SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Protecting pavement and curbs to remain.
3. Protect existing building to remain.
4. Protecting underground and overhead utility systems.
5. Stripping and disposal of existing lawn.
6. Stripping and stockpiling of topsoil for reuse.
7. Temporary erosion – and sedimentation control measures.
8. Tree protection.
9. Pavement and curb saw cutting.
10. Removal of existing asphalt pavement and base materials.
11. Removal of existing concrete pavement and base materials.
12. Removal of existing curbs and base materials.
13. Removal of existing storm structures and storm sewer piping.
14. Removal of existing ballfield backstops and chain link fencing.
15. Salvage existing ballfield infield mix.

B. Related Sections:

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2. for related site improvement layout.
2. Division 31 Section 312000 “Earth Moving” for excavation related to pavement.
3. Division 31 Section 312020 “Trenching”, for coordination.
4. Division 32 Section 321216 “Asphalt Pavement” for related site improvements.
5. Division 32 Section 320113 “Soil Preparation” for coordination.
6. Division 33 Section 334100 “Storm Utility Drainage Piping” for coordination.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-preparation operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner, authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
3. Supplemental confirming information as deemed necessary by Contractor shall be obtained by Contractor at Contractors expense.

4. Owner's Representative shall not be responsible for any conclusions or interpretations which the Contractor may make on the basis of information provided.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. If public utility service locator will not come onto District property: Contractor shall engage private firm to verify the location of any utility within the work area before beginning work. Any utilities damaged by the Contractor shall be repaired at no cost to the Owner.

D. Do not commence site preparation operations until temporary erosion and sedimentation-control and plant-protection measures are in place. Provide County required 1x3 limestone gravel run-off mat wherever trucks leave the roads and drives to enter the work area. Remove gravel when work is done and restore grass turf.

E. Do not commence site preparation operations until Contractor obtains any required permits.

F. 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.

1.4 REGULATORY REQUIREMENTS AND RESPONSIBILITES

A. As per Federal, State, County and Local municipal requirements.

B. Contractor shall secure erosion and sedimentation control permits. Contractor shall pay permit fee costs.

1.5 SUBMITTALS

A. Submit a copy of soil erosion and control permit to Owner's Representative.

B. Submit product all product data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. SEDIMENT CONTROL FABRIC FENCE

1. Fence shall be Propex Silt Stop Sediment control Fabric, or "Approved Equal".
2. Stakes shall be 2" x 2" x 42" hardwood stakes.

B. INLET PROTECTION

1. Fabric shall be Typar 3201 by Fiberweb, Inc.
2. Debris bag shall be Siltsack by ACF Environmental.
3. Aggregate shall be MDOT 6A washed natural aggregate, no fines.

C. GRAVEL CONSTRUCTION ENTRY

1. Refer to drawings for materials.

D. TREE PROTECTION

1. Refer to drawings for materials.

PART 3 - EXECUTION

3.1 PREPARATION

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

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

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 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 PROTECTION

A. Refer to drawings for location of tree protection measures.

B. Vehicles of any kind shall not park beneath dripline of existing trees.

C. Storage of any materials shall not take place beneath dripline of existing trees.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.
2. Contractor shall locate all underground site lighting wires and gas mains and protect during construction.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's Representatives written permission.

3.5 LAWN REMOVAL AND TOPSOIL STRIPPING

A. Remove lawn before stripping topsoil, dispose of lawn off site.

B. Strip existing topsoil as noted on drawings. Stockpile in locations determined by Owner. Topsoil stockpile shall be protected at all times and shall remain free of other soil materials.

3.6 SITE IMPROVEMENTS

A. Remove existing above and below grade materials as indicated on drawings and necessary to facilitate new construction.

B. Sawcut all pavement removals full depth and at nearest joint. Sawcut edge shall remain protected at all times. Confirm limits of concrete pavement and curb removal with Owner's Representative.

C. Pavement and curb and associated base removals shall be as indicated on plans. Adjacent pavement and curbs to remain shall be protected at all times. Contractor shall review and confirm pavement, curb and base removal and proposed pavement profiles with Owner's Representative and Testing Engineer.

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.

END OF SECTON

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. Subbase and base course for asphalt paving.
2. Subbase and base course for concrete paving.
3. Drainage base for drain tile.
4. Earthwork; cut, fill, and grading.

B. Related Sections:

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2. for verification of layout and dimensioning.
2. Division 31 Section 311000 “Site Preparation” for related removals and erosion control measures.
3. Division 31 Section 312020 “Trenching”, for coordination.
4. Division 32 Section 321216 “Asphalt Paving” for grading, subbase preparation, base preparation and installation.
5. Division 32 Section 321313 “Concrete Paving” for grading, subbase preparation, base preparation and installation.
6. Division 32 Section 329113 “Soil Preparation” for grading as related to finished lawns.

1.3 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill an excavation.

B. Base Course/Concrete Paving: Aggregate layer placed between the sub-grade and concrete paving.

C. Base course/asphalt paving: Aggregate layer placed between the sub-grade and asphalt paving.

D. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

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

F. Drainage Course: Aggregate layer supporting the pavement that also minimizes upward capillary flow of pore water.

G. 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 Owner and Testing Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner. Unauthorized excavation, as well as remedial work directed by Owner shall be completed without additional compensation.

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

I. 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.

J. Subbase Course: Aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. 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.

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

1.4 QUALITY ASSURANCE

A. Pre-excavation Conference: Conduct conference at Project site.

B. Contractor shall have a minimum of 10 years - experience with similar projects.

C. Perform work in accordance with Michigan Department of Transportation (MDOT) – 2012 Standard Specifications For Construction.

1.5 PROJECT CONDITIONS

A. Utility Locator Service: Employ private utility locator service for area where Project is located before beginning earth moving operations.

B. Do not commence earth moving operations until erosion control measures are in place.

1.6 SUBMITTALS

A. Submit all product data.

B. Submit samples and sieve analysis of all aggregate base materials.

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 (75 mm) 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. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

E. Base Course/Concrete Pavement: MDOT 21AA Limestone or MDOT Class II Aggregate as indicated on plans.

F. Base Course/Asphalt Paving: MDOT 21AA Limestone

G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

H. Open Aggregate Fill: MDOT 4G

I. Where undercut of tennis court subgrade is directed by the on-site geotechnical engineer, separation or reinforcement geotextiles shall be placed over compacted subgrade. Use of separation fabric or Geogrid reinforcement fabric will be specified by the Owner's Geotechnical Engineer based upon observed field conditions. Plan to provide either AASHTO Non-woven road way separation fabric, OR Geogrid Reinforcement: such as Triaxial geogrid, Tensar TX8 as directed. Include the most expensive fabric in bid proposal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks cures, 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 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.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 SUBGRADE INSPECTION

A. Proof-roll subgrade below the concrete slabs and asphalt pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. Proof rolling shall be as directed and approved by Testing Engineer.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.5 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation as directed by Testing Engineer.

3.6 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use engineered fill.

3.7 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.

3.8 COMPACTION OF SOIL BACKFILLS, FILLS, AND BASE MATERIALS

A. Place backfill and fill soil materials in layers not more than 8 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 walkways, and pavements scarify and re-compact top 6 inches below sub-grade and compact each layer of backfill or fill soil material at 97 percent.
2. Under turf or unpaved areas, scarify and recompact top 6 inches below sub-grade and compact each layer of backfill or fill soil material at 85 percent.

D. Compact aggregate base materials beneath concrete and asphalt pavement to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Concrete and asphalt pavement, compact to 98%.

3.9 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.

B. Site Rough Grading: Slope grades to direct water away from bleachers and buildings to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Pavements: Plus or minus 1/2 inch.

3.10 SUBBASE AND BASE COURSES UNDER CONCRETE PAVEMENTS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross-slope grades.
2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 and 98 percent of maximum dry unit weight according to ASTM D 1557.

3.11 FIELD QUALITY CONTROL

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

B. Allow testing agency to inspect and test sub-grades and base courses. Proceed with subsequent earth moving operations only after test results for previously completed work comply with requirements.

C. 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.

3.12 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.

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.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil and waste materials, legally dispose of them off Owner's property.

END OF SECTION

TRENCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specifications Sections apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavate and backfill trenches for utilities and drainage systems as illustrated on drawings.
2. Compacted bed and compacted fill over utilities.
3. Compaction requirements.

B. Related Sections:

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2
2. Division 31 Section 311000 “Site Preparation”
3. Division 31 Section 312000 “Earth Moving”
4. Division 32 Section 321216 “Asphalt Paving”
5. Division 32 Section 321313 “Concrete Pavement”
6. Division 33 Section 334100 “Storm Utility Drainage Piping”
7. Division 33 Section 334601 “Underdrainage System”

1.3 REFERENCES

A. ANSI/ASTM D1557 - Moisture-Density of Soils and Soil-Aggregate Mixture.

B. Michigan Department of Transportation (MDOT): 2012 Standard Specification for Construction.

1.4 STANDARDS

A. Washtenaw and City of Dexter Standard Trenching Details and Notes.

1.5 TESTS

A. Representatives of the Testing Laboratory shall determine the adequacy of bearing surfaces prior to construction of utility.

B. Representatives of the Testing Laboratory will make all tests of backfill materials to determine their suitability for compaction and may supervise the placing of backfill.

C. Representatives of the Testing Laboratory shall have the power of rejection of materials, equipment or operating procedures of the backfilling operation. The Contractor shall replace, rework or correct work which does not meet the specifications as directed by the Owner’s Representative.

1.6 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

B. Notify Owner of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

C. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

D. Protect existing foundations and tunnel walls.

E. Grade excavation top perimeter to prevent surface water run-off into excavation.

F. Dewater trenches as required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Select bed and fill material shall be as indicated on drawings. Granular backfill shall be MDOT designated Class II.

2.2 UNDERDRAINAGE SYSTEM

A. Refer to Specification Section 02715 - Underdrainage Systems.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify pipe installation has been inspected before backfilling.

C. Verify areas to be backfilled are free of debris, snow, ice or water, and surfaces are not frozen.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Compact subgrade surfaces to density requirements for backfill material. Subgrade density shall be tested, notify Engineer as trenches are ready for testing.

3.3 EXCAVATION

A. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.

B. Correct unauthorized excavation at no cost to Owner.

C. Fill over-excavated areas under pipe bearing surfaces in accordance with Testing Engineers recommendations and Owner's direction.

D. All excavated materials shall be utilized on-site as possible and as approved and directed by the Testing Engineer. Unsuitable soils shall be disposed of off-site by the Contractor.

3.4 BACKFILLING

A. Support pipe during placement and compaction of Class II bedding fill.

B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.

C. Place and compact select fill materials in continuous layers not exceeding 8 inches loose depth.

D. Maintain optimum moisture content of backfill materials to attain required compaction density, 95% modified proctor density ASTM D1557 within the zone of influence.

3.05 TOLERANCES

A. Top Surface of Backfilling: Plus or minus 0.10 foot.

3.06 FIELD QUALITY CONTROL

A. Representatives of the Testing Laboratory may supervise the backfilling of trenches and determine their acceptability of compaction.

END OF SECTION

SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes conducting earthwork and earth change activity operations in a manner to protect Waters of the State of Michigan, storm drains, and adjacent properties from soil erosion and sedimentation. This Section also includes furnishing all materials and placing all temporary and permanent erosion control measures. This Section also includes installation, maintenance and removal at the end of the construction of gravel filters, curb and gutter inlet filters, and silt fences and posts.

1.3 DEFINITIONS

A. "Waters of the State of Michigan" include the Great Lakes and their connecting waters, lakes, ponds and streams which may or may not be serving as a County drain as defined by the drain code; or any other body of water that has definite banks, a bed and visible evidence of a continued flow or continued occurrence of water or wetlands regulated under Part 303.

1.4 REFERENCES

A. MDOT refers to the Michigan Department of Transportation 2003 Standard Specifications.

B. Guidebook of Best Management Practices for Michigan Watersheds.
http://www.michigan.gov/deq/0,1607,+7-135-3313_3682_3716-103496--,00.html

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: For earth changes, comply with the following:

1. Part 91, Soil Erosion and Sedimentation Control (SESC) of the Natural Resources & Environmental Protection Act, 1994, PA 451, as amended (Part 91).

B. ASTM Specification D4632, 4491, 4751 and 4355.

1.6 SUBMITTALS

A. Submit product information for materials proposed for use.

1.7 PERFORMANCE REQUIREMENTS

A. Implement the soil erosion and sedimentation control plan including required maintenance during construction and final removal as needed per site conditions and as required by site inspections.

B. Control runoff, soil erosion, and sedimentation. No sediment should leave the site.

C. Prevent wind erosion. No visible emissions (dust) should leave the site.

D. The Contractor will provide a Washtenaw County SESC Permit, as soil disturbance will be within 500' of Mill Creek. The planned scope of work should fall into the County's Minor Permit category and will require silt fence and inlet filters, depending upon the Contractors logistics plans.

1.8 MEASUREMENT AND PAYMENT

A. Payment for placing, maintaining temporary and permanent soil erosion control measures, and for removing temporary soil erosion control measures shall be included in the Lump Sum price bid for the project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials to be provided in accordance with MDOT Specifications.

B. Silt sacks are to be per plan detail.

C. Silt fence materials:

1. Posts: Posts shall be a minimum of 4 feet long and constructed of either pressure- treated wood or steel posts. If wood posts are used, the size may be 1-1/2" x 1-1/2" with a minus tolerance of 1/8" providing the cross sectional area is a minimum of 2.25 square inches. Steel posts shall be round, U.T., or C-shaped with a minimum weight of 1.3 lbs/foot and have projections for fastening the wire to the fence.
2. Geotextile Fabric: Fabric shall be composed of strong rot-proof synthetic fibers formed into a fabric of either the woven or non-woven type. The fabric shall contain stabilizer and/or inhibitors to make the filaments resistant to deterioration from exposure to sunlight or heat. The edges of the fabric shall be finished to prevent the outer yarn from pulling away from the fabric. The fabric shall be free of defects or flaws, which significantly affect its physical and/or filtering properties. The fabric shall have a minimum width of 24 inches. Sheets of fabric may be sewn or bonded together. No deviation from any physical requirements will be permitted due to the presence of seams.

   The fabric shall be manufactured with pockets for posts, hems with cord, or with posts reattached using staples or button head nails.

   During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protected covering which will protect the cloth from sunlight, mud, dust, dirt, and debris. The fabric shall not be exposed to temperatures greater than 140° F.

   The fabric shall meet the physical requirements of Table 1 below.

Table 1 Physical Requirements for Temporary Silt Fence Geotextiles		
Property	Test Method	Standard Fence Requirements
Tensile Strength, lbs.	ASTM D 4632	90
Elongation; %	ASTM D 4632	40 max.
Permittivity, gal/min/ft^2	ASTM D 4491	15
Apparent Opening Size, Max.	ASTM D 4751	20
Ultraviolet Degradation, 4%	ASTM D 4355	70

3. Wire staples will be No. 17 gauge (minimum) and shall have a crown at least 3/4-inch wide and legs at least 1/2-inch long. Staples shall be evenly spaced with at least five (5) per post.
4. Nails shall be 14 gauge (minimum), 1-inch long with 3/4-inch button heads. Nails shall be evenly spaced with at least four (4) per post.

PART 3 - PLACEMENT

3.1 EXAMINATION

A. Examine site and notify the Owner's representative of any issues that will not allow placement of temporary soil erosion control measures as directed herein.

3.2 GENERAL

A. Where the following events result in the need for additional or modified soil erosion and sedimentation control installations to meet the objective of the referenced procedures, provide remedial installations on a timely basis.

B. Unanticipated alterations to the construction schedule.

C. Unanticipated site conditions except Acts of God such as a tornado or fire.

D. Install temporary erosion and sedimentation control measures prior to or upon commencement of earthwork activities.

E. Install an entrance anti-tracking pad with a minimum of 50 feet in length. A geotextile filter fabric should be placed under six (6) inches of limestone aggregate.

F. Install temporary inlet protection at all adjacent and down-gradient stormwater inlets, catch basins and manholes that may be impacted.

G. Install silt fence with stakes on the site down gradient from the disturbed area. Toe in six (6) inches of the fencing material.

H. Place stockpiles and other spoil piles away from the drainage system to minimize sediment transport. Keep as few stockpiles as possible during the course of the project. If the stockpile and/or spoil pile must remain on-site overnight, or if the weather conditions indicate the change for precipitation:

1. Cover the pile with water repellent material to prevent erosion; or
2. Install silt fencing around the base of the pile to prevent transport of sediment to the stormwater system and wet the pile as needed to prevent wind erosion; or
3. Apply other control methods as appropriate to the site.

I. Where runoff enters the existing stormwater system, protect the storm system from sedimentation.
1. Temporary inlet protection must prevent the release of sediment and allow for proper drainage:
    - Use of burlap is not acceptable as a SESC measure.
    - If filter fabric is used on drains, ensure the filter fabric is placed over (not under) the storm grates to facilitate maintenance (cleaning) of the controls.
    - If high stormwater flows are expected, use silt sacks in lieu of filter fabric for drain protection. Based on site conditions select regular or high flow silt sacks as appropriate.

J. Utilize a water truck as needed for dust control.

K. Utilize a sweeping machine to remove sediment tracked onto the pavement on a daily basis at minimum. Use sweeper more frequently as dictated by site conditions.

L. Maintain erosion and sedimentation controls on a daily basis until the contract has been completed and accepted. Maintenance shall include:

1. Repair of damaged installations.
2. Replacement of lost soil erosion and sedimentation control measures.
3. Periodic removal of collected silt and sedimentation as required or directed to maintain effectiveness of the silt traps, filters and basins.

M. Correct non-conforming soil erosion and sedimentation control work on a timely basis within 24 hours, if Waters of the State are being impacted or within five (5) days if not impacting Waters of the State.

N. Complete permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area within five (5) calendar days after final grading or the final earth change has been completed. Maintain temporary control measures until permanent soil erosion control measures are in place and the area is stabilized.

O. Place all temporary soil erosion control measures.

P. All permanent measures shall be placed as soon as practical based on construction scheduling for the project.

Q. All temporary measures shall be maintained until the Owner's representative determines that the site is stable enough to allow removal.

R. The Contractor shall place cereal rye seeding at 200 lbs/acre as directed by Engineer as a temporary soil stabilization means in those areas that are not part of the work staging or work areas, but which have been disturbed. Cereal rye seeding, including mulching, shall be performed per MDOT Specification 6.53 for turf establishment.

S. Intermediate slopes created as a result of phased site removals shall also have mulch blankets for slopes 3H to 1V or steeper. Materials and placement shall be per MDOT Specification 6.53. The Contractor shall include up to 400 square yards of high velocity mulch blankets in addition to the amount shown on the plans for intermediate grading use purposes.

T. The Contractor shall include in his Bid up to 150 feet of silt fence for intermediate soil erosion control work in excess of the amount shown on the plans.

U. The Contractor shall cooperate and coordinate with the site stormwater inspector in regard to maintenance of erosion control measures.

V. Silt sacks will be placed at all inlet structures. Silt sacks to be placed per manufacturer's instructions.

W. Silt Fence installation:

1. The Contractor shall install temporary silt fence according to this Specification and as required by their own project Logistics plan and as per the requirements of public law and regulations.
2. A 6-inch deep trench shall be constructed by either a trenching machine, motor grader, or if equipment cannot be operated on the site, by hand.
3. Post installation shall start at the center of the low point (if applicable) with the remaining posts spaced six (6) feet apart. Post shall be installed with at least 18 inches in the ground. Where an 18-inch depth is impossible to achieve, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.
4. Filter fabric shall be attached to posts by wire, cord, pockets, staples, or other acceptable means. The filter fabric shall be installed such that, 6 to 8 inches of fabric is left at the bottom to be buried and a minimum overlap of 18 inches is provided at all splice joints. The fabric shall be installed in a trench, and 2 to 4 inches across the bottom of the trench in the upstream direction, respectively. The trench shall then be backfilled and compacted to prevent any flow from passing under the barrier.
5. During installation, the fabric will be rejected if it is found to have defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.
6. Maintenance and Removal: The Contractor shall maintain the silt fence until the project is either accepted or removed at the direction of the Engineer. The Contractor shall remove and properly dispose of accumulated silt as directed by the Engineer. Filter fabric shall be removed and replaced whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence.
7. Silt fence shall remain in place until the Engineer directs that it be removed. Silt fence which has been removed will remain the property of the Contractor and may be used at other locations provided it is in a condition acceptable to the Engineer.

PART 4 - CLEANUP

A. Remove temporary erosion control measures after permanent soil erosion measures are in place and the area is stabilized, unless ordered by the Owner's Representative to remain in place. Care shall be taken during removal to prevent soil erosion and sedimentation.

END OF SECTION

AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. This Section includes furnishing and placing aggregate base courses.

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

D. Michigan Department of Transportation - Division 3 - 2012 Standard Specifications for Construction.

1.4 MEASUREMENT AND PAYMENT

A. Payment for Aggregate Base Courses will be included in the lump sum price for the project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall meet MDOT Specifications for Site Work.

B. Aggregate Base: As specified on the plan.

C. Site Fill: Materials per "Soils for Earthwork", Section 310513.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected; gradients and elevations are correct, and dry.

3.1.1 AGGREGATE PLACEMENT

A. Spread aggregate over prepared substrate to the required total compacted thickness.

B. Place aggregate in maximum eight (8) inch layers and compact to 97% M.D.

C. Level and contour surfaces to elevations and gradients indicated.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

F. Placement shall conform to MDOT Specification 2:11, Subbase and 3.01, Aggregate Base Course for Site Work.

3.2 TOLERANCES

A. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/2 inch.

C. Variation from True Elevation: Within 1/4 inch.

3.3 FIELD QUALITY CONTROL

A. Field inspection and materials testing will be performed by the independent testing agency retained by the Owner.

B. Field compaction testing will be performed in accordance with ASTM D2922 and AASHTO T180.

C. If tests indicate Work does not meet specified requirements, remove Work and replace at Contractor's expense.

D. Frequency of Tests: As determined by Engineer.

END OF SECTION

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. Hot-mix asphalt paving.
2. Pavement markings.

B. Related Sections:

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2 for layout.
2. Division 31 Section 311000 “Site Preparation” for coordination.
3. Division 31 Section 312000 “Earth Moving” for subgrade preparation, fill material, unbound-aggregate subbase and base courses.
4. Division 31 Section 312020 “Trenching” for coordination.
5. Division 32 Section 321313 “Concrete Paving” for coordination.
6. Division 32 Section 321834 “Tennis Court Construction and Surfacing”, for coordination.
7. Division 33 Section 334100 “Storm Utility Piping” for coordination.

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: For each job mix proposed for the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.

B. Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

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

D. Field quality-control reports.

E. Tennis court Wear Course shall be verified at asphalt plant by Testing Engineer.

1.6 QUALITY ASSURANCE

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

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the MDOT 2012 Standard Specifications for Construction for asphaltpaving work.

1. Measurement and payment provisions and safety program submittals includedin standard specifications do not apply to this Section.

1.7 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 materials to adequately cure, or if the following conditions are not met:
1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Asphalt Leveling Course: Minimum surface temperature of 50 deg F and rising at the time of placement.
4. Asphalt Wearing Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

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

B. Coarse Aggregate: Aggregates shall be in compliance with Section 302 of the MDOT 2012 Standard Specifications for Construction and materials shall conform with Section 902 ofthe MDOT 2012 Standard Specifications for Construction.

C. Fine Aggregate: Aggregates shall be in compliance with Section 302 of the MDOT 2012 Standard Specifications for Construction and materials shall conform with Section 902 ofthe MDOT 2012 Standard Specifications for Construction.

D. Tennis Court Aggregates: Use only materials and gradations that have performed satisfactorily in previous tennis court installations. Aggregates used in the mix shall be **virgin crushed limestone** with less than 1% deleterious materials and shall contain no pyrite, clay/iron stone or other materials that could cause staining or damage to the tennis court bituminous and acrylic surfacing. Natural sands shall contain no pyrite or other materials that could cause staining or damage to the tennis court bituminous pavement or acrylic surfacing.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: MDOT PG 64-22.

B. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application. MDOT designated SS-1h

C. Water: Potable.

2.3 AUXILIARY MATERIALS

A. 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.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes meeting MDOT 2012 Standard Specifications for Construction and complying with the following requirements.

B. Mixes – Profiles As Shown On Drawings

1. Standard Duty Bituminous Pavement
   Leveling Course: MDOT 13A
   Wearing Course: MDOT 36A
2. Heavy Duty Bituminous Pavement
   Leveling Courses: MDOT 13A
   Wearing Course: MDOT 36A
3. Bituminous Walkway Pavement
   Leveling/ Wearing Course: MDOT 36A
4. Bituminous Playground/ Basketball Pavement
   Leveling Course: MDOT 13A
   Wearing Course: MDOT 36A
5. Tennis Court Bituminous Pavement
   Leveling Course: MDOT 13A
   Wearing Course: MDOT 36A – No RAP

2.5 JOINT SEALANT

A. Between the concrete curb at fencing and the asphalt court pavement, install the following Joint Sealant: D-3405 Parking Lot Sealant by Right Pointe Company, 234 Harvestore Drive, Dekalb, IL 60115, 888.755.5700, or Approved Equal. Verify compatibility with Tennis Court Coatings manufacturer.

B. Within the asphalt courts at control joints and any other cracks within the asphalt fields, install sealant recommended by the coatings manufacturer. Submit that sealant for approval. Color match the interior sealant to the tennis court surfacing. Install appropriate backer rod.

C. Install both sealants at substantial completion and again one year after substantial completion, as a part of the base bid proposal.

2.6 PAVEMENT MARKING

A. Pavement Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II.

1. Color: Colors shall be as indicated on plans.
2. Roundness: Minimum 75 percent true spheres by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Remove and reinstall any tennis court fencing components as required for specified asphalt placement and performance. Replace any damaged asphalt components.

C. 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. Proof-roll to be observed by Testing Engineer.

1. Complete proof-roll as directed by Testing Engineer.
2. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
3. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons, or as directed by Testing Engineer.
4. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Testing Engineer and Owner, replace with compacted backfill or fill as directed by Testing Engineer and Owner.

3.2 PATCHING

A. Asphalt Pavement: Sawcut perimeter of patch area and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches into adjacent sound pavement, unless otherwise directed. Cut excavation faces vertically and remove excavated materials - protect base material from adjacent pavement from undermining pavement to remain. Compact existing subgrade or base material per drawings.

B. Tack Coat: Before placing patch material, apply tack coat uniformly to base material and adjacent vertical 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 as required.

C. Placing Patch Material: Confirm compaction of base materials, partially fill excavated pavements with hot-mix asphalt leveling mix and, while still hot, compact. Cover asphalt leveling course with compacted, hot-mix surface wearing course finished flush with adjacent surfaces

3.3 SURFACE PREPARATION

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

B. Tack Coat: Apply uniformly to surfaces of existing pavement and face of abutting concrete surfaces at a rate of 0.05 – 0.15 gal./sq. yd.
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Place tack coat on all abutting concrete and asphalt surfaces.
   3. Avoid smearing or staining of adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected areas.
   4. Retain first paragraph below for full-depth asphalt pavement.

3.4 PLACING HOT-MIX ASPHALT

A. Each tennis court lift shall be installed as a continuous hot-pour without use of cold or bonded joints.

B. 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 leveling and wearing courses in number of lifts and thickness indicated on drawings.
   2. Place hot-mix asphalt courses 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.

C. Place paving in consecutive strips not less than 10’ 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 approximately 1 to 1 ½” from strip to strip to ensure proper compaction of mix along longitudinal joints.
   2. Complete a section of asphalt leveling course before placing asphalt wearing course.

D. 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.

3.5 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 12 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. Tennis court saw-cut control joints shall be sealed using products and methods recommended by tennis court coatings manufacturer for compatibility with acrylic coating system. Sealant shall not protrude above top of joint or cover bituminous court surface. See joint sealant materials specification within section 2.5.

3.6 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: 92 percent of reference maximum theoretical density according to ASTM D 2041, 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. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

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

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

3.7 PAVEMENT MARKING

A. Apply temporary and permanent pavement marking in accordance with manufacturer's instruction per layout of plans.

B. Pavement surface shall be clean and dry prior to temporary pavement marking and clean, dry and cured for 30 days prior to permanent painting.

C. Apply paint using mechanical equipment for lines and stencils for painting directions and identification.

D. Paint edges shall be clean and sharp.

E. Protect fresh paint until it is dry.

F. All barrier free parking spaces shall have the handicap symbol (wheel chair).

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/4 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 Course: 1/4 inch.
2. Surface Course: 1/8 inch.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections of materials, and to observe Contractor's field quality test, but Contractor shall perform all field work.

B. Before tennis court coating cleaning takes place, Contractor shall Flood water on all finish asphalt surfaces to determine if any ponding areas thicker than a nickel exist(s) after 24 hours of water spray. If so, repair or remove and replace asphalt as required to achieve no water ponding before applying tennis court surface coatings.

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

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

E. Once tennis court coatings are applied, no standing water will be acceptable 24 hours after a rain event for one year after installation and Contractor shall so guarantee this obligation.

F. Comply also with the requirements of Section 321834 TENNIS COURT CONSTRUCTION AND SURFACING.

END OF SECTION

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
2. Concrete Pavement
3. Concrete Curbs
4. Concrete Ramps and Detectable Warning Plates
5. Playground Sidewalks with Turndown Edge

B. Related Sections

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2 for field layout and verification.
2. Division 31 Section 311000 “Site Preparation” for removals.
3. Division 31 Section 312000 “Earth Moving” for subbase establishment and preparation, grading and pavement base materials and installation requirements.
4. Division 32 Section 321834 “Tennis Court Construction and Surfacing”, for coordination.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Submit product data on joint fillers, sealants, admixtures, curing compounds, joint dowels and pavement reinforcement.

B. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

2. Submit samples of detectable warning plates cut to match specified radii.

1.4 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.

B. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

C. Obtain materials from same source throughout.

D. Perform work in accordance with Michigan Dept of Transportation (MDOT) - 2012 Standard Specification for Construction.

1.5 REFERENCES

A. ANSI/ASTM D1751 – Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

B. ASTM A615 – Deformed and Plain Billet-Steel for Concrete Reinforcement.

C. ASTM C33 – Concrete Aggregates.

D. ASTM C94 – Ready Mixed Concrete.

E. ASTM C150 – Portland Cement.

F. ASTM C260 – Air-Entrained Admixtures for Concrete.

G. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.

H. ASTM C494 – Chemical Admixtures for Concrete.

I. Michigan Dept. of Transportation (MDOT) – 2012 Standard Specification for Construction.

1.6 TESTS

A. The Owner will employ a qualified Testing Laboratory to furnish all required testing and inspection.

B. Testing firm will take cylinders, perform slump and air entrainment tests in accordance with ACI 301.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete on frozen or muddy base, or when rain is threatening.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Portland cement Type I.

a. Fly Ash: ASTM C 618, Class C or Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source.

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.

2.2 FORMING MATERIALS

A. Forms for unexposed finishes: Wood or steel form materials, profiled to suit conditions.

2.3 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.4 PAVEMENT JOINTS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips, size as indicate on drawing.

B. Polyurethane Sealant: Two-component, non-sag and not staining to meet ASTM C920 and Federal Specification TT-5-002278, color to be selected.

C. Filler Material: Material shall be closed cell polyethylene joint filler foam backer rod complying with ASTM D 1622,

2.5 AGGREGATE BASE AND GRANULAR BASE

A. Refer to Section 312000: Earth Moving

2.6 JOINT DOWELS

A. Construction dowels shall be made from steel, epoxy coated on all surfaces, 5/8” x 18”, or as indicated on drawing.

B. Dowel caps shall be Speed Dowel as manufactured by Greenstreak, 1.800.352.9504, or approved equal.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), 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 Pavement: 5 inches, plus or minus 1 inch.
4. Slump Limit Curbs: 2 inches, plus or minus 1 inch.
5. Air Content: 6 percent plus or minus 1.0 percent.

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.

2.9 DETECTABLE WARNING PLATES

A. Manufacturer: Engineered Plastics, Inc.
300 International Drive, Suite 100
Willamsville, New York 14221
800.682.2525

B. Model: Amor-tile Tactile Systems, Cast-In-Place

C. Color: To be determined

D. Quantity: Refer to Drawings

2.10 CONCRETE REINFORCEMENT

A. Synthetic Fiber Reinforcement shall be; Fibermesh 300 by Propex, 800.621.1273

B. Dowel Baskets, 1 ¼" Diameter bars, set 12" O.C., in accordance with MDOT Detail R-40-H. **BO1**

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding. Verify required compaction with Testing Engineer.

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

C. Base course installation, refer to Section 312000: Earthmoving.

3.2 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.

3.3 JOINTS

A. General: Form construction, isolation, and contraction 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.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints. When placing new curbs against existing curbs, provide two each ¾" dowel rods drilled into existing curb ends anchored into the existing curb with cement: fine sand paste or epoxy adhesive.

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.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness:

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.4 SYNTHETIC FIBER REINFORCEMENT

A. Add synthetic fiber reinforcement to concrete mixture in accordance with manufacturer's instructions.

B. Application Rate: Add synthetic fiber reinforcement at minimum application rate of 2.0 pounds per cubic yard of concrete.

C. Mix synthetic fiber reinforcement in accordance with mixing time and speed of ASTM C 94 to ensure uniform distribution and random orientation of fibers throughout concrete.

3.5 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, placing, and consolidating concrete.

C. 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.

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

E. 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.

3.6 RAMP AND DETECTABLE WARNING PLATES

A. Install as indicated on drawings.

B. Detectable warning plates to be cut uniformly to match curb radius; no gaps shall exist between individual plates.

3.6 FLOAT FINISHING

A. Concrete finish to match existing abutting concrete finish. Contractor shall review in field with Owner's Representative prior to finishing work. Conditions vary.

B. General: Do not add water to concrete surfaces during finishing operations. See Para.3.5.E for initial floating operation.

C. 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-to-Fine-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.
2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

3.7 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. x h (1 kg/sq. m x h) 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. Retain one or more options in paragraph below.

E. Curing Methods: Cure concrete by curing compound.

3.8 PAVING TOLERANCES

A. Comply with tolerances in ACI 117, and Barrier Free requirements. Comply with all barrier free requirements.

3.9 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. 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.

C. 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.

END OF SECTION

TENNIS COURT CONSTRUCTION AND SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 SUMMARY

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary for complete acrylic tennis court surfacing and line markings, nets, line posts, and anchor tie downs.

B. Related Sections:

1. Division 31 Section 311000 “Site Preparation”
2. Division 31 Section 312000 “Earth Moving”
3. Division 32 Section 321216 “Asphalt Paving”
4. Division 32 Section 323113 “Chain Link Fences and Gates”

2.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary for acrylic tennis court surfacing and line markings.

2.3 QUALITY ASSURANCE

A. Reference Standards:

1. Member American Sports Builders Association (ASBA).

2. Certified (ASBA) installer.

B. The installation contractor must be able to supply the Owner, upon request, a list of twenty (20) outdoor tennis courts surfaces with the material accepted over the last five (5) years and have required no maintenance.

2.4 SUBMITTALS

A. Contractor shall submit complete shop drawings of all tennis court markings 3 weeks after given notice to proceed.

B. Contractor shall submit manufacturer's data sheets and color samples for all materials.

C. Contractor must submit copies of the Material Data Safety Sheets (MSDS) for all products to be used, before materials are delivered to the site.

2.5 WARRANTY

A. Tennis court surfacing installer and manufacturer shall provide a five year warranty against any defects with the surfacing material.

PART 2 - PRODUCTS

2.1 TENNIS COURT SURFACE MATERIAL

A. This material shall be a fully pigmented system in-depth color. The material shall be from one of the following approved manufacturers:

1. Plexipave Standard – ITF Category 3 – Pace: Medium, 800.225.1141, Goddard Coatings Sports Surfaces, 248.393.6320, Pontiac, Michigan. “Or Approved Equal”.

2. System Components:

a. Plexipave Acrylic Resurfacer.
b. Fortified Plexipave (Plexipave Color Surface System and Plexipave Plexichrome).
c. Plexicolor Hi-Hide Line Paint.
d. Crack sealant suitable for the joint in the asphalt, compatible with the tennis court coating, color matched to adjacent surface color and approved by the coating manufacturer.

B. Acrylic Coloring of Courts shall be selected by Owner from list of manufacturer’s standard colors.

C. Asphalt or tar in any form will not be permitted in any coating. The color shall be pure acrylic-type containing no asphalt or tar emulsions and no vinyl’s, alkyds or non-acrylic resins. The color finish system shall contain factory-mixed compositions requiring only the addition of water on the job site. The material shall be delivered to the site in sealed containers with the manufacturer's label affixed.

2.2 EQUIPMENT

A. Tennis Nets

1. Manufacturer: Douglas Industries, 800.553.8907.
2. Model: No. TN-36 with side pockets and wooden dowels.
3. Quantity: 10 (Ten)

B. Net Posts and Sleeves

1. Manufacturer: Douglas Industries, 800.553.8907.
2. Model: DTP-37 Green, 3” O.D., with net lacing, 3/16” Steel Wall, with ground sleeves.
3. Quantity: 10 (Ten) Set

2.3 BITUMINOUS PAVEMENT

A. Refer to Specification Section 321216 Asphalt Paving.

2.4 CHAIN LINK FENCING AND GATES

A. Refer to Specification Section 323113 Chain Link Fencing and Gates.

Remove and replace enough chain link fencing to allow proper asphalt and tennis court coating placement per specifications. Replace any fencing components which are damaged.

PART 3 – EXECUTION

3.1 ACCEPTANCE

A. Prior to beginning work Tennis Court Surfacing Contractor, Bituminous Pavement Contractor, Owner's Representative, and Testing Agency shall review the court surface for acceptance.

1. Bituminous Pavement Contractor shall flood the entire asphalt surfacing, to confirm 'Bird Bathes'. Any ponding water deeper than a nickel and holding water after one hour of 'sitting' time shall be repaired by the Bituminous Pavement Contractor by acceptable means to Tennis Court Surfacing Contractor and Engineer at no cost to Owner.

3.2 INSTALLATION

A. Plant Mix Bituminous Asphalt shall cure for a minimum of 21 days prior to application of surfacing materials.

B. Tennis courts shall be cleaned using detergent specified by coatings manufacturer, a stiff bristle broom, and a gas-powered, water based pressure spray unit capable of generating 2500 psi. at the nozzle tip, to remove excess oil-tar, all dirt, and debris.

C. Application of the system shall be in strict accordance with then manufacturer's specifications. If the system is installed by someone other than the manufacturer, an experienced manufacturer's representative shall supervise the installation of the material.

D. The surface to receive the tennis surface system as specified shall be checked to be free from grease, oil and other foreign materials before starting the work. The Contractor shall remove by brush, vacuum or blower all dust, dirt, imbedded soil, etc. and shall mechanically wash all pavement surfaces.

E. Holes, cracks and spalled areas shall be clean of dirt, water and deleterious materials before any coating operations are started. After cleaning and treating these areas with the proper filler materials, the application shall proceed only if the surfaces are dry and clean and the temperature is at least fifty degrees Fahrenheit (50°F). and rising and the surface temperature is not in excess of one hundred forty degrees Fahrenheit (140°F).

F. After all leveling and patching, the tennis courts shall receive two (2) coats of Plexipave Acrylic Resurfacer. Mix with potable water and approved (60 – 80 mesh) silica sand per manufactures specifications. Apply in strict accordance with manufacturer's specifications and instructions.

G. Following approval of the filler coating, the tennis courts shall receive two (2) coats of Fortified Plexipave acrylic color playing surface. The Fortified Plexipave system shall consist of and approved blend of Plexipave Color Surface System and Plexipave Plexichrome. Both shall be mixed individually and jointly per manufacturers specifications for a 'Medium Pace Court'. The Fortified Plexipave acrylic color playing surface shall be applied in strict accordance with manufacturer's specifications and instructions for both the base coat and the finish coat.

H. Care shall be taken to protect adjacent areas and structures (fences, posts, sidewalks, buildings, etc.) which are not to be coated. If coated, remove immediately before drying occurs.

I. Contractors must notify the Landscape Architect of all applications, 48 hours prior to installation.

J. Acceptability of work: The finished surface shall be constant in color and texture, free from voids, depressions, joint marks, ridges, wheel marks or other imperfections. If any of these become apparent during the installation of the system, the contractor will correct prior to the final coat application, or the surface shall be rejected.

3.3 LINE MARKINGS

A. Line markings shall be Plexipave HI-Hide Plexicolor Line Paint. Apply in strict accordance with manufacturer's specifications and instructions.
B. Upon completion and acceptance of the tennis surface, this Contractor shall prepare and paint lines for tennis. Unless otherwise noted, tennis lines shall be white.

C. The lines shall be masked on both sides with an acceptable tape. Each measurement shall be accurately set to within 1/8" tolerance in accordance with the American Sports Builders Association (ASBA). Each court area shall be marked for doubles play.

D. All areas that have overlapped in color shall be corrected and non-appearing. All overspray in excess shall be corrected and non-appearing. No spraying shall be done with the wind factor above seven (7) mph.

3.4 EQUIPMENT INSTALLATION

A. Nets, Net Posts and Sleeves; Refer to drawings.

B. Net Anchor; Refer to drawings.

END OF SECTION

CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications sections apply, to work of this section.

1.2 SUMMARY

A. Section Includes:

1. Fence framework, fabric and accessories.
2. Excavation for post footings.
3. Concrete footings.
4. Tennis court fencing and gates.

B. Related Sections:

1. Division 31 Section 311000 “Site Preparation”
2. Division 31 Section 312000 “Earth Moving”
3. Division 32 Section 321313 “Concrete Paving”
4. Division 32 Section 329200 “Turf and Grasses”

1.3 REFERENCES

A. ANSI/ASTM A123 - Zinc (Hot Galvanized) Coatings of Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

B. ANSI/ASTM F567 - Installation of Chain Link Fence.

C. ASTM A120 - Pipe, Steel, Black and Hot-dipped Zinc-coated (Galvanized) Welded and Seamless, for Ordinary Uses.

D. ASTM A392 - Zinc-coated Steel Chain-Link Fence Fabric.

E. ASTM C94 - Ready-mixed Concrete.

F. ASTM A525 General Requirements for Steel Sheet, Zinc-Coated (galvanized) by Hot-Dip Process.

G. Michigan Department of Transportation (MDOT): 2012 Standard Specifications for Construction.

1.4 QUALITY ASSURANCE

A. Manufacturer: Furnish certificate of inspection stating that the material has been sampled, tested and inspected per ASTM A120 or ASTM A525 and A392.

1.5 SUBMITTALS

A. Submit complete shop drawings and product data for review and approval.

B. Submit complete system components: fabric, posts, rails, connections, gate hinge and latch, and welded gate frame connection.

1.6. WARRANTY

A. Warranty on all galvanized fencing and gates shall be one (1) year from final acceptance.

B. Warranty on all welds shall be for a period of ten (10) years from final acceptance.

C. Warranty on all vinyl coated material shall be for a period of fifteen (15) years from final acceptance.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Fabric: All fabric shall be ASTM A392, (gauge and mesh size as shown on plans), mesh, zinc coated after weaving, Class 1 coating, top and bottom selvage, knuckled finish. Fabric height as indicated on plans.

B. Post, Rails, and Braces: ASTM A120, Type I, Schedule 40, steel pipe with 1.8 ounce per square foot zinc coating inside and outside applied by hot dipped process.

1. Pipe diameter for posts, rails and braces as indicated on plans. Posts shall be of sufficient length to extend into the footings as indicated on plans.

C. Fabric Connection: 1/4" x 3/4" tension bars with 11 gauge pressed steel bands. Nine (9) gauge steel wire ties. Hog rings shall be minimum 11 gauge.

D. Post Tops:

1. Heavy pressed steel, galvanized, 1.8 ounce per square foot, zinc coating, water tight. Top rail to pass through base of top.

E. Miscellaneous Fittings: All steel fittings and accessories to be hot dip galvanized with a minimum zinc coating of 2 ounces per square foot of surface or be malleable iron as specified.

F. Concrete: ASTM C94; MDOT designated 30M. Commercial grade of concrete containing 517 pounds (5.5 sacks) of cement per cubic yard. MDOT designated 30P may be substituted in lieu of grade 30M.

G. Bolts, Nuts, Locknuts, Washers: Stainless steel or hot-dip galvanized.

H. Gates: All gates shall be fabricated in the shop. Contractor shall confirm gate post dimensions and gate frame dimensions prior to fabrication. Gate frame rails shall be machine cut to form a cupped fit to mate with the post. All welds shall be completed by a certified welder. Welds shall be clean and uniform without overlapping strike marks. Welds shall not exceed ¼” in width. Immediately following fabrication all welds shall be ground smooth and clean, tape limits of grinding and sandblast weld, following sandblasting prepare metal and apply cold galvanizing material per manufacturers recommendations. At second year following installation all welds shall be inspected for rust. If any degree of rust is present the materials shall be removed and replaced.

I. Cold Galvanizing Material: ZRC Zero-VOC Water Based Cold Galvanizing Compound, Meeting Federal Specification DOD-P21035P, Type II, and MIL-P-26915A, Type I, Class B. ZRC Worldwide, 145 Enterprise Drive, Marshfield, Massachusetts, 781.319.0400. Or Approved Equal.

2.2 VINYL COATING

A. All fencing, gates, and fencing components shall be vinyl coated, color shall be black. System shall meet or exceed Merchants Metals Color Bond I. Merchants Metals 810.227.3036.

B. Vinyl coated components shall meet all requirements and standards for materials outlined within this specification.

C. Vinyl coating shall consist of thermally fused and bonded material, vinyl coating shall be PVC, 10 – 15 mils minimum, color shall be black.

D. Warranty for vinyl coated system shall be fifteen (15) years.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Stake fence layout, including all terminal and gate posts for Owner's and Engineers approval.

B. Post holes are to be excavated per Plan. Contractor shall review all excavation with Owner and independent testing agency retained by the Owner. Footings completed without review and approval shall be rejects and replaced.

C. Posts are to set vertical, plum and in line. Posts are to extend into concrete footings and tennis bituminous paving detailed on drawings.

D. Place terminal post at all ends, corners, and at the beginning and end of slope grades. Maximum spacing 200 feet on center.

E. Place line posts as indicated on Plans, equal spacing.

F. Provide top rail through line post tops and splice with 7 inch long rail sleeve. All retrofit railings shall contain a heavy spring to take up expansion and contraction.

G. Top, intermediate, and bottom rails shall be secured to posts using manufacturer's standard fittings. All rails shall be parallel to the grade.

H. Place chain link fabric on the side of fence as indicated on plans, one (1) inch above grade. Fabric shall be tied loosely to top rail and then stretched taut so that maximum deflection of fabric is two (2) inches when a 30 pound pull is exerted perpendicular to the center of panel. Fabric shall have a smooth uniform appearance free from sag.

I. Cut the fabric by untwisting a picket and attach each span independently at all terminal post.

J. Join rolls of wire fabric by weaving a single picket into the ends of the rolls to form a continuous mesh.

K. Height of fabric shall be as indicated on drawings.

L. Fabric shall be connected to terminal post by use of tension bar clamped to the post by steel bands 12 inches apart.

M. Fabric shall be fastened to the line post with wire ties 12 inches apart.

N. Fabric shall be fastened to the top, intermediate and bottom rail with wire ties 12 inches apart.

O. Prior to fabrication of gate frames, contractor shall field measure gate posts at all locations.

P. Gates shall be installed true to opening and plumb in a closed position. All existing gates shall be adjusted to swing free and provide even clearance tolerances on al sides.

**END OF SECTION*

SOIL PREPARATION

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 planting soils for lawns.

B. Related Sections:

1. Division 31 Section 311000 “Site Preparation” for coordination.

1.3 DEFINITIONS

A. Imported Soil: Soil that is transported to Project site for use.

B. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

C. Topsoil: Imported soil; or manufactured soil that has been modified as specified with required soil amendments to produce a soil mixture best for turf growth.

D. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

E. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

F. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Submit a certified analysis of topsoil from all sources from an independent testing laboratory prior to placement. Topsoil shall meet criteria within the paragraph 2.1 deficiencies shall be corrected prior to placement of topsoil.

C. Submit fertilizer product data sheet.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Planting Soil Mix for Seeding: Topsoil shall be from site topsoil stockpile or imported as required for site restoration, shred before spreading. Contractor shall ensure that all existing topsoil utilized for lawns shall be free of extraneous materials (debris, sticks, stones, etc.) larger than ½".

1. Topsoil from site stockpile shall be amended to meet the following criteria as deeded appropriate by the independent testing agency retained by the Owner. Cost to amend topsoil shall be based on Geotechnical Engineers report and shall be an additional cost to the Owner.

a. pH range between 5.5 and 6.5.
b. Soluable salts content 500 ppm (parts per million) maximum.
c. Organic content between 5 and 25 percent.
d. Clay content between 5 and 25 percent.

2. Imported topsoil, shall meet the criteria outlined within paragraph 2.1.A.1. Contractor shall provide certified analysis of topsoil from an independent testing laboratory prior to placement, results shall be submitted to the independent testing agency retained by the Owner for approval. Topsoil not meeting defined criteria shall be amended as required by Contractor. Topsoil shall be weed-free and free of extraneous material (stones, sticks, etc.) larger than ½".

a. pH range between 5.5 and 6.5
b. Soluble salts content 500 ppm (parts per million) maximum
c. Organic content between 5 and 30 percent
d. Clay content between 5 and 25 percent

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomite limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.3 ORGANIC SOIL AMENDMENTS

A. Acceptable organic soil amendments shall be as determined by Geotechnical Engineer within their topsoil analysis and recommendations.

2.4 ADDITIONAL TOPSOIL AMENDMENT FIELD AREA AROUND TENNIS COURTS**ADD 01**

A. In addition to topsoil criteria required within Paragraphs 2.1, 2.2, and 2.3 Contractor shall amend Turf Area shall add 15% specified sand (by volume) to topsoil mix.

PART 3 - EXECUTION

3.1 GENERAL

A. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in subsoil or topsoil.

3.2 PLACING TOPSOIL OVER EXPOSED SUBGRADE FOR LAWNS

A. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches. Remove stones larger than ½" inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

B. Spreading topsoil for Lawns: Spread topsoil to a minimum total depth of 4 inches but not less than as required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

C. Compaction: Compact topsoil to 85 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place. Ensure compaction and full depth

D. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.3 PROTECTION AND CLEANING

A. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform seeding operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

B. Remove surplus soils and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose off site unless otherwise indicated.

END OF SECTION

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Seed bed preparation, fertilization, seeding, mulching, maintenance and seeding warranty.

B. Related Sections:

1. Division 32 Section 329113 “Soil Preparation” for topsoil preparation and placement.

1.3 DEFINITIONS

A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

B. Weeds: includes dandelion, jimsonweed, quackgrass, horsetail, morning glory, rush grass, mustard, lambsquarter, chickweek, cress, crabgrass, Canadian thistle, nutgrass, poison oak, blackberry, tansy ragwort, Bermuda grass, Johnson grass, poison ivy, nut sedge, nible will, bindweed, bent grass, wild garlic, perennial sorrel and brome grass.

C. Topsoil: Use topsoil from site. See Section 329113 “Soil Preparation” and drawing designations for topsoil and seeding.

1.4 REFERENCES

A. Michigan Department of Transportation (MDOT) – 2012 Standard Specification for Construction.

1.5 INFORMATIONAL SUBMITTALS

A. Certification of grass seed.

1. Certification of each seed mixture.

B. Product certificates and data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when seeding work is in progress.
2. Pesticide Applicator: State licensed, commercial.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

PART 2 - PRODUCTS

2.1 SEED MIXES

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Mixture

1. Quality: Seed of grass species as listed below with not more than 0.5 percent weed seed:

Mix Type: **B01**
Supplier: Rhino Seed, 800.482.3130
Product: 'Sports Turf'
Seeding Rate: 250 lbs/acre

2.2 FERTILIZERS

A. Recommended starter fertilizer for grass with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil as indicated within topsoil analysis, and shall contain a minimum of 4% phosphorus acid, 2% soluble potash and sufficient nitrogen to provide one pound of actual nitrogen per 1000 square feet of lawn area.

2.3 STRAW MULCH

A. Straw mulch shall be threshed straw, oats, spring wheat, spring barley, or spring rye, chopped in 8" to 12" length and containing no noxious weeds.

2.4 TACKIFIER

A. Tracer Tackifier, Reinco Inc., 800.526.7687.

2.5 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 TURF AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

C. Before seeding, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 PLANTING SEASON

A. April 1st through May 31st or August 1st through October 10th unless otherwise noted on plans or directed by Landscape Architect.

3.3 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil.

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix fertilizer thoroughly into upper two inches (2") of topsoil

3.4 MECHANICAL SEEDING

A. Sow seed with mechanical seeder only.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed immediately following rain, when ground is dry, or during windy periods.

B. Sow seed at a total rate of 250 lbs per acre.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Within 24 hours of seeding, all areas shall be mulched using straw mulch and tackifier. Mulch shall be spread evenly with extreme care so as to leave the seeded surface with a minimum amount of damage.

1. Straw mulch shall be applied uniformly at a rate of approximately 2.5 tons per acre on seeded areas. The mulch shall be loose enough to permit air to circulate but compact enough to prevent erosion.

2. Apply tackifier immediately following installation of mulch. Apply tackifier at manufacturers recommended application rates.

3.5 TURF MAINTENANCE

A. Mow grass a minimum of three (3) times at regular intervals to maintain a maximum height of 3 inches. Do not cut more than 1/3 of grass at any one mowing.

B. Immediately remove clippings after mowing and trimming.

C. Water the lawn 3 times per week minimum or more frequently as required until final acceptance to prevent grass withering, to ensure dense growth and prevent soil from drying out. Arrangements for water source are Contractor's responsibility.

D. Control and prevent the growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from the improper use of herbicides.

E. Immediately reseed areas which show bare spots.

3.6 ACCEPTANCE

A. It is the responsibility of the Contractor to establish a dense stand of grasses, free from lumps and depressions. Any part of the area that fails to show a uniform germination shall be reseeded and maintained. Reseeding shall continue until a dense stand of turf is established and accepted. Damage to seeded areas resulting from erosion shall be repaired by the Contractor. Scattered bare spots will not be allowed over 3% of the area.

B. Acceptance: When the above requirements of the specifications have been fulfilled, the Contractor will request acceptance of the lawn areas and if accepted the Owner will continue with the turf maintenance. Any areas that are not acceptable at this time shall be reseeded and will continue under the Contractors maintenance until accepted by the Owner. Continued maintenance shall include watering until final acceptance as necessary to keep the seeded lawn areas in a thriving condition. Continued maintenance of lawns shall also include mowing whenever the turf reaches a height of three (3) inches.

**END OF SECTION*

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.
3. Playground Underdrainage System.

B. Related Sections

1. Division 00 Section 002413 “Scopes of Work for Bid Categories” Item B.2 for field layout and verification.
2. Section 311000 “Site Preparation” for removals.
3. Section 312000 “Earth Moving” for subbase establishment and preparation, for aggregate base installation and compaction.

1.3 ACTION SUBMITTALS

A. Product Data: For geotextile filter fabrics and perforated pipe.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:

1. NPS 6 and Smaller: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
2. NPS 8 and Larger: ASTM F 667; AASHTO M 252, Type CP; or AASHTO M 294, Type CP; corrugated; for coupled joints.
3. Couplings: Manufacturer's standard, band type.

B. Perforated PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

2.2 SOIL MATERIALS

A. Soil materials are specified in Section 312000 "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 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 UNDERDRAINAGE SYSTEM

A. Excavate for underdrainage system after subgrade material has been compacted but before drainage course has been placed. Include horizontal distance of at least 6 inches between drainage pipe and trench walls. 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. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive or tape.

E. Install drainage piping per City of Dexter standards. Ensure drainage piping is well embedded into yard drains where shown. Install manufacturer’s standard bolt down cast iron solid top on all yard drains.

F. Wrap geotextile fabric around pea stone bottoms, sides and top to prevent silting. Fill drainage trench with 3/8” to 3 /4” crushed stone or pea stone to within 6” of adjacent grade. Backfill over fabric enclosed French drain with 6” screened topsoil and seed as specified.

3.3 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.

3.4 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