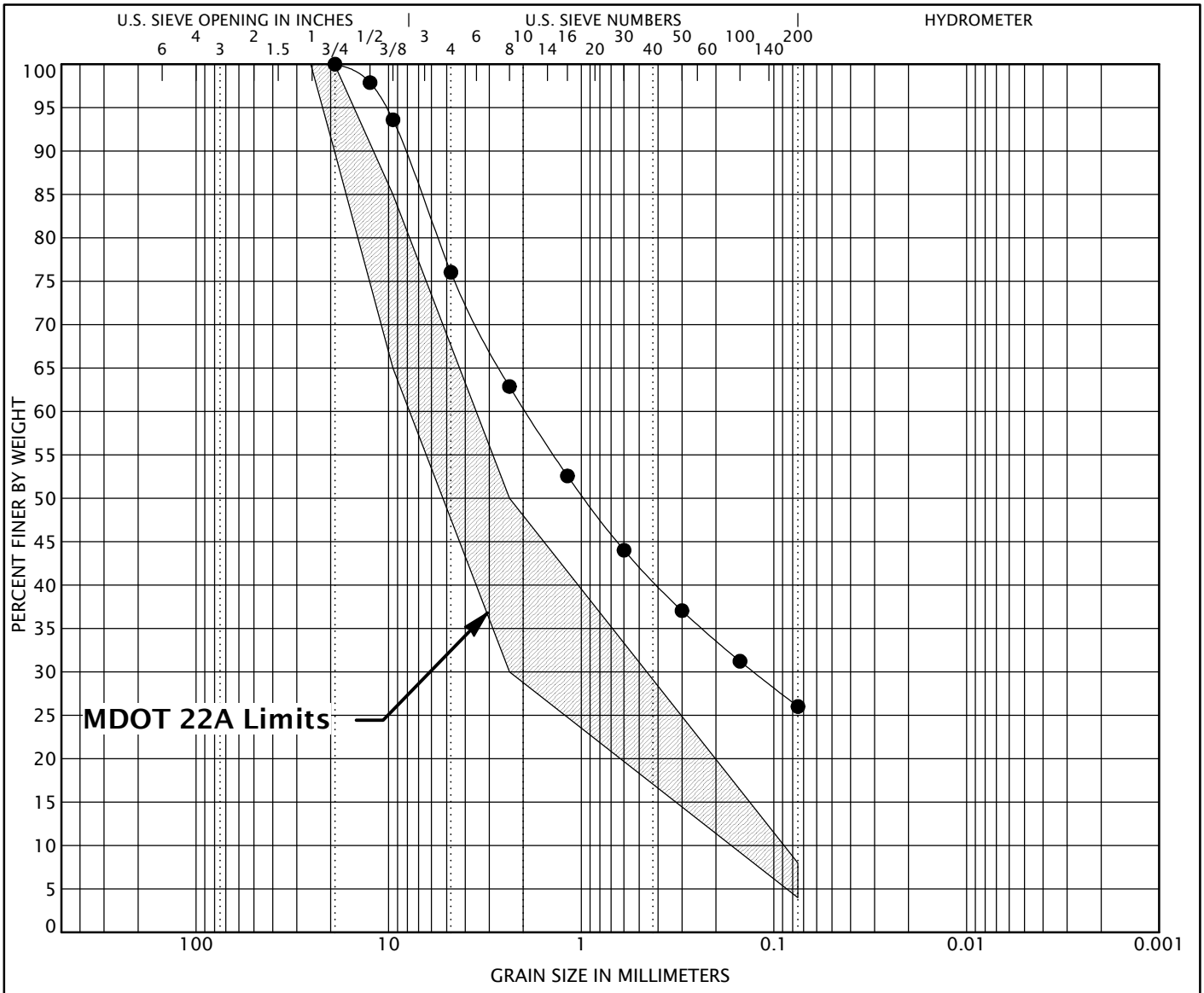
GRAIN SIZE DISTRIBUTION

Project Name: Dexter Community Schools Pavement Improvements: Jenkins Early Childhood Learning Center

Project Location: 2801 Baker Road
Dexter, Michigan 48130

G2 Project No.: 223014

Figure No. 20



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	B-13 BS-01	Dark Brown Gravelly Sand with some silt					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-13 BS-01	19	1.945	0.127		24.0	50.0	26.0	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

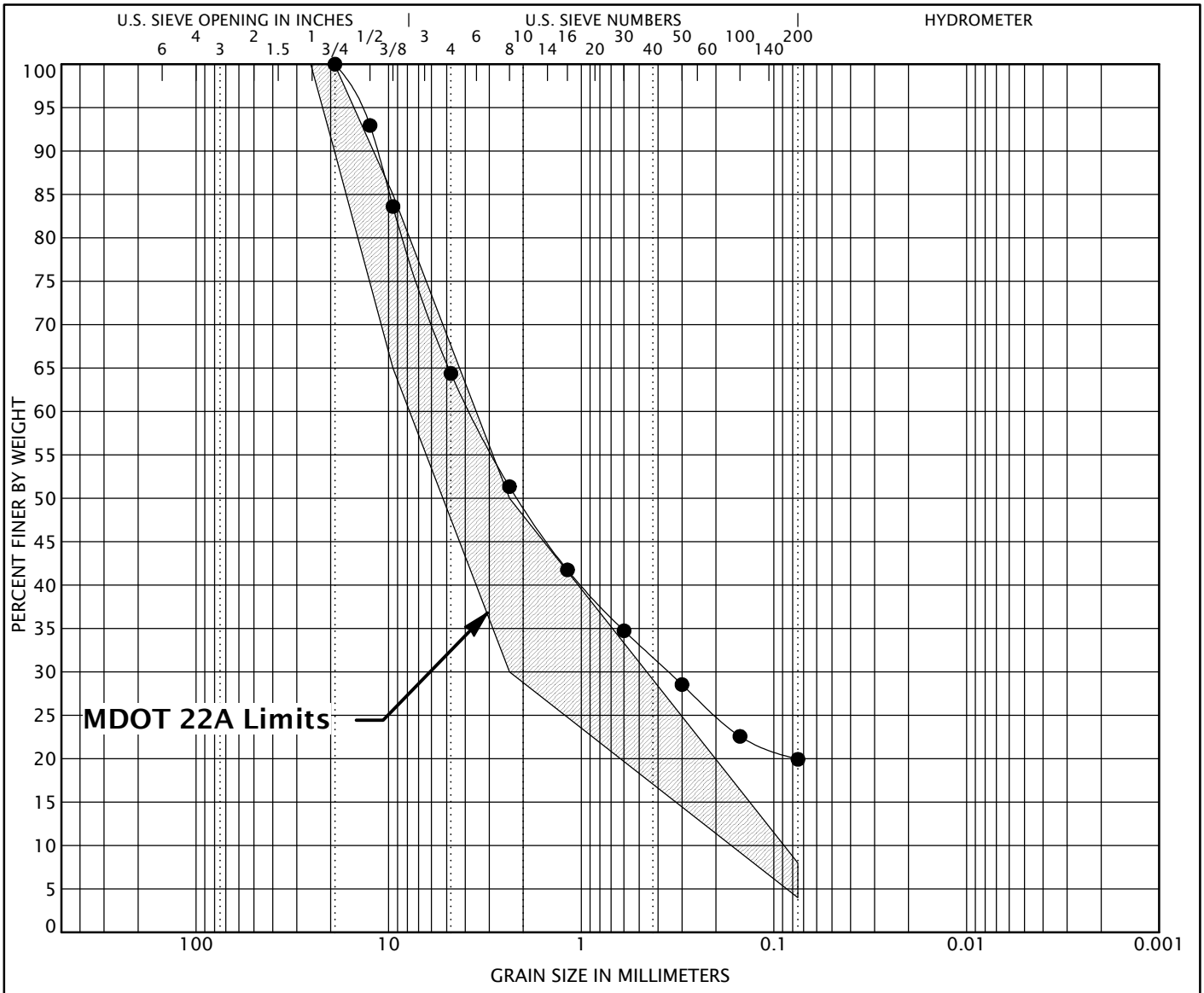
Project Name: Dexter Community Schools Pavement Improvements: Wylie Elementary School

Project Location: 3060 Kensington Street, Dexter, Michigan 48130

G2 Project No.: 223014

Figure No. 21

US_GRAIN_SIZE_MDOT_22A 223014C.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	B-17 BS-01	Dark Brown Gravelly Sand with little silt					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17 BS-01	19	3.756	0.353		35.6	44.4	19.9	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

Project Name: Dexter Community Schools Pavement Investigation: Mill Creek Middle School

Project Location: 7305 Dexter Ann Arbor Road, Dexter, Michigan 48130

G2 Project No.: 223014

Figure No. 22

US_GRAIN_SIZE_MDOT_22A 223014D.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 2/8/22

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Dexter, Michigan
G2 Project No. 223014

Photograph No. 1: High severity block and fatigue cracking with surface patching at Dexter High School near boring B-01. View to the south.

Photograph No. 2: High severity block and fatigue cracking with surface patching at Dexter High School near boring B-02. View to the south.

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G2 Project No. 223014

Photograph No. 3: Moderate to high severity transverse, longitudinal, and edge cracking at Dexter High School near boring B-03. View to the west.

Photograph No. 4: High severity block and fatigue cracking at Dexter High School near boring B-04. View to the northwest.

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Dexter, Michigan
G2 Project No. 223014

Photograph No. 5: Low severity transverse cracking at Dexter High School near boring B-05. View to the west.

Photograph No. 6: High severity block and fatigue cracking with cold patching at Dexter High School near boring B-06. View to the west.

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G2 Project No. 223014

Photograph No. 7: Moderate to high severity transverse, longitudinal, and fatigue cracking at Dexter High School near boring B-07. View to the west.

Photograph No. 8: Moderate to high severity block and fatigue cracking at Jenkins Early Education Center near boring B-08. View to the west.

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Dexter, Michigan
G2 Project No. 223014

Photograph No. 9: Moderate to high severity block and fatigue cracking with surface patching at Jenkins Early Education Center near boring B-09. View to the west.

Photograph No. 10: High severity block and fatigue cracking with cold patching at Jenkins Early Education Center near boring B-10. View to the southwest.

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Dexter, Michigan
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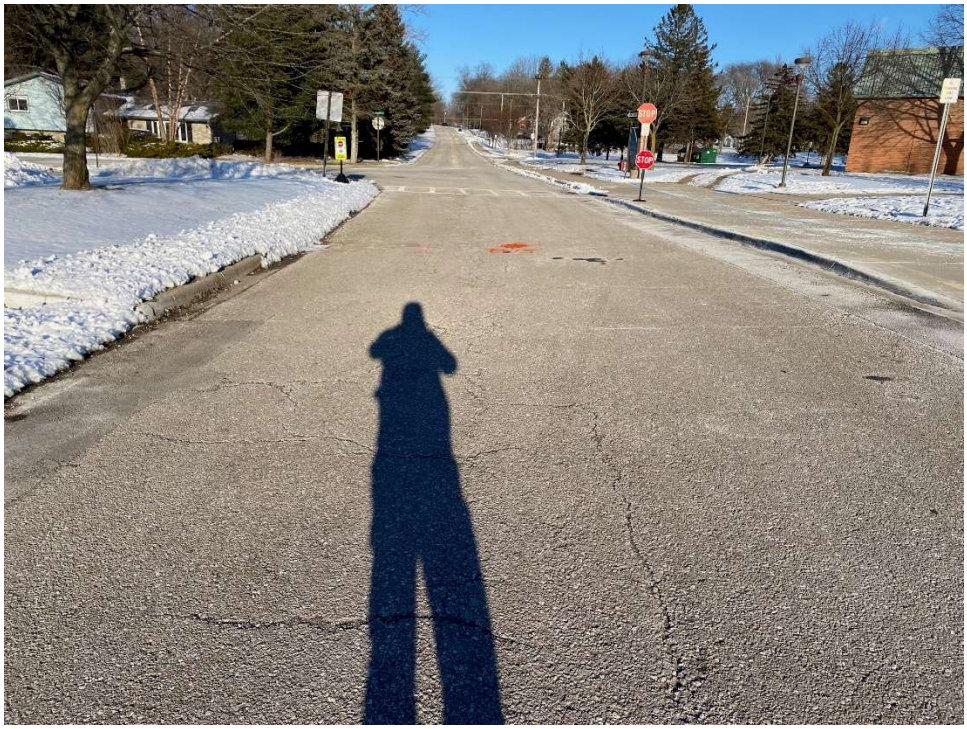
Photograph No. 11: Moderate to high severity fatigue, transverse, and longitudinal cracking with cold patching with at Wylie Elementary School near boring B-11. View to the southeast.

Photograph No. 12: Low to moderate severity longitudinal and transverse cracking with at Wylie Elementary School near boring B-12. View to the southeast.

Photographic Documentation
Dexter Community School Pavement Improvements
Dexter, Michigan
G2 Project No. 223014



Photograph No. 13: Low severity longitudinal and transverse cracking with at Wylie Elementary School near boring B-13. View to the northeast.

Photograph No. 14: Low to moderate severity longitudinal and transverse cracking with at Wylie Elementary School near boring B-14. View to the east.

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Dexter, Michigan
G2 Project No. 223014

Photograph No. 15: Low to moderate severity transverse and longitudinal cracking with pot holes and cold patching at Mill Creek Middle School northeast parking lot near boring B-15. View to the east.

Photograph No. 16: Moderate to high severity fatigue, block, and transverse and longitudinal cracking at Mill Creek Middle School northeast parking lot near boring B-16. View to the west.

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Dexter, Michigan
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Photograph No. 17: Low to moderate severity transverse and longitudinal cracking at Mill Creek Middle School northeast parking lot near boring B-17. View to the east.

Photograph No. 18: Moderate to high severity fatigue, block, and transverse and longitudinal cracking at Mill Creek Middle School northeast parking lot near boring B-18. View to the west.

Photographic Documentation
Dexter Community School Pavement Improvements
Dexter, Michigan
G2 Project No. 223014

Photograph No. 19: Moderate to high severity fatigue, block, and transverse and longitudinal cracking at Mill Creek Middle School southwest parking lot. View to the south.

Photograph No. 20: Moderate severity fatigue, block, and transverse and longitudinal cracking at Mill Creek Middle School southwest parking lot. View to the south.

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders		- greater than 12 inches
Cobbles		- 3 inches to 12 inches
Gravel	- Coarse	- 3/4 inches to 3 inches
	- Fine	- No. 4 to 3/4 inches
Sand	- Coarse	- No. 10 to No. 4
	- Medium	- No. 40 to No. 10
	- Fine	- No. 200 to No. 40
Silt		- 0.005mm to 0.074mm
Clay		- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Split Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).