PROJECT:	Axtell Public Schools Outdoor Athletic Complex Renovations	PROJECT NO.	L14098
FROM:	BVH Architects	DATE:	06/24/2014
TO:	All Potential Bidders	ADDENDUM	#1

This Addendum is issued by the Architect to all bidders of record prior to receipt of proposals. Bidders shall acknowledge receipt of this addendum by so indicating on the Proposal Form. Failure to do so may subject Bidder to disqualification.

All information and instructions given herein shall become a part of the Contract Documents.

PROJECT MANUAL

1. Add Sections:
    a. 312000 – Earth Moving
    b. 321216 – Asphalt Paving
    c. 321313 – Concrete Paving
    d. 321373 – Pavement Joint Sealants
    e. 321823.33 – Running Track Surfacing
    f. 334100 – Storm Utility Piping

END OF ADDENDUM

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Shaping and sloping of all cut and fill areas, including placing, compacting, and rough grades.
2. Trench excavation and backfill for utility trenches.
3. Rough and fine grading to conform to the grades, lines and contours shown on the Drawings.
4. Placing of topsoil.
5. Granular fill.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. “Geotechnical Engineering Report” for soils recommendations.

1.03 REFERENCES

A. ASTM D698 Standard Proctor, ASTM D1557 Modified Proctor Tests for Moisture Density Relations of soils and soil aggregate mixture.

1. Site Information: Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn by the Contractor. Data are made available for convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

1.04 QUALITY ASSURANCE

A. Soil testing shall be arranged and paid for by the Owner. The Contractor shall be responsible for the cost of all retests due to initial tests failing to meet specifications. The Contractor shall also be responsible for scheduling soil testing at least 72 hours prior to needing the testing.

B. In general, the services of the soils engineer shall include, but are not limited to the following:

1. Perform classification tests and determine moisture density relations for materials used for fill and backfill.
2. Test and approve subgrades under foundations, floor slabs and pavements.
3. Perform soil density tests, including observation and testing during compaction of fill and

preparation of subgrade to check suitability of soils, proper moisture content and degree of compaction.

C. The following minimum number of compaction and moisture tests, in accordance with appropriate ASTM procedures, shall be made, where directed, in the designated areas:

DESIGNATED AREA	NUMBER OF TESTS
All lifts of fill	1 test per 3000 square feet or per smaller separate area prepared.
Completed subgrade below slabs on grade	1 test per 1000 square feet or per smaller separate area prepared.
Completed subgrade for drives and parking areas	1 test per 3000 square feet of large areas or per 100 lineal feet of area less than 50 feet in width or per smaller separate area prepared.
Completed subgrade for walks	1 test per every 100 lineal feet
Backfill for foundations	1 test horizontally every 100 feet and for every one-foot of vertical fill.

Backfill for utility trenches:

Depth Over Top of Pipe	**Location of Test**	**Frequency of Test**
0-5 Feet	Every foot	Every 100 Lin. Feet
5-12 Feet	Every 2 feet	Every 100 Lin. Feet
Over 12 Feet	Every 2 feet	Every 100 Lin. Feet

1.05 PROTECTION

A. Carefully maintain all bench marks, monuments, stakes, and other reference points and replace same if disturbed or destroyed.

B. Exercise extreme care to protect all existing underground and overhead utilities. Repair all utilities damaged or destroyed during construction.

C. Protect trees, shrubs, lawns, and other features which are to remain after construction is completed.

D. Properly dispose of all waste materials. On-site burial will not be allowed.

E. Protect all excavations from the action of the elements. Keep all excavations free of water and/or snow at all times during the entire progress of construction, regardless of the cause, source or nature of the water. Temporarily grade areas adjacent to excavations to prevent excessive moisture from entering excavations. If water enters excavations, or other construction areas, dewater promptly using means which will ensure dry excavations and the preservation of all lines and grades. Provide ample means and devices at all

times during construction to ensure prompt and adequate removal of water. Where soil has been softened or eroded by actions of the elements remove all damaged areas, replace soil and recompact as required by these specifications.

F. Provide for surface drainage during construction of the project so at all times there is positive drainage away from the building area. Soils in the building area, under paving and walks, and within 20 feet of the building perimeters, shall be protected against moisture content increase throughout the construction period.

G. Guard against any movement, settlement or collapse of all excavations, buildings, structures, paved areas, drives, sidewalks, streets, utility items or any other item adjacent to or within the construction limits of this project. Adequately brace all walls and other construction during backfilling and compacting operations so movement does not occur.

H. Protect bottoms of all excavations for foundations and soil under slabs, as needed, from frost.

I. Repair, at the Contractor's expense, all damage occurring to the owner's property or any other property, on or off the premises, that has resulted from a lack of adequate protection. All repair or replacement shall be approved by the Architect.

1.06 DEFINITIONS

A. Suitable materials include material that is free of debris, roots, organic matter, frozen matter, and which is free of stones or foreign material which any dimension greater than 2 inches and all fill material shall be defined as clean, inorganic or clean clay with a liquid limit no greater than 45 and a plasticity index between 10 to 25 percent. Excavated site soils will not be suitable for reuse as structural fill. All proposed fill material shall be approved by Soils Engineer at least 2 weeks prior to fill placement.

B. Unsuitable materials include all material that contains debris, roots, organic matter, frozen matter, building foundations, brick, concrete, rubble, wood, metals, stone with any dimension greater than 2 inches and or other materials that are determined by the Engineer or Soil Engineer, as too wet or otherwise unsuitable for providing a stable subgrade. **All unsuitable excavated materials shall be hauled off-site to an approved location.** The excavated area shall be refilled with suitable material, obtained from the grading operations or haul-in, and thoroughly compacted by rolling.

PART 2 - PRODUCTS

2.01 FILL (EMBANKMENT) AND BACKFILL MATERIAL

A. All fill and backfill materials shall be low plasticity cohesive soils, free of ruble and organics. The fill material shall be non-expansive with a liquid limit no greater than 45 and a low plasticity index between 10 and 25 percent. Where expansive clay soils are present within 24 inches of floor subgrade level, and 12 inches below exterior pavement, they shall be overexcavated and replaced with non-expansive fill, or the Contractor may choose to follow one of the recommendations in the Geotechnical Engineering Report. Excavated materials shall be sorted to separate expansive clay from non-expansive soil. When unsuitable materials are encountered, notify the Soils Engineer. If directed by the Engineer, excavate and replace with suitable material. Suitable material for backfill shall be obtained from off-site borrow as approved by the Engineer and Soil Engineer.

B. Top soil shall be clean, fertile, friable soil. Topsoil shall be a mixture of soil and organic matter and shall be free of stones over one-half inch in diameter, hard clay

clumps, refuse, plant material or their roots, sticks, noxious weeds, salts, soil sterilants or other material that is detrimental to plant growth. The ph range shall be 6.0 to 7.5, 5% organic material minimum as determined by loss on ignition of moisture free samples dried at 100 degrees centigrade. Topsoil shall conform to ASTM D 5268. Obtain from naturally well drained sites free of flooding where topsoil occurs at least 4 inches deep. Do not obtain from bogs or marshes. Topsoil shall not be delivered or used while in a frozen or saturated condition. The contractor shall submit a certified analysis of the topsoil from a testing lab to the Owner and Engineer prior to beginning work.

1. Submit testing laboratory certified analysis of proposed topsoil to Engineer.

C. Granular fill material under floor slabs shall be a clean, pervious material, which will prevent capillary action and conforms to the following requirements:

1. 100 percent passing the 1 inch sieve.
2. Less than 40 percent passing the #40 sieve.
3. Less than 5 percent passing the #200 sieve.

PART 3 - EXECUTION

3.01 EQUIPMENT

A. All equipment shall be adequate for the purpose for which it is to be used and shall be kept in satisfactory working order. Equipment shall be adequate to perform all excavation, hauling, placement of embankment, compaction, trimming, and shaping.

3.02 UNSUITABLE EXCAVATION

A. All unsuitable materials in locations that require suitable materials, as determined by the Soils Engineer shall be excavated to the depth designated by the Soils Engineer. Unsuitable materials shall be disposed of by the Contractor, off-site as direct by the Engineer. The excavated area shall be refilled with suitable material, obtained from the grading operations or haul-in, and thoroughly compacted by rolling. The necessary refilling will constitute a part of the embankment.

3.03 FILL AND COMPACTION

A. Strip topsoil and vegetation to a depth of 6 to 9 inches or below the root crown. The Contractor shall consult the Engineer during stripping operations to avoid removing more topsoil than is necessary.

B. Prior to the placement of any new fill; the top nine (9) inches of the existing fill material shall be scarified and recompacted before placement of any fill if required. The reworked soil shall be compacted to minimum of 98 percent of the maximum dry density as recommended by ASTM D698 within 0 to + 4 % of the materials optimum. In addition, any desiccated fat clay or desiccated lean to fat clay shall also be removed from these areas. Unsuitable areas observed at this time shall be improved by scarification and recompaction or by undercutting and placement with structural fill. Proofrolling shall be accomplished with a fully loaded tadem-axel dump truck or other equipment providing an equivalent subgrade loading. A minimum gross weight of 25 tons is required for the proofrolling equipment.

C. Following proofrolling and removal of unsuitable soils, the exposed soils shall be scarified to a minimum depth of 9 inches prior to 4 adding at least 9 inches of additional

newly compacted fill soils to form the minimum 18 inches of newly compacted lean clay fill below all floor slabs. The fill soils shall be compacted according to the specifications. All new fill shall be placed in 8 inch maximum lifts and compacted as specified hereinafter. Prior to placement of any fill, floor slabs or pavement construction, stripped subgrades shall be observed by the Soils Engineer to verify all unsuitable materials have been removed. Bench all slopes steeper than 5H: 1V.

D. Compaction of Fill; All fill and backfill shall be wetted or dried by aeration, and then compacted to the following percentage of maximum density at a moisture content within the limits specified above or below optimum moisture content, as determined by Testing Procedure ASTM D 698, (Standard Proctor) and ASTM D1557 (Modified Proctor), unless otherwise noted:

Material	**Percent of Maximum (Cohesive Soil Only)**	**ASTM**	**Percent Above or Below Optimum Moisture Content**
Recompacted Materials	98% minimum	D698	0 to 4%
Upper 12" of subgrade beneath pavement	98% minimum	D698	0 to 4%
Random Fill	90% minimum	D698	0 to 4%
Upper 6" of subgrade beneath sidewalks	98% minimum	D698	0 to 4%
Trench Backfill under paving	98% minimum	D698	0 to 4%
Trench Backfill grass areas	92% minimum	D698	0 to 4%

E. Extend compaction requirements for all pavements to 2 feet beyond pavement perimeter. Extend compaction requirements for all sidewalks to 18 inches beyond sidewalk perimeter.

F. Compact cohesive soils by the use of sheepsfoot or pneumatic type compactors under optimum moisture conditions.

3.04 EXCAVATION

A. Perform excavation to dimensions and elevations indicated on Drawings or required for footings, and all work incidental thereto. Excavation shall extend a sufficient distance from footings to allow for forming and inspection, except for spread footings and continuous trench beam footings where concrete may be deposited directly against earth surfaces, when approved by Architect and governing authorities. Care shall be taken during excavation and site work to avoid unnecessarily disturbing soils at the greater depth excavations.

B. Trench excavations within the limits under paving or walks shall be carefully excavated, maintaining a minimum width and in no way impairing the bearing value of any footing or foundation. Excavations should not extend below an imaginary plane projecting out and down from the bottom edge of the existing footing of a 3H:1V. Even with these criteria, excavations that extend below the level of existing foundations shall be

backfilled the same day they are excavated.

C. Excess excavation shall be avoided.

D. All excavated material not suitable for filling, backfilling as approved by the Soils Engineer and all excess earth or other material shall be removed from the site.

E. The bottoms of all excavations for foundations shall be hand trimmed and free of all loose material and shall have clean suitable material 6 inches below foundations.

F. Cut footing excavations vertically from the widest part of the footing. Undercutting for footing projections will not be permitted.

G. Pour footings immediately after excavation for footings is completed. Concrete for footings which bear on earth shall be placed on undisturbed soil and as shown on drawings. When footings are inadvertently over-excavated below elevations shown on the drawings, the footings shall be filled to the proper level with concrete. All footing excavations shall be observed by the soils engineer before any concrete is placed so that adjustments to footing depths and sizes may be made, if necessary, to provide bearing on stable, uniform soil. Contractor shall allow time for Soils Engineer to obtain density samples at the bottom of the footing excavation to determine if low-density loess soils are present. Where otherwise suitable, low-density loess is encountered, excavation shall extend to the depth of these materials or 2 feet below the footings, whichever is less. The overexcavation shall then be backfilled up to the footing base elevation with approved cohesive fill placed in lifts of 8 inches or less in loose thickness and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D698).

H. Unexpected Subsurface Condition. Where suitable bearings are encountered at different elevations from those indicated on the drawings, the Soils Engineer shall direct, in writing, that the excavation be carried to elevations above or below those indicated on the Drawings. Adjustment in payment shall be made in accord with the terms of the General Conditions.

I. During construction of roadways and parking areas, the roadbed shall be maintained in such condition that it will be adequately drained at all times. Side ditches emptying from cuts to embankments shall be constructed so as to avoid damage to embankments by erosion. The finished roadway shall be free from waves and true to the lines, grades and cross sections shown on the Drawings.

J. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

K. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.
2. Walks: Shape surface of areas under walks to line, grade and cross section, with finish surface not more than 0.10' above or below required subgrade elevation.
3. Pavements: Shape surface of areas under pavement to line, grade and cross section, with finish surface not more than 1/2" above or below required subgrade elevation.

L. All excavations should comply with the requirements of OSHA'S "Construction Standards for Excavations".

M. Contractor shall add shoulders as necessary to aid with the installation of the asphalt paving at no additional cost to the 6 **Owner. Shoulder may stay in place**

as long as they are graded not to interfere with drainage.

3.05 EXCAVATION FOR UTILITY STRUCTURES AND APPURTENANCES

A. Excavate as required for manholes and other appurtenances until firm, undisturbed soil is reached. If excavation is carried below bottom of foundations as shown on the Drawings, fill with 3,000 psi concrete or stabilizing material, as directed by the Architect, at no expense to Owner.

B. When unstable material is encountered which will not provide suitable bearing (as determined by the Soils Engineer), Contractor shall be entitled to payment for this extra work in accordance with the General Conditions.

3.06 TRENCHING

A. Perform trenching operations to the depth indicated on the Drawings or as specified.

B. Pile excavated material suitable for backfill in an orderly manner sufficient distance back from edge of excavation to avoid rollbacks, slides, or cave ins.

C. Remove soil not suitable for backfill and waste at a disposal area designated by the Engineer. All utility trenches shall have clean suitable materials as determined by the Soils Engineer. Clean suitable material shall be a minimum of 6 inches below the bottom of utilities.

D. Where new construction crosses or closely parallels existing utilities or utility services, excavate in advance of pipe laying to determine location and crossing arrangement, including exact construction line and grade.

E. Excavate by open cut under existing streets, utilities, and structures, except as noted on the Drawings or as directed by the Architect.

F. Keep width of trench as narrow as possible, but provide adequate room for backfilling and jointing. Keep sides of the trench as nearly vertical as practical within the limits of excavation codes and maintain vertical walls of excavation below top of pipe. Trench widths shall be as follows:

Pipe Size	Trench Width
3/4" to 3"	12"
4" to 8"	24"
10" to 16"	36"
18" to 24"	48"
30" and Greater	Pipe size plus 18" each side

G. Excavate to full depth by machine and level trench bottom to provide uniform bearing and support for full length of pipe. Trench bottom shall be continuous, relatively smooth, and free of rocks.

H. Do not use granular backfill in exterior trenches.

I. Bed trench bottom as shown on the Drawings or as directed by the Soils Engineer.

J. Provide bell holes at each pipe joint and allow access completely around circumference of

pipe for proper jointing operations.

K. Install pipe and provide a minimum pipe envelope consisting of compacted backfill completely around the pipe and a distance of 12 inches above the top of the pipe.

L. When unstable material is encountered which may not provide a suitable foundation for pipe, notify the Soils Engineer immediately. If determined by the Soils Engineer upon his investigation that the material is unsuitable for foundations, the Soils Engineer may specify and authorize remedial measures. If removal of unsuitable material is authorized, replace it with a stabilizing material consisting of three fourths inch to one and one half inch (3/4" to 1 1/2") size, coarse, sharp, and clear crushed stone or other approved material. Provide a minimum of four inches (4") of bedding material on top of the stabilizing material to prevent point load.

M. Excavate by hand under and around utilities, where overhead clearance prevents use of machine, and under trees and shrubs where shown on the Drawings.

N. Construct sheeting, shoring, and bracing required to hold walls of excavation, to provide safety for workmen and to protect existing utilities or structures. If wood sheeting is driven below the level of pipe, it shall be left in place to a level 5 feet below finished grade. Steel sheeting shall be pulled upon completion unless indicated otherwise on the Drawings. When a movable trench shield is used below the spring line of the pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

O. If dewatering is necessary, obtain the Soils Engineer's approval of proposed methods of dewatering. When dewatering is necessary, provide for handling of water encountered during construction. Lay no pipe in and pour no concrete on excessively wet soil. Prevent surface water from flowing into the excavations and remove water as it accumulates. Divert stream flow away from areas of construction.

P. Do not pump water onto adjacent property without approval of Soils Engineer and adjacent property owner. Do not use sanitary sewers for disposal of trench water. The cost of dewatering shall be included in the original Bid Price for construction. No additional remuneration for dewatering shall be permitted.

3.07 GRANULAR FILL

A. Aggregate Base Course shall be NDOR Crushed Rock, modified to with 6% passing a number 200 sieve or approved alternate. Granular fill shall be placed in uniform depths and compacted by vibratory hand held compaction equipment or other approved means until no significant further consolidation occurs and approved by the Soils Engineer.

3.08 BACKFILLING

A. Place the backfill for structures in horizontal uniform layers not to exceed 8 inches. Bring each layer up uniformly on all sides of the structure and thoroughly compact using pneumatic compaction or other methods as approved by the Soils Engineer. Granular backfill shall not be used in exterior areas.

B. Employ a placement method that will not disturb or damage foundation waterproofing.

C. When embankments are constructed on sidehill slopes steeper than 4 to 1, the area of the original slope on which embankment is to be placed shall be stepped to a vertical depth of at

least twelve inches (12") in order in integrate the embankment and the slope.

D. Place all embankments to the grades, lines, and contours shown on the Drawings. Place embankment systematically, as early as possible, to allow maximum time for natural settlement. The hauling of embankment material shall be distributed over the entire embankment areas to assist in compacting the material.

E. Do not place embankments over porous, wet, or spongy subgrade surfaces. If necessary, remove such unsuitable material and replace with satisfactory stabilizing materials, as directed by the Architect.

F. The Contractor shall be responsible for the stability of all embankment and excavation areas and shall replace, at Contractor's own expense, any portions which become displaced or unstable prior to the expiration of the warranty period.

G. Remove excess backfill material from site.

3.09 BACKFILL FOR TRENCHES

A. Backfill material shall be crushed limestone or crushed gravel. Backfill material shall be finer than 3/8 inch and shall be well graded. Backfill trenches immediately after the location of all lines, connections, and appurtenances are recorded, or at the Soils Engineer’s direction.

B. Backfill with material removed from excavation except where sand backfill may be specified. Backfill material shall be as specified herein and shall not contain any debris, frozen earth, large clods, stones, or other unsuitable material.

C. Place backfill simultaneously on both sides of the pipe to prevent displacement. Place backfill into the trench at an angle so that the impact on the installed pipe is minimized. Install a cushion of four feet (4') of backfill above the pipe envelope before using heavy compaction equipment.

D. Hand place backfill in the pipe envelope and compact finely divided material to twelve inches (12") over the top of the pipe.

E. Backfill top twelve inches (12") of the trench with soil equivalent to adjacent topsoil.

F. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

G. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

H. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 CHEMICAL STABILZATION

A. Chemical stabilization shall be performed by mixing Class “C” fly ash or quick lime into the

subgrade. Refer to Geotechnical Report for installation procedures.

END OF SECTION 31 20 00

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Hot-mix asphalt patching of existing asphalt parking areas.
2. Asphalt surface treatments.
3. Pavement-marking paint.

B. Related Sections include the following:

1. Division 31, Section 31 20 00 "Earthwork" for subbase.

1.03 DEFINITIONS

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

B. Nebraska Department of Roads, NDOR.

1.04 SYSTEM DESCRIPTION

A. Provide hot-mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of the NDOR.

1. Standard Specification: NDOR Latest specifications.
2. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.05 SUBMITTALS

A. General: Submit electronic (PDF) format submittals according to the Conditions of the Contract and Division 1 Specification Sections.

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

C. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

D. Material Certificates: Copies of submittals to the Owners Testing Laboratory.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. Manufacturer shall be a paving-mix manufacturer registered with and approved by NDOR.
2. **Asphalt Contractor must have and must demonstrate previous experience of successful installation of 3 asphalt running tracks.**

B. All Testing shall be paid for by the Contractor. All retesting shall be paid for by the contractor. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548. A copy of the test results shall be provided to Engineer.

C. Regulatory Requirements: Comply with NDOR Standard Specifications for asphalt paving work.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
2. Review condition of subgrade and preparatory work.
3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F (15.5 deg C).
2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
3. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
4. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.5 deg C) at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4 deg C) for oil-based materials, 50 deg F (10 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.01 AGGREGATES

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

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof.

D. Mineral Filler: ASTM D 242 rock or slag dust, hydraulic cement, or other inert material.

2.02 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO SPR, PG 58-34

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.

C. Water: Potable.

D. Undersealing Asphalt: ASTM D 3141 or AASHTO M 238, pumping consistency.

2.03 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Sand: ASTM D 1073 or AASHTO M 29, Grade Nos. 2 or 3.

1. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying Color: White for all striping except handicap stalls where the color is to be Blue.

2.04 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Mix design Criteria target field values to be in accordance with NDOR (SPR) Standard Specifications.
2. Parking Area:

a. 0.0% target field air voids.
b. 0.1% minimum crushed value for the combined mineral aggregate.
c. 0.2% blow Marshall design.
d. A maximum of 60% limestone in the mix.

3. Base Course: Band “B” Mix 1-9 inches max..
4. Surface Course: Band “A” Mix 2 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

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

3.02 COLD MILLING

A. Contractor shall limit driving on the track with all equipment including but not limited to full or empty trucks. The contractor shall access and exit the track to and from the grass shoulder adjacent to the track as close to the milling machine as possible. No additional compensation shall be given for transporting of the asphalt millings from the smaller to larger trucks. Contractor shall be responsible for the repair of all grass shoulders including but not limited to fill, compaction, grading and seeding.

B. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 1 inch.
2. Mill to a uniform finished surface free of gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Transport milled hot-mix asphalt to asphalt recycling facility.
7. Keep milled pavement surface free of loose material and dust.

3.03 PATCHING

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

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

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.

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

3.04 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1-inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4-inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.05 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.

1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.06 HOT-MIX ASPHALT PLACING

A. Contractor shall limit driving on the track with all equipment including but not limited to full or empty trucks. The contractor shall access and exit the track from the grass shoulder adjacent to the track as close to the paving machine as possible. The contractor shall place the asphalt with trucks no larger than 5 yards. The contactor may elect to off load from larger trucks to the 5 yard trucks on site. No additional compensation shall be given for transporting of the asphalt from the larger to smaller trucks. Contractor shall be responsible for the repair of all grass shoulders including but not limited to fill, compaction, grading and seeding.

B. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at minimum temperature of 250 deg F (121 deg C).
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 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface 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.

3.07 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.08 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 vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

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: Not less than 90 percent of the voidless density for that mixture when tested in accordance with the Nebraska Standard Method of Tests, NDRT 166 and NDRT 209.

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

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

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

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

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

3.09 INSTALLATION TOLERANCES

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

1. Base Course: Plus or minus 1/2-inch.
2. Surface Course: Plus 1/4-inch, no minus.

B. 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. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4-inch.

3.10 PAVEMENT MARKING

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

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

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

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

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

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

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

E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with the following:

1. Density samples shall be tested in accordance with Nebraska Standard Method of Tests for specific gravity of compressed bituminous mixtures, NDRT 166. The voidless density for each lot sample shall be tested in accordance with the Nebraska Standard method of test for maximum specific gravity of bituminous paving mixtures NDRT 209.

a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than 3 cores taken.
b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

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

3.12 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow excavated materials to accumulate on-site.

END OF SECTION 32 12 16

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes exterior Portland Cement Concrete pavement for the following:

1. Driveways and approaches.
2. Street paving.
3. Curbs and gutters.
4. Walkways, public walks and patios.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section “Testing Laboratory Services” specifies procedural requirements for testing of concrete.
2. Division 03 Section “Cast-In-Place Concrete” for footings, foundations, floor slabs, garage floor slabs and toppings on structural stoops at all structures.
3. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.

1.03 SUBMITTALS

A. General: Submit electronic (PDF) format submittals according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each type of product indicated to be used on project.

C. Design Mixtures: For each concrete pavement mixture.

D. Shop Drawings: For steel reinforcement.

E. Material test reports and certificates.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 318, “Building Code Requirements for Reinforced Concrete”
2. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.

3. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
4. Concrete Reinforcing Steel Institute (CRSI), “Manual of Standard Practice”.

C. Concrete Testing Service: The Owner will retain a testing laboratory as specified in Division 1 Section, “Testing Laboratory Services” to perform quality tests on concrete. Materials and work may require testing or re-testing at any time during the progress of the work. The Owner will pay for initial tests. Contractors shall pay for any re-testing required due to inferior work.

D. Sampling and Testing requirements during construction:

1. Sampling Fresh concrete as per ASTM C172; except as modified for slump to comply with ASTM C94.
2. Slump as per ASTM C143; one test at point of discharge for each day’s pour of each type of concrete and when consistency seems to have changed.
3. Air Content as per ASTM C173 and ASTM C231; one test for each day’s pour of each type of air entrained concrete.
4. Compression Test Specimens as per ASTM C39; one set of four (4) standard cylinders for each day’s pour, plus additional sets for each 50 cubic yards; one specimen will be tested at 7 days, two will be tested at 28 days and one will be reserved for later testing if required.
5. Additional tests as directed by the Architect or Engineer.

E. Strength level of Concrete will be considered satisfactory if averages of sets of three consecutive strength tests results equal or exceed specified compressive strength and no individual strength test results falls below the specified compressive strength by more than 500 psi.

F. Additional tests of in-place concrete will be required when test results indicate that specified strengths and other characteristics have not been attained. Conduct tests by cored cylinders complying with ASTM C42 or other methods as directed by the Architect or Engineer.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

A. Forms for Exposed Smooth-Finish Concrete: Plywood or smooth faced metal. Provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Forms for Unexposed Finish Concrete: Plywood or metal. Provide lumber dressed on at least two (2) edges and one side for tight fit.

C. Form Coatings: Provide commercial form-coating compounds that will not affect concrete surfaces.

2.02 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A497, flat sheet.

C. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420); deformed.

D. Plain Steel Wire: ASTM A82, as drawn.

E. Deformed-Steel Wire: ASTM A496.

F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.03 CONCRETE MATERIALS

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

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

B. Normal-Weight Aggregates: Coarse aggregate, uniformly graded in accordance with Nebraska Department of Roads (NDOR) Standard Specifications for Highway Construction, Latest Edition. Provide aggregates from a single source.

C. Water: ASTM C94/C94M.

D. Air-Entraining Admixture: ASTM C260.

E. Chemical Admixtures: ASTM C494/C494M, of type suitable for application, 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.

2.04 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

E. White Waterborne Membrane-Forming Curing Compound: ASTM C309, Type 2, Class B.

2.05 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips:

1. At Streets and Parking Lots: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
2. At Drives, Public Walks, Patios and Around Units: Minimum 1/2 inch thick polyethylene closed-cell expansion joint filler.

a. Products: Sonneborn Expansion Joint Filler by ChemRex, Inc., or equal.

2.06 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, meeting the properties of NDOR Class A Concrete with the following properties:

1. Compressive Strength (28 Days): 3,500 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: 4 to 6 percent.

2.07 CONCRETE MIXING

A. Ready-mixed concrete shall comply with the requirements of ASTM C94, and as specified.

1. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1 ½ hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.
2. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work.

2.08 HOT-APPLIED JOINT SEALANTS

A. Sealant for Concrete: Single-component formulation complying with ASTM D 3405.

B. Products: Subject to compliance with requirements, provide one of the following or pre-approved substitution:

1. ROADSAVER 221; Crafco Inc.
2. Product #9005; Koch Materials Company.
3. Product #9030; Koch Materials Company.
4. SEALTIGHT HI-SPEC; W.R. Meadows, Inc.

2.09 JOINT-SEALANT BACKER MATERIALS AND PRIMERS

A. General: Provide joint-sealant backer materials that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rod for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depths and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depths, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

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

PART 3 - EXECUTION

3.01 EXAMINATION

A. Proof-roll prepared sub-base surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

3.02 EDGE FORMS AND SCREED CONSTRUCTION

A. General: Design, erect, support, brace, and maintain formwork to support all loads that might be applied. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.

B. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement 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. Provide for openings, anchorages and inserts, and other features required in work. Solidly butt joints and provide backup to prevent leakage of cement paste.

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

3.03 STEEL REINFORCEMENT

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

3.04 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings 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 pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, 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: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch (10-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.05 CONCRETE PLACEMENT

A. Moisten sub-base to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing 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 pavement surfaces 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

F. Cold-Weather Placement: Comply with ACI 306.1.

G. Hot-Weather Placement: Comply with ACI 301.

3.06 FLOAT FINISHING

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces.

B. Do not add water to concrete surfaces during finishing operations.

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. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. 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.
3. 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.

3.07 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.

E. Curing Methods: Cure concrete by moisture curing moisture-retaining-cover curing curing compound or a combination of these methods.

3.08 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch (6 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
4. Joint Spacing: 3 inches (75 mm).
5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
6. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.09 INSTALLATION OF JOINT SEALANTS

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

C. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions.

D. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior

experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

E. General: Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply.

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

G. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

H. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

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

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

K. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 50 cu. yd. or fraction thereof of each concrete mix placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump Test: Slump Test as per ASTM C143; one test at point of discharge for each day's pour or one per 50 yards of each type of concrete and when consistency seems to have changed.
3. Air Content: ASTM C 231, pressure method; one test for each day's pour or per 50 yards of each type of air entrained concrete and whenever compressive strength specimens are cast.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: Compression Test Specimens as per ASTM C39; one set of three (3) standard 6 x12 cylinders for each day's pour, plus additional sets for each 50 cubic yards.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

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

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

F. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

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

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

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

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

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

END OF SECTION 32 13 13

SECTION 32 13 73

PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.
2. Joints between cement concrete and asphalt pavement.

1.02 RELATED DOCUMENTS

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

1.03 SUBMITTALS

A. General: Submit electronic (PDF) format submittals according to the Conditions of the Contract and Division 1 Specification Sections.

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

C. Samples: For each type and color of joint sealant required.

D. Product certificates and test reports.

E. Compatibility and Adhesion Test Reports: From sealant manufacturer.

1.04 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of

service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

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

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.03 COLD-APPLIED JOINT SEALANTS

A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.

a. Available Products:

1) Pecora Corporation; Urexpan NR-300.

2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.

a. Available Products:

1) Meadows, W. R., Inc.; Sealtight Gardox.

3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

a. Available Products:

1) Tremco Sealant/Waterproofing Division; Vulkem 202.

B. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

1. Available Products:

a. Sonneborn, Div. of ChemRex, Inc.; Sonomeric 1.

C. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

1. Available Products:

a. Crafco Inc.; RoadSaver Silicone.
b. Dow Corning Corporation; 888.

D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Available Products:

a. Crafco Inc.; RoadSaver Silicone SL.
b. Dow Corning Corporation; 890-SL.

E. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

1. Available Products:

a. Meadows, W. R., Inc.; Sof-Seal.

2.04 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

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

PART 3 - EXECUTION

3.01 INSTALLATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience.

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

D. Install backer materials to support sealants during application and at position required to produce optimum sealant movement capability. Do not leave gaps

between ends of backer materials. Do not stretch, twist, puncture, or tear backer materials. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

E. Install sealants at the same time backings are installed to completely fill recesses provided for each joint configuration and to produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

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

END OF SECTION 32 13 73

SECTION 32 18 23.33

RUNNING TRACK SURFACING AND STRIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

Track dimensions, markings and construction shall comply with the standards as approved by the National Federation of State High School Associations (NFSHSA) and the International Association of Athletics Federation (ISSF).

Provide lane lines, starting lines, and marking required, all shall conform to the standards for track construction as prescribed and approved by the NFSHSA.

The finished base (ashphalt) shall not vary under a 10’ straight edge more than 1/8”.

The base surface shall be flooded with water immediately after the concrete is capable of handling traffic. If, after 20 minutes of drying time, ponding water is evident, it shall be the responsibility of the engineer, in conjunction with the surfacing contractor to determine the method of correction. No cold tar patching, skin patching, or sand mix patching will be acceptable. The surfacing Contractor will make necessary corrections at no additional expense to the Owner.

Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in concrete.

The surfacing contractor shall determine if the base (concrete) has cured sufficiently prior to the application of polyurethane surfacing system.

Rubber granules used shall be 100% recycled Nebraska rubber product.

Products and Procedures should be followed in order for the Boone Central Public Schools to be eligible to receive funding for partial reimbursement for the purchase of tire-derived products and/or crumb rubber through the Scrap Tire Reduction and Recycling Incentive Fund as administered through the Nebraska Department of Environmental Quality (NDEQ).

B. Related Sections include the following:

1. Division 31, Section 31 20 00 "Earthwork"
2. Division 32, Section 32 13 13 “Concrete Paving”

1.03 DEFINITIONS

A. Concrete

B. Nebraska Department of Roads, NDOR.

C. National Federation of State High School Associations (NFHS)

D. American Sports Builders Association (ASBA)

E. American Society for Testing and Materials (ASTM)

1.04 SYSTEM DESCRIPTION

A. Provide concrete paving according to materials, workmanship, and other applicable requirements of standard specifications of the NDOR.

1. Standard Specification: NDOR Latest specifications.

1.05 SUBMITTALS

Product Data: For each type of product indicated.

Samples: for each exposed product and for each color and texture specified.

Product certificates.

Product test reports.

Field quality-control reports.

Maintenance data including repair methods.

Warranty: Sample of special warranty.

A. General: Submit electronic (PDF) format submittals according to the Conditions of the Contract and Division 1 Specification Sections.

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

C. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

D. Material Certificates: Copies of submittals to the Owners Testing Laboratory.

QUALITY ASSURANCE

Manufacturer and Installer's Experience:

1. The synthetic track surface installer and manufacturer shall have a regional presence and reputation.

2. The synthetic track surface Contractor shall employ only qualified, experienced supervisors and technicians skilled in the installation of the proposed synthetic track system.

Prospective synthetic track surface Contractor bidders must meet the following criteria:

1. Have proper state contractor's license at the time of bidding, in good standing, and never had a license revoked or suspended.

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

1. Bidders of this product must demonstrate at least 10 installations that are a minimum of 5 years old that contain the same products.

2. The installing foreman must have at least 3 years of experience installing this type of system.

3. Certification: Provide written approval of installer by synthetic surface manufacturer. Installer mush show evidence of at least 10 surface installations in the last 3 years utilizing the exact system specified.

B. Standards and Guidelines: The work hereunder shall be done and conform to:

Codes and standards shall follow the current guidelines set forth by the National Federation of State High School Association (NFHS) and the American Sports Builders Association (ASBA) along with current material testing guidelines as published by the American Society for Testing and Materials (ASTM).

C. Preinstallation Conference: Conduct conference at Project site to review methods and procedures related to the installation of "Running Track Surfacing" including, but not limited to, the following:

1. Review concrete paving for smoothness and within design tolerance.
2. Review condition of preparatory work.
3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Weather conditions and remaining schedule.

1.06 WARRANTY

1. The synthetic track surface manufacturer and installation contractor shall provide a joint warranty, specifically listing both parties, covering the material and workmanship.

2. The synthetic track surface Contractor shall submit with the bid package a specimen copy of its Manufacturer's Warranty which guarantees the synthetic track surface system against defects in materials, workmanship, and significant color fade and granule loss for a five (5) year period commencing with the date of Substantial Completion. The warranty shall exclude damage or defects caused by subsequent deterioration or improper construction or design of the subbase materials, vandalism, abuse, neglect, lack of maintenance, or acts of God. The warranty coverage shall not be prorated nor limited to the amount of the usage.

a. The warranty submitted must have the following characteristics:

i. Must provide full coverage for five (5) years from the date of Substantial Completion.

ii. Must warrant materials and workmanship.

iii. Must warrant that the materials installed meet or exceed the product specifications.

iv. Must have a provision to either make a cash refund or repair or replace such portions of the installed materials that are no longer serviceable to maintain a serviceable and playable surface.

v. Must be a joint warranty covering both workmanship and all self-manufactured or procured materials.

vi. Guarantee the availability of replacement material for the synthetic track surface system installed for the full warranty period.

PART 2- PRODUCTS

2.1 RUNNING TRACK SURFACE SYSTEM

A. Approved Running Track Surface Systems are as follows:

1. Poly-Mat - Fisher Tracks; Boone, Iowa (515) 432-3191

2. Revolution – Midwest Tennis & Track; Denison, Iowa (712) 263-3554

2.2 GENERAL

A. The specified running track surface is a mixture of graded rubber granules bound with 100% polyurethane binders. The track surface is of a permeable design and the mixture is applied to a base by means of a mechanically operated screed.

Only a high quality polyurethane binder is to be used.

The depth shall be a minimum of ½-inch.

The installation shall be performed in full compliance with the Plans and Reviewed Shop Drawings.

The concrete surface to receive the synthetic track surface shall be inspected and certified by the manufacturer as ready for the installation of the synthetic track system and must be perfectly clean as the installation commences and shall be maintained by the synthetic track surface Contractor in that condition throughout the process.

2.3 RUBBER

The running track surfacing rubber shall be specifically graded elasometric rubber granules with a controlled gradation between 0.1mm to 3.0mm. **100% of the rubber incorporated into the track system must derive from recycled Nebraska tires. The running track surfacing contractor shall provide written certification from the supplier/manufacture of the rubber materials certifying that 100% of the rubber incorporated into the project was derived from recycled Nebraska tires.**

1. Dust and rubber particulate smaller than No 200 sieve size shall not exceed 4% of the total rubber.
2. The rubber shall be black SBR or EPDM.

2.4 PRIMER

A. The primer shall be polyurethane based and compatible with concrete and synthetic track surfacing materials

1. The polyurethane primer may be diluted to ensure proper penetration of the existing surface.

2.5 BINDER

A. The binding agent shall be a single component; MDI based, moisture cure polyurethane binder.

1. The polyurethane binder is to be 100% solids.
2. The polyurethane binder shall be compatible with SBR and EPDM rubber granules.

B. The polyurethane binder will be delivered in new unopened containers, clearly labeled by the manufacturer.

PART 3- EXECUTION

3.1 SURFACE PREPARATION

A. Hard-Surface Substrates: Verify that substrates are satisfactory for surface system installation and that substrate surfaces are dry, cured, and uniformly flat and sloped to drain within recommended tolerances according to surface system manufacturer's written requirements for cross-section profile.

1. Repair unsatisfactory surfaces and fill holes and depressions.

The surface on which the new synthetic track surface is to be placed is Portland cement concrete base. A concrete curb and/or concrete encased trench drain border will run along side the inside perimeter of the track. The Contractor shall be responsible for any damage to the concrete, trench drain, concrete curb border or any other existing structures or vegetation during the installation of the synthetic track system.

B. The entire surface shall be swept, power blown or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.

3.2 LIMITATIONS

A. The concrete base, should be sufficiently cured and cleaned in order for work to progress.

B. Apply the synthetic surfacing materials only during favorable weather conditions. Work is to progress only when adequate curing can be guaranteed by the installer.

C. During surface installation and striping all sprinkler systems must be shut off, or controlled so that no water falls on the track or event surfaces.

D. All materials will be installed in strict compliance with the manufacture's recommendations.

E. During setup, installation, and striping of the running track surfacing it is the responsibility of the general contractor and the owner to have the entire track area, and the other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the project.

3.3 INSTALLATION

The running track surfacing contractor shall be on the project site during the installation of the concrete and shall verify all measurements prior to commencing synthetic track surfacing installation.

A. Subbase

Concrete shall serve as the subbase for the synthetic track surface. The synthetic track surface Contractor shall be on the Project Site during the installation of the concrete to observe the concrete Contractor's installation process. The General Contractor shall provide compaction test results per the recommendation of the Geotechnical Engineer. To insure that the synthetic track surfacing

system shall be laid on an approved pavement receiving surface, prior to the beginning of synthetic track surface installation, the manufacturer/installer of the synthetic track surface shall inspect the pavement receiving surface and supply the Contractor and Engineer a Certificate of Pavement Receiving Surface Acceptance.

The curing time for concrete is approximately 28 days. It shall be the responsibility of the synthetic track surfacing Contractor to determine if the concrete substrate has cured sufficiently prior to the application of the polyurethane surfacing system.

It shall be the responsibility of the paving contractor to flood the surface immediately after the concrete is capable of handling traffic, but within 24 hours. If, after 20 minutes of drying time, there are birdbaths evident, the Engineer, in conjunction with the surfacing contractor shall determine the method of correction.

It shall be the responsibility of the Contractor to determine if the concrete substrate meets all design specifications, i.e. cross slopes, planarity, and specific project criteria. After all the above conditions are met, the synthetic track surfacing Contractor must, in writing, accept the planarity of the concrete receiving base, before work can commence.

B. Cleaning

The area to be surfaces shall be clean and free of any loose or foreign substances prior to the commencement of the track surfacing installation. The surface shall be cleaned by the use of a power blower and high-pressure washer.

3.4 STRIPING

A. Track surfacing contractor shall verify with the school districts Athletic Director exact locations, size, shape and color of lines and markings before proceeding with markings and striping. Marking and striping shall conform to American Sports Builders Association Standards. All line and event markings shall be applied by experienced personnel utilizing polyurethane-based paint compatible with the synthetic track surfacing. All marking dimensions by the Contractor shall be certified in accordance with the specifications issued by the National Federation of High Schools (NFHS). The Contractor shall supply the Owner with all necessary computations and drawings, as well as a letter of certification attesting to the accuracy of the markings.

B. Experienced personnel specializing in all-weather running track striping shall accomplish all striping.

C. Provided lane lines, starting lines, and markings required. This should conform to the standards for track construction as prescribed by the NFHS or other governing body.

D. Contractor shall verify with the owner's representative for exact locations, size, shape, and color of the lines and markings before proceeding with markings and striping.

E. Calculations shall be made to the nearest 0.001'. These shall be rounded to the nearest 0.01' for marking.

F. Angles shall be set up using a transit or theodolite capable of reading direct to 20 seconds.

G. Measurement shall be made with a steel tape in engineering scale that will read directly to 0.01’.

H. All lane lines shall have a width of 5cm (approximately 2”).

I. Track certification as to its accuracy for the correct distance of 400mm around the track oval shall be provided by the track professional.

3.5 CLEANING

A. Upon completion off all work, remove all containers, surplus materials and installation debris. Leave area of work in clean orderly condition.

3.6 FINAL SUBMITTALS

A. The Running Track Surfacing Contractor shall provide to the Owner written certification that 100% of the SBR rubber used on this project was derived from recycled Nebraska tires.

B. The Running Track Surfacing Contractor shall provide to the Owner a joint warranty covering both workmanship and all self–manufactured or procured materials.

END OF SECTION

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes storm drainage piping, fittings, accessories, and flowable fill, and the connection of the drainage system to curb inlets, area inlets, and junction boxes.

1.03 REFERENCES

A. Nebraska Department of Roads (NDOR) Standard Specification for highway construction latest edition, including all current supplemental specifications.

1.04 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

A. General: Submit electronic (PDF) format submittals according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each type of product indicated to be used on the project.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Project Record Documents:

1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 - PRODUCTS

2.01 SEWER PIPE MATERIALS

D. High Density Polyethylene (HDPE) with H-25 Loading ASTM F2487, ASTM F2468 and ASTM 1417 and ASTM D3212, light weight and smooth interior wall and annular exterior corrugations.

2.02 CURB INLETS, AREA INLETS, AND JUNCTION BOXES

A. General – Refer To:

1. Section 03300 – Cast-in-Place Concrete
2. Plan Details

B. Concrete

1. Minimum Compressive Strength – 3,500 psi

C. Reinforcing Steel

1. ASTM A 615/A 615: Grade 40 or Grade 60 deformed billet steel bars

D. Manhole Rings and Covers

1. Curb Inlets

a. See plans for details

2.03 BEDDING AND COVER MATERIALS

A. See plans for details

2.04 FLOWABLE FILL (IF USED)

A. See Section 32 13 13

PART 3 - EXECUTION

3.01 TRENCHING

A. See Section Earthmoving

B. Hand trim excavation for accurate placement of pipe to elevation indicated

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.

C. Lay pipe to slope to gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

3.03 INSTALLATION – CURB INLETS, AREA INLETS, AND JUNCTION BOXES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts for inlets and outlets as indicated.

C. Form and place cast-in-place concrete base pad, and sidewalls for pipe.

D. Mount lid and frame level in grout to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing and provide testing results to engineer.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

C. Compaction of backfill

1. Under paving, slabs-on-grade, and similar construction: 98% of maximum dry density
2. At other locations: 95% of maximum dry density

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 33 41 00