November 11, 2022
PREPARED BY: John Adair, P.E.

EXHIBIT 2
SPECIFICATIONS PACKAGE

The July 2022 edition of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction is revised as follows:

I hereby certify that this specifications package has been properly prepared by me, or under my responsible charge, in accordance with procedures adopted by the Florida Department of Transportation.

Signature
and Seal: _____

Date: _____
Engineer of Record: JOHN ADAIR, P.E.
Fla. License No.: 73833
Firm: BAY COUNTY PUBLIC WORKS DEPARTMENT
840 WEST 11TH STREET
PANAMA CITY, FLORIDA 32401
Certificate of Authorization:
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SPECIAL PROVISIONS

BAY COUNTY SPECIAL PROVISIONS FOR THE ADAPTATION AND USE OF THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION

The County uses the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction" as the governing specification for County roads and stormwater projects. This special provision contains specific clauses adopted by the Bay County Board of County Commissioners that add to or revise the Florida Department of Transportation Standard Specifications for Road and Bridge Construction or supplement specifications, setting forth conditions varying from or additional to the Standard Specifications and are applicable to Bay County Public Works road and storm water construction projects.

The Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, 2022 Edition, Division II shall be the governing specifications for all contract pay items unless the pay items are modified by pay item notes or special provisions. Division I of the FDOT specifications shall be used for prosecution and progress of the contract except where modified by the County's general conditions or special provisions. Sections 2, 3, 4, 5, 8-1, 9-2.1.1 and 9-2.1.2 of the FDOT specifications are specifically excluded from this project. For purposes of liquidated damages, the contract time shall be calculated in accordance with Section 8-7 of the FDOT specifications with the exception that no work shall be allowed on Saturdays or Sundays.

1. The governing order of project documents is:
    a. General Terms and Conditions
    b. Bay County Special Provision for the Adaptation and Use of the FDOT Specifications
    c. Bid Form Pay Item Notes
    d. Plans
    e. FDOT Design Standards
    f. Project Specific Specifications
    g. FDOT Standard Specifications for Road and Bridge Construction
    h. When discrepancies exist between any of the above the Bay County Public Works Director or his designated representative shall determine the proper course of action for the Contractor.

2. The hours of work shall be 7:00 A.M. until 30 minutes prior to sundown Monday through Friday. No work is to be done in the period from December 24th through the following January 1st. These days off will be added to the contract time, but no additional compensation for delays will be allowed. No work shall be done on the Friday immediately preceding Memorial Day, or Labor Day. Contract time will be charged during holiday and weekend periods regardless of whether or not the Contractor's operations have been suspended. The Contractor is not entitled to any additional compensation for suspension of operations during such holiday periods or weekend periods.

3. Contract Time - The number of calendar days allowed by the County for the substantial completion of the Contract. The contract substantial completion date is computed by adding the number of days authorized by the Form of Agreement to the Notice to Proceed date.
4. Notice to Proceed – Written communication issued by the County to the Contractor authorizing them to proceed with the work and establishing the date for commencement of the work. For purposes of calculating liquidated damages, the Notice to Proceed date will be considered day zero.

5. Substantial Completion - For a unit price contract a project is substantially complete when all the work, as specified in the plans and list of pay items, has been completely installed. For a lump sum contract, a project is substantially complete when all the work specified by the plans and specifications are complete and the county can enjoy beneficial use or occupancy and may use, operate and maintain the project in all respects and for its intended purpose as determined by the County's Designated Representative. The Contractor will not be charged liquidated damages for any days on or after the substantial completion date, but retainage will be withheld until all punchlist items are completed.

6. Whenever unanticipated work not covered by the drawing or specifications is found and is considered essential to satisfactorily completion of the work within intended scope, the Contractor shall notify the County's Designated Representative immediately.

7. The County may at any time, as the need arises, order changes within the scope of the work without invalidating the agreement. If such changes increase or decrease the amount due under the Contract Documents, or the time required for performance of the work, an equitable adjustment shall be authorized by Change Order. Rights are reserved to purchase additional quantities at bid price.

8. When the Contractor deems that extra compensation is due for work not covered in the contract the Contractor shall immediately verbally notify the County's Designated Representative and follow-up with a written claim within twenty (20) calendar days of the date of the event that gave rise to the claim. The county will not consider any claim when the notice given by the Contractor is over 20 calendar days past the date of the event giving rise to the claim and the Contractor shall waive the claim for compensation. The contractor shall not commence any work claim until they have received written approval from the county to do such work.

9. The Contractor must submit in writing to the County Engineer any claims for compensations due to delays. The County will not compensate the Contractor for any delays for any reason unless five days (excluding Saturdays, Sundays and holidays) have elapsed from the start of work stoppage. The first day of any claims shall be on day six of the work stoppage. This shall apply to each work stoppage. In order to submit a valid claim for work stoppage, the Contractor must submit a schedule made using the critical path method which shows the early start, late start, early finish, late finish and the critical path. The County expects the Contractor to use forces and equipment on any item of work that can be completed during the delay. The Contractor's claim must show the delay is due to the controlling item of work as shown on the critical path method schedule. After five work days if the County deems the delay claim to be valid, the Contractor's claim shall only be

for labor, equipment and materials that are delayed due to the controlling work item. If the County Engineer determines the Contractor forces and equipment can be used on other work items during the delay, no compensation will be given for these forces and equipment.

10. The Contractor fully warrants all workmanship and material, in the performance of his obligation under this contract, for a period of one (1) year after completion of the work described in this Contract. The warranty period begins at the date of final payment for the project. The Contractor shall forthwith repair or remedy any defects in the construction done by him, discovered within one (1) year, without cost or change to the Owner. In the event the Contractor fails, within five days after notice, to begin correction of the defect, or fails within a reasonable time thereafter to complete the correction of the defect, then the Owner may have the work done at the Contractor's expense or may proceed against the surety bond.
11. Unless otherwise stated in the contract documents, the term furnish shall be interpreted as meaning furnish and install, which shall include the full cost of materials, labor and equipment to furnish and install a complete item to include satisfactorily completion of all testing requirements.
12. The County will not make payment on any invoices until the schedule and if applicable, the schedule of values is received and approved by the County.
13. An invoice must be submitted even if no work was performed during that month.
14. All submittals shall be submitted to the County for staff review no later than 10 work days prior to the products use on the project.
15. The Contractor's project manager shall provide written documentation on elevations of curbing, inlet box inverts and grate elevations, pipe inverts, final milling and base profiles and cross slopes and any other critical elevations and slopes as directed by the County, all prior to covering up the work and done as the work progresses.

FDOT SPECIFICATIONS DIVISION I – GENERAL REQUIREMENTS & COVENANTS

DEFINITIONS

ARTICLE 1-3 has the terms Department, Engineer and Holidays deleted and the following substituted:

Department.

Bay County.

Engineer.

The Professional Engineer, registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, acting as the project's Construction Engineering Inspection Manager. The Engineer may be County in-house staff or a consultant retained by the County.

Note: In order to avoid cumbersome and confusing repetition of expressions in these Specifications, it is provided that whenever anything is, or is to be done, if, as, or, when, or where "acceptable, accepted, approval, approved, authorized, condemned, considered necessary, contemplated, deemed necessary, designated, determined, directed, disapproved, established, given, indicated, insufficient, ordered, permitted, rejected, required, reserved, satisfactory, specified, sufficient, suitable, suspended, unacceptable, or unsatisfactory," it shall be understood as if the expression were followed by the words "by the Engineer," "to the Engineer," or "of the Engineer."

Holidays.

County Holidays – New Years Day, Martin Luther Kings Birthday, Good Friday, Memorial Day, Independence Day (4th of July), Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, Christmas Eve, and Christmas Day. Holidays that fall on a Saturday will normally be observed on the preceding Friday and holidays that fall on Sunday will normally be observed on the following Monday.

LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – E-VERIFY.

7-29 E-Verify.

The Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the Contractor during the term of the Contract and shall expressly require any subcontractors performing work or providing services pursuant to the Contract to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the Contract term.

FDOT SPECIFICATIONS DIVISION II – CONSTRUCTION DETAILS

Section 102 – Maintenance of Traffic

1. Contractor at Contractor's expense shall give residents and businesses located on the project right-of-way 48 hours notice of start of construction and have maintenance of traffic signage in place prior to beginning any construction. The County will provide door hanger type notices to the Contractor. Contractor personnel shall distribute to each business and resident 24 hours prior to starting any operations that could prevent access to any residence or business. The Contractor should include the cost of these notifications in their maintenance of traffic (MOT) costs.

2. When traffic signs are located within the area of construction, the Contractor shall notify the County Inspector for approval to remove, re-set, or relocate any sign. The Contractor shall reinstall any disturbed mailboxes or signs to existing or acceptable condition.

3. Lane closure restrictions are:
   From 6:00 a.m. to 8:00 a.m. and 4:30 p.m. to 6:30 p.m. - no lane closure.
   At the discretion of the County Engineer, if lane closure causes extended congestion, the Contractor shall be directed to reopen the closed lane(s) until such time as the traffic flow has returned to normal.

   All lanes must be reopened to normal traffic within 12 hours during and evacuation notice of a hurricane or other catastrophic event and shall remain open for the duration of the evacuation or event as directed by the County Engineer.

4. Any road closures will require a minimum of 10 working days notice and County manager approval prior to closure. The Contractor, at Contractor's expense shall be responsible for designing and implementing a detour plan, to include signage. Two working days in advance of any road closure, the Contractor shall post signage that can be clearly read by the traveling public notifying the public of the road closure.

5. In the event that law enforcement is required for maintenance of traffic, the Contractor shall pay all costs.

Section 104 – Prevention, Control, and Abatement of Erosion and Water Pollution

1. The erosion control plan shown in the drawing package denotes a minimum requirement for the project. It may not meet all the requirements of a stormwater pollution prevention plan required for the NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

2. Contractor shall be responsible for obtaining coverage under the Florida Department of Environmental Protection NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities for all projects disturbing one (1) acre or more. The cost of all items and work required to implement the conditions of the NPDES Generic Permit for Stormwater Discharge shall be included in the Contractor's bid.

3. Unless otherwise directed by the County Engineer, all areas disturbed by construction shall be seeded and mulched or sodded within five (5) days after construction in that area.

4. Contractor, at Contractor's expense, shall maintain all sodded and seeded areas in accordance with the plans. Contractor shall guarantee sodding and seeding for a period of ninety (90) days after issuance of Certificate of Completion. During the guarantee period, the Contractor shall replace at no cost to the County, any sod or grass that dies or is not established 90 days after seeding or sod placement, if the causes for such defects are traced to negligence or poor workmanship by the Contractor. Any sod or grass missing or defective shall be replaced in a manner satisfactory to the County Engineer. In case of any doubt as to the condition and satisfactory establishment of the sod, the County Engineer

may allow the sod or grass to remain through another 90 day establishment period. After which time the sod or grass in question, if found to be dead or in an unhealthy or badly impaired condition shall be replaced by the Contractor at no cost to the County. Contractor shall also be responsible for maintenance of grass including mowing to keep grass a maximum of 6 inches in height during the project and through the 90 day warranty period.

5. In general, seed with Pensacola Bahia grass, except in sandy areas, then use unhulled Bermuda. Add temporary grass seeds as appropriate for the season. In urban areas where lawns are maintained in the right of way, the Contractor shall sod or seed to match existing grass or sod at no additional cost to the County. During the months of October through February overseed all sodded areas with temporary grass seed. Seeding rates are as follows:

Type of Seed	Coastal (Mar.-Nov.)	Coastal (Nov.-Mar.)	Inland (Mar.-Nov.)	Inland (Nov.-Mar.)
	Seeding rate (lb/Ac)	Seeding rate (lb/Ac)	Seeding rate (lb/Ac)	Seeding rate (lb/Ac)
Unhulled Bermuda[2]		90		20
Hulled Bermuda[2]	60		15	
Bahia (Argentine or Pensacola)			180	180
Annual Rye Grass		90		90

Notes:

Table from FDOT 2000 Standard Specification for Road and Bridge Construction. Bermuda shall not be used in areas adjacent to existing or proposed landscaping.

6. When hydroseeding is used, Contractor shall submit hydro-seeding mix to the County Engineer for approval. Mix shall include permanent and temporary seed, fertilizer, mulch, and soil seal. The mix shall give a seeding, mulching and fertilizing rate that is equal to or greater than the seeding rates specified in the table above and meeting standards for hydroseeding technology.

7. Seeding may only be used on slopes less than 4:1 horizontal to vertical (H:V). Sod all slopes between 4:1 and 2:1 H:V slopes. Use lapped and pinned sodding or erosion control blankets for all slopes between 2:1 and 1:1 H:V. Use retaining walls or sand cement riprap for slopes greater than 1:1 (H:V).

8. When working in the waters of the state under a state or federal regulatory permit, the Contractor shall take water samples as directed by the conditions of the permit.

Section 105 – Contractor Quality Control General Requirements

1. The Contractor shall have the following Florida Department of Transportation (FDOT) plant and laboratory approvals:
    a. An FDOT approved asphaltic concrete production plant.
    b. An FDOT approved asphaltic concrete laboratory at the asphalt production plant.

2. The contractor shall provide at or prior to the pre-award meeting personnel certifications meeting the requirements of FDOT Specification Section 105-8.

3. The contractor shall provide a Florida Department of Environmental Protection qualified Stormwater Management Inspector who shall inspect the construction site in accordance with the Pollution Control Inspection Plan and the Stormwater Pollution Prevention Plan for the NPDES Construction Permit.

Section 110 – Clearing and Grubbing

1.The Contractor shall protect from disturbance or damage all land monuments and property markers. All disturbed land monuments and property markers shall be properly restored to original condition at Contractor's expense.

Section 120 – Earth Work and Related Operations

1. The County does not have a resolution testing lab. If deemed necessary, the Contractor must be willing to use an FDOT certified laboratory that is mutually acceptable to the County and the Contractor for any resolution testing. The Contractor will retain and store any resolution test samples.

2. The County shall not compensate the Contractor for overhaul of excavated materials. The Contractor shall include the cost of such overhaul in the unit price for excavation or embankment, as applicable.

3. The Contractor shall stockpile, except in the area denoted in the roadway plans, and use all suitable excavated materials on the jobsite and haul off any excess upon completion of the job. Topsoil shall be stored in a separate stockpile in the County right of way or as directed by the County Engineer except the area denoted in the roadway plans.

Section 327 – Milling of Existing Asphalt Pavement

1. Asphalt concrete millings are to remain property of the County unless otherwise noted on the plans. The Contractor shall haul the asphalt concrete millings to the stockpile designated by the County Public Works Department Roads and Bridges Division. Call the Bay County Roads and Bridges Division (phone 850-248-8810) to obtain the stockpile locations.

Section 334 – Superpave Asphalt Concrete

1. The County does not have a resolution testing lab. If deemed necessary, the Contractor must be willing to use an FDOT certified laboratory that is mutually acceptable to the County and the Contractor for any resolution testing. For plant and roadway asphaltic concrete acceptance, Contractor is to utilize all methods of construction quality control testing and frequency of testing in accordance with FDOT 2022 Specification.

2. For all paving contracts, the asphalt concrete supplier shall allow County personnel or their designated representatives to inspect the asphalt production plant and laboratory, and to monitor the on-site laboratory testing of asphaltic concrete during production runs for County projects. If County personnel or their designated representatives need take asphalt concrete samples from the trucks at the asphalt plant or at the job site the Contractor shall provide a safe platform for taking the samples.

3. The Contractor shall stop production of asphaltic concrete in time for the mix to be placed and finished 30 minutes prior to sundown. If the contractor predicts such operations cannot be completed prior to sundown, approval must be obtained from the County.

4. The County will not allow asphaltic concrete to be produced or placed until the County Inspector and Contractor have received satisfactory test results and certified the base to be suitable for paving.

5. Segregated aggregate, surface bumps and depressions, bleeding asphalt concrete, clay balls, poor aggregate gradation, asphalt content out-of-tolerance from the job mix formula, poor joint construction, and noncompliance with the rolling procedures may all result in rejection of the asphalt concrete by the County. In such cases the Contractor, at Contractor's expense, shall remove and replace the asphalt concrete, or overlay the existing pavement with suitable material. The choice to remove and replace, or overlay the deficient asphalt concrete shall be made by the County Engineer.

6. The County will not accept nor pay for any asphaltic concrete placed without a County Inspector on-site during the entire paving operation. To receive payment for paving materials, the Contractor must give the County Inspector a materials delivery ticket showing mix design, the truck number, the tonnage, the date, and the job name. Contractor's failure to give the delivery ticket to the inspector may result in the County not paying for the material. If the paving schedule changes the Contractor must give the County Inspection office 48 hours (2 work days exclusive of Saturday and Sundays) in advance of the beginning of paving. Failure to give the 48 hours notification will result in shutdown of the paving operation by the County Inspector or County Engineer.

7. The Contractor shall utilize a Material Transfer Vehicle (MTV) on any single road with the total combined lane length of 1.0 mile or greater.

Section 346 – Portland Cement Concrete

1. The Contractor shall stop production of portland cement concrete in time for the mix to be placed and finished 30 minutes prior to sundown.

2. The County will not allow Portland cement concrete to be produced or placed until the County Inspector and Contractor have received satisfactory test results and certified the base to be suitable for concrete placement. The County will not accept or pay for any Portland cement concrete placed without a County Inspector being on site to observe placement, and the County requires 48 hours notice to schedule its inspectors.

Section 400 – Concrete Structures

1. County Inspector must be present during placement of all concrete. The County will not pay for any concrete placed without a County Inspector present. Contractor shall give 48 hours (2 workdays) advance notice to the County Inspector prior to placement.

Section 425 – Inlets, Manholes, and Junction Boxes

1. Unless otherwise approved by the County Engineer, inlet basins shall have sump bottoms with drain constructed in accordance with FDOT Index 201 Sheet 2.

Section 430 – Pipe Culverts

1. The County does not have a resolution testing lab. If deemed necessary, the Contractor must be willing to use an FDOT certified laboratory that is mutually acceptable to the County and the Contractor for any resolution testing. The Contractor will retain and store any resolution test samples.

2. Unless otherwise shown on the plans, the cost per linear foot for the installation of any drainage pipe or structure under a roadway that requires a roadway cut shall include the cost of patching the roadway cut in accordance with the requirements of the Bay County Utility Accommodation Guide, dated March 1992.

3. Only RCP, ERCP, and HDPE meeting requirements of the FDOT specifications are suitable for County projects. Asphalt coated metal pipe will only be allowed under driveways with concrete mitered ends.

4. The Contractor shall excavate, construct and place all pipelines, concrete work, fill, and bedding rock, in the dry. In addition, the Contractor shall not make the final 24 inches of excavation until the water level is a minimum of one foot below proposed bottom of excavation. For purposes of these specifications, “in-the-dry” is defined to be within 2% of the optimum moisture content of the soil. The County reserves the right to ask the Contractor to demonstrate that the water level is a minimum of one foot below proposed bottom of excavation before allowing the construction to proceed.

Section 530 – Riprap

1. The riprap shall be a durable stone with a minimum unit weight of 165 pounds per cubic foot. Riprap gradation shall consist of reasonably well graded durable rock with a medium stone size of 80 pounds and not over 10 percent larger than 200 pounds. There shall be sufficient small stones and spalls to approximately fill the void between the larger stones.

SUPPLEMENTAL SPECIFICATIONS

312 BITUMINOUS CRACK RELIEF LAYER.

SECTION 312
BITUMINOUS CRACK RELIEF LAYER

312-1 Description.

Construct a crack relief layer composed of a separate application of bituminous material covered with a single application of aggregate.

312-2 Composition and Proportioning.

Use the composition and proportioning for the crack relief layer as shown in the table below. The range of bituminous material and cover material are approximate. The Engineer may increase or decrease the range.

NON SI UNITS			
Proportions For Crack Relief Layer			
		Bituminous Material gal/yd^2	
Aggregate Grade	Cover Material ft^3/yd^2	Asphalt Cement	Emulsified Asphalt
67	0.32 - 0.38	0.20 - 0.30	0.29 - 0.43
SI UNITS			
Proportions For Crack Relief Layer			
Aggregate Grade	Cover Material m^3/m^2	Bituminous Material L/m^2	
		Asphalt Cement	Emulsified Asphalt
67	0.011 - 0.013	0.9 - 1.4	1.3 - 1.9

312-3 Materials.

Meet the following requirements:

(1) Bituminous Material:

Emulsified Asphalt……..2016 FDOT Standard Specification 916-3

(2) Cover Material:

Stone, Slag, or Crushed Gravel…2016 FDOT Standard Specification 901

312-4 Equipment.

312-4.1 Pressure Distributor: Provide a pressure distributor that meets the requirements of 300-3.1.

312-4.2 Spreading Equipment: Provide sufficient trucks and aggregate spreaders at the site of the work to ensure continuous spreading of the aggregate on the uncovered bituminous material. Use a spreader of the mechanical type that is self-supported (towed) or self-propelled and is capable of producing a smooth, uniform distribution of the cover material. Do not use spreaders of the type attached directly to the rear of the truck body (tail gate spreaders).

312-4.3 Rollers: Provide pneumatic-tired traffic type rollers equipped with at least seven smooth-tread, low-pressure tires and capable of carrying a gross load of at least 8 tons [7 metric tons]. Maintain the inflation of the tires such that in no two tires the air pressure varies more than 5 psi [35 kPa]. Load the traffic roller as directed by the Engineer.

312-5 Limitations to Width of Application.

Confine the application of bituminous and cover material to one lane at a time, leaving all additional lanes open to traffic.

312-6 Preparation of Road Surface.

312-6.1 Cleaning: Sweep the surface to be covered clean and free of sand, dirt, dust, and other deleterious material by means of mechanical rotary sweepers or other approved methods, and keep the surface free from moisture.

312-6.2 Condition of Underlying Surface: Do not construct the crack relief layer over any loose or unstable pavement that results in excessive penetration of the cover material during the rolling operations.

312-7 Protection of Adjacent Surface.

Where constructing a crack relief layer adjacent to curb and gutter, valley gutter, or any other concrete surface, cover the concrete surfaces with heavy paper or other protection approved by the Engineer during application of bituminous material. Immediately remove any bituminous material deposited on such concrete surfaces.

312-8 Weather Limitations.

Do not apply bituminous material when the air temperature in the shade and away from artificial heat is less than 45ºF [4ºC] or when weather conditions or the surface conditions are otherwise unfavorable.

312-9 Application of Bituminous Material.

312-9.1 Distributor Pressure: After cleaning the surface to be treated to the satisfaction of the Engineer, uniformly spray the bituminous material over the surface by means of a pressure distributor. Use a distributor that maintains a consistent pressure of at least 20 psi [135 kPa], but not more than 75 psi [520 kPa].

312-9.2 Application Temperatures: For emulsified asphalt, maintain an application temperature between 140 and 180ºF [60 and 82ºC].

312-9.3 Uniformity of Distribution: Adjust and operate the distributor to maintain an even and uniform distribution of the bituminous material. Immediately remove excessive deposits of bituminous material upon the road surface caused by stopping or starting the distributor, by leakage, or otherwise.

312-9.4 Limitations to Application: Ensure that the area to be covered by any one application of bituminous material is no greater than the aggregate can cover without interruption due to limitations of hauling and spreading equipment or to any other cause.

312-10 Spreading Cover Material.

312-10.1 Spreading: Spread the cover material immediately following the application of bituminous material. Uniformly distribute the cover material over the bituminous surface in one course. Do not drive trucks, spreaders, or other vehicles on the uncovered bituminous material.

312-10.2 Brooming and Dressing: Immediately after applying the cover material, broom the surface in order to secure a uniform distribution of cover material and a smooth surface. Place additional aggregate by hand on any areas not properly covered. If deemed necessary by the Engineer, drag the surface with a light drag broom or other dragging equipment approved by the Engineer, of a type that will not disturb the embedded aggregate. Supplement this operation by additional hand brooming until obtaining a smooth and even surface. Repeat the dragging and brooming, in conjunction with the rolling, for as long as required to ensure a uniform surface.

312-11 Rolling.

Immediately after the spreading and dragging of cover material, roll the entire surface. Begin rolling at the edge of pavement, and progress toward the centerline, uniformly lapping each preceding pass and thoroughly covering the entire surface. During rolling, perform additional dragging and hand brooming as specified in 312-10.2.

312-12 Surface Requirements.

Remove all joints or portions of the completed surface that are defective, not properly finished, or not in conformance with these Specifications, and replace them with a satisfactory surface. The Department will not pay for the defective work and its removal.

312-13 Covering Crack Relief Layer.

Cover the crack relief layer with an asphalt concrete layer prior to opening it to traffic.

312-14 Method of Measurement.

312-14.1 Bituminous Material: The quantity to be paid for will be the volume, in gallons [liters], applied on the road and accepted, determined as provided in 2016 FDOT Standards Specifications 300-9.

312-14.2 Cover Material: The quantity to be paid for will be the area, in square yards [square meters], applied on the road and accepted, determined by surface area.

312-15 Basis of Payment.

312-15.1 Bituminous Material: Price and payment will be full compensation for furnishing all the materials and for heating, hauling, and applying.

312-15.2 Cover Material: Price and payment will be full compensation for all the work described in this Section, except for the work paid for under the item of Bituminous Material.

312-15.3 Payment Items: Payment will be made under:

Item No. Misc. 1- Bituminous Material - per gallon.
Item No. Misc. 2- Cover Material for Crack Relief Layer - per square yard.

320 HOT MIX ASPHALT – PLANT METHODS AND EQUIPMENT.

(REV 3-24-16) (FA 3-30-16) (7-16)

SUBARTICLE 320-3.3.2 is deleted and the following substituted:

320-3.3.2 Storage: Equip asphalt binder storage tanks to heat the liquid asphalt binder to the temperatures required for the various mixtures. Heat the material in such a manner that no flame comes in contact with the binder. Heat or insulate all pipe lines and fittings. Use a circulating system of adequate size to ensure proper and continuous circulation during the entire

operating period. Locate a thermometer, reading from 200 to 400°F, either in the storage tank or in the asphalt binder feed line. Maintain the asphalt binder in storage within a range of 230 to 370°F in advance of mixing operations. Locate a sampling device on the discharge piping exiting the storage tank or at a location as approved by the Engineer. Provide a metal can of one quart capacity for binder sampling at the request of the Engineer.

SUBARTICLE 320-6.1 is deleted and the following substituted:

320-6.1 Mixing: After the aggregate is dried and properly proportioned, mix the aggregate, along with any other components, with the asphalt binder to produce a thoroughly and uniformly coated mixture. Do not produce the mix by altering the component blend percentage of the RAP or sand by more than plus or minus 5.0% from the job mix formula on the approved mix design. For mix designs using fractionated RAP, the combined blend change for all RAP components must not exceed plus or minus 5.0%. The plus or minus 5.0% maximum component change does not apply to crushed virgin aggregate components during production.

334 SUPERPAVE ASPHALT CONCRETE.

(REV 2-12-16) (FA 3-30-16) (7-16)

SUBARTICLE 334-1.2 is deleted and the following substituted:

334-1.2 Traffic Levels: The requirements for Type SP Asphalt Concrete mixtures are based on the design traffic level of the project, expressed in 18,000 pound Equivalent Single Axle Loads (ESAL's). The five traffic levels are as shown in Table 334-1.

Table 334-1
Superpave Traffic Levels

Traffic Level	Traffic Level ($1x10^6$ ESAL's)
A	<0.3
B	0.3 to <3
C	3 to <10
D	10 to <30
E	≥30

The traffic levels for the project are as specified in the Contract Documents. A Type SP mix one traffic level higher than the traffic level specified in the Contract Documents may be substituted, at no cost to the Department (i.e., Traffic Level B may be substituted for Traffic Level A, etc.). As an exception, the same traffic level and binder type that is used for the mainline traffic lanes may be placed in the shoulder at no additional cost to the Department.

SUBARTICLE 334-5.1.2 is deleted and the following substituted:

334-5.1.2 Acceptance Testing Exceptions: When the total combined quantity of hot mix asphalt for the project, as indicated in the Plans for Type SP and Type FC mixtures only, is less than 2000 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may require the Contractor to run process control tests for informational purposes, as

defined in 334-4, or may run independent verification tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any asphalt layer placed on subgrade (regardless of type), miscellaneous asphalt pavement, shared use paths, crossovers, gore areas, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-7.7. In addition, density testing for acceptance will not be performed on the following areas when they are less than 1,000 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes or ramps. Do not perform density testing for acceptance in situations where the areas requiring density testing is less than 50 tons within a sublot.

Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A random core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer.

Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) as approved by the Engineer or with Standard Rolling Procedure as specified in 330-7.2. In the event that the rolling procedure deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.

The density pay factor (as defined in 334-8.2) for areas not requiring density testing for acceptance will be paid at the same density pay factor as for the areas requiring density testing within the same LOT. If the entire LOT does not require density testing for acceptance, the LOT will be paid at a density pay factor of 1.00.

SUBARTICLE 334-5.4.1 is deleted and the following substituted:

334-5.4.1 Lost or Missing Verification/Resolution Samples: In the event that any of the Verification and/or Resolution asphalt mixture samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the minimum possible pay factor for each quality characteristic as described in 334-8.2 will be applied to the entire LOT in question, unless called for otherwise by the Engineer. Specifically, if the LOT in question has more than two sublots, the pay factor for each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for each quality characteristic will be 0.80. If only the roadway cores are lost, damaged, destroyed, or are otherwise unavailable for testing, then the minimum possible pay factor for density will be applied to the entire LOT in question. In either event, the material in question will also be evaluated in accordance with 334-5.9.5.

If any of the Verification and/or Resolution samples that are in the custody of the Department are lost, damaged, destroyed or are otherwise unavailable for testing, the corresponding QC test result will be considered verified, and payment will be based upon the Contractor’s data.

916 BITUMINOUS MATERIALS.

(REV 2-16-16) (FA 3-30-16) (7-16)

SECTION 916 is deleted and the following substituted:

SECTION 916
BITUMINOUS MATERIALS

916-1 General.

All products supplied under this Specification shall be one of the products included on the Approved Product List (APL). Producers seeking evaluation of a product for inclusion on the APL shall submit an application in accordance with Section 6.

For liquid anti-strip agents, in addition to the above, producers shall include a report of test results from an independent laboratory confirming the material meets the requirements of this section. In lieu of submitting test results from an independent laboratory, the Department will evaluate the material. For each liquid anti-strip agent, the producer will submit one pint of a representative sample of liquid anti-strip agent to the State Materials Office when submitting the APL application to the Department's Product Evaluation Section.

Any marked variation from the original test values for a material below the established limits or evidence of inadequate quality control or field performance of a material will be considered sufficient evidence that the properties of the material have changed, and the material will be removed from the APL.

916-2 Superpave PG Asphalt Binder:

916-2.1 Requirements: Superpave Performance Graded (PG) asphalt binders, identified as PG 52-28, PG 58-22, PG 67-22, polymer modified asphalt (PMA) binders, PG 76-22 (PMA) and PG 82-22 (PMA), and asphalt rubber binders (ARB), PG 76-22 (ARB), shall meet the requirements of 916-2 and AASHTO M 332-14. All PG asphalt binders shall meet the following additional requirements:

1. The intermediate test temperature at 10 rad/sec. for the Dynamic Shear Rheometer (DSR) test (AASHTO T 315-12) shall be 26.5ºC for PG grades PG 67 and higher.

2. An additional high temperature grade of PG 67 is added for which the high test temperature at 10 rad/sec for the DSR test (AASHTO T 315-12) shall be 67ºC.

3. All PG asphalt binders having a high temperature designation of PG 67 or lower shall be prepared without modification.

4. All PMA binders having a high temperature designation higher than PG 67 shall only be produced with a styrene-butadiene-styrene (SBS) or styrene-butadiene (SB) elastomeric polymer modifier and the resultant binder shall meet all requirements of this Section.

5. Polyphosphoric acid may be used as a modifier not exceeding 0.75% by weight of asphalt binder for PG 76-22 (PMA), PG 76-22 (ARB), and PG 82-22 (PMA) binders.

6. PG 76-22 (ARB) shall meet the additional requirements of 916-2.1.1.

7. All PG asphalt binders having a high temperature designation of PG 67 or lower shall not have a high temperature true grade more than 5.9°C higher than the specified PG grade, (for example, if a PG 58-22 is specified, do not supply a PG 64-22 or higher).

For all PG binder used in all hot mix asphalt, silicone may be added to the PG binder at the rate of 25 cubic centimeters of silicone mixed to each 5,000 gallons of PG binder. If a disbursing fluid is used in conjunction with the silicone, the resultant mixture containing the full

25 cubic centimeters of silicone shall be added in accordance with the manufacturer's recommendation. The blending of the silicone with the PG binder shall be done by the supplier prior to the shipment. When the asphalt binder will be used with a foaming warm mix technology, refer to the technology supplier's guidance on the addition of silicone.

Where an anti-strip additive is required, per the requirements of Sections 334 and 337, the amount shall be from 0.25% to 0.75% by weight of asphalt binder. The anti-strip additive shall meet the requirements of 916-4. The anti-strip additive shall be introduced into the PG binder by the supplier during loading.

916-2.1.1 Additional Requirements for PG 76-22 (ARB): The following additional requirements apply only to PG 76-22 (ARB):

1. The asphalt binder shall contain a minimum of 7.0% ground tire rubber (GTR) by weight of asphalt binder.
2. The GTR shall meet the requirements of Section 919.
3. Polymer modification is optional for PG 76-22 (ARB).
4. Use of excess PG 76-22 (ARB): The Contractor may use excess PG 76-22 (ARB) in other asphalt concrete mixes requiring the use of a PG 67-22 binder by blending with straight PG 67-22 binder so that the total amount of ground tire rubber in the binder is less than 2.0%. The Contractor may use excess PG 76-22 (ARB) in asphalt concrete mixtures requiring the use of a PG 52-28 or PG 58-22 by blending with the designated binder in such proportions that the total amount of ground tire rubber in the binder is less than 1.0%.

916-2.2 Compliance with Materials Manual: Producers of Superpave PG binders shall meet the requirements of Section 3.5, Volume II of the Department's Material Manual, which may be viewed at the following URL:
http://www.dot.state.fl.us/programmanagement/Implemented/URLinSpecs/files/Section3.5-100915.pdf

916-2.3 Reporting: Specification compliance testing results shall be reported for the tests in the table below, unless noted otherwise. Quality control (QC) testing results shall be reported for original binder DSR (G/sin δ and phase angle, as applicable).

SUPERPAVE PG ASPHALT BINDER		
Test and Method	Conditions	Specification Minimum/Maximum Value
Superpave PG Asphalt Binder Grade		Report
APL Number		Report
Modifier (name and type)	Polymer, Ground Tire Rubber with Approved Product List (APL) number, Sulfur, PPA, REOB, and any Rejuvenating Agents	Report
Original Binder		
Solubility, AASHTO T 44-14	in Trichloroethylene	Minimum 99.0% (Not applicable for PG 76-22 (ARB))
Flash Point, AASHTO T 48-06 (2015)	Cleveland Open Cup	Minimum 450ºF
Rotational Viscosity, AASHTO T 316-13	275ºF	Maximum 3 Pa·s[(a)]
Dynamic Shear Rheometer [(b)], AASHTO T 315-12	$G^*/\sin\delta$	Minimum 1.00 kPa
	Phase Angle, δ[(c)] PG 76-22 (PMA) and PG 76-22 (ARB)[(d)] PG 82-22 (PMA)	Maximum 75 degrees Maximum 65 degrees
Separation Test, ASTM D 7173-14 and Softening Point, AASHTO T 53-09 (2013)	163±5°C 48 hours	 Maximum 15°F (PG 76-22 (ARB) only)
Rolling Thin Film Oven Test Residue (AASHTO T 240-09)		
Rolling Thin Film Oven, AASHTO T 240-13	Mass Change %	Maximum 1.00
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$ AASHTO M 332-14	Grade Temperature (Unmodified binders only)	"S" = 4.50kPa^{-1} max
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$[(d, e, f)] AASHTO M 332-14	67°C (Modified binders only)	"V" = 1.0 kPa^{-1} max "E" = 0.5 kPa^{-1} max Maximum $J_{nr,diff}$ = 75%
Multiple Stress Creep Recovery, %Recovery[(d, e)] AASHTO M 332-14	67°C (Modified binders only)	$\%R_{3.2} \geq 29.37 (J_{nr,\ 3.2})^{-0.2633}$
Pressure Aging Vessel Residue (AASHTO R 28-12)		
Dynamic Shear Rheometer, AASHTO T 315-12	$G^*\sin\delta$, 10 rad/sec.	Maximum 5000 kPa[(f, g)]

Creep Stiffness, AASHTO T 313-12	S (Stiffness), @ 60 sec. m-value, @ 60 sec.	Maximum 300 MPa Minimum 0.300

(a) Binders with values higher than 3 Pa·s should be used with caution and only after consulting with the supplier as to any special handling procedures, including pumping capabilities.
(b) Dynamic Shear Rheometer (AASHTO T 315) shall be performed on original binders for the purposes of QC testing only.
(c) The original binder phase angle (AASHTO T 315-12) shall be performed at grade temperature.
(d) AASHTO T 315-12 and AASHTO T 350-14 will be performed at a 2 mm gap for PG 76-22 (ARB)
(e) All binders with a high temperature designation >67 will be tested at 67°C. PG 76-22 (PMA) and PG 76-22 (ARB) shall pass a "V" graded and PG 82-22 (PMA) shall pass an "E" grade per AASHTO M 332-14.
(f) A maximum Jnr diff = 75% does not apply for any Jnr value < 0.5 kPa-1.
(g) For all PG grades of a PG 67 or higher, perform the PAV residue testing at 26.5°C with a maximum of 5000 kPa.

916-3 Asphalt Emulsions.

916-3.1 Compliance with Materials Manual: Producers of asphalt emulsions shall meet the requirements of Section 3.4, Volume II of the Department's Material Manual, which may be viewed at the following URL:
http://www.dot.state.fl.us/programmanagement/Implemented/URLinSpecs/files/Section3.4-100915.pdf

916-3.2 Requirements: Use a prime coat meeting the requirements of AASHTO M 140-13 for anionic emulsions, AASHTO M 208-01 (2013) or AASHTO M 316-13 for cationic emulsions, or as specified in the Producer's QC Plan. For anionic emulsions, the cement mixing test will be waived. For tack products the minimum testing requirements shall include percent residue, naphtha content (as needed), one-day storage stability, sieve test, Saybolt Furol viscosity, original DSR, and solubility (on an annual basis). Residue testing shall be performed on residue obtained from distillation (AASHTO T 59-15) or low- temperature evaporation (AASHTO PP 72-11(2013) Method B).

916-4 Liquid Anti-strip Agents.

916-4.1 Requirements: Liquid anti-strip agents shall be tested in accordance with FM 1-T 283. A minimum tensile strength ratio of 0.80 must be obtained when testing the liquid anti-strip with various aggregate sources and two nominal maximum aggregate size mixtures. Specific requirements are contained in the APL process.

916-4.2 Mix Design Verification: Inclusion of a liquid anti-strip agent on the APL does not guarantee that the anti-strip will be approved for use in an asphalt mixture. Particular aggregate sources may require moisture susceptibility testing per FM 1-T 283 for each mix design. Results from this testing may meet the Department's requirement of minimum tensile strength ratio of 0.80 or may indicate the need for a larger dosage rate of anti-strip agent (up to 0.75% maximum) or a different anti-strip agent to meet the specification requirements.

BAY COUNTY SPECIFICATION FOR OPEN GRADED ASPHALTIC CONCRETE

1.1 For all paving contracts, the asphaltic concrete supplier shall allow County personnel to inspect the asphalt production plant, and to monitor the production of open graded asphalt concrete runs. During mix placement, the County will take samples of the mix from the trucks either at the Contractor's plant or the job site, and run extraction and gradation tests on the samples. The Contractor shall provide a safe platform for taking the samples. The County will accept the mixture on the basis of visual inspection of the mix placed in the roadway, the Contractor's compliance with the design rolling procedure, and the results of the extraction test. The extraction test results shall be used by the Contractor to make immediate corrections to the production process as necessary. Any open grade mix deemed unacceptable by the County Engineer shall be removed and replaced by the Contractor at Contractor's expense.

1.2 Mix Design Requirements:

MIX TYPE: **S-1 Open Graded Hot Mix (OGHM) Asphaltic Concrete**

MATERIAL: S-1 Stone, Vulcan Materials – Code 52

SOURCE: Aggregate Pit AL-131 Calera, Alabama

SIEVE SIZE	PERCENT PASSING	QUALITY CONTROL
1"	100	NA
¾"	100	93 - 100
½"	91	84 - 98
3/8"	77	70 - 84
#4	28	21 - 35
#10	6	0.5 - 11.5
#40	4	0 - 8.5
#80	3	0 - 6
#200	2	0 - 4

MIXTURE ANALYSIS:

Percent Asphalt: 3.5 (+/- 0.25%) percent (PG 67-22)

Percent Air Voids: 8.8; Range 8.0 – 15.0 Percent

Bulk Specific Gravity Mix: 2.364 / Maximum Specific Gravity Mix: 2.647 Mixing

Temperature Range: 160 – 250 Degrees F.

Recommended Compaction Temperature Range: 120 – 150 Degrees F.

Alternative binder as specified in plans: 3.5 (+/- 0.25%) percent PG 76-22

ADDITIVES TO LIQUID ASPHALT:

Asphalt Additives

- Silicone (per FDOT Specifications) {25cc/5000gals}
- Anti-Stripping Agent (per FDOT Specifications) {0.5 Percent}

LAY-DOWN OPERATIONS:

Recommended: 1 – 2 passes with maximum 30% overlap

Note: Excessive Rolling at high temperature may fracture surficial aggregate and cause premature raveling.

MIX TYPE: **#89 Open Graded Hot Mix (OGHM) Asphaltic Concrete**

MATERIAL: #89 Stone

SIEVE SIZE	PERCENT PASSING	QUALITY CONTROL RANGE
1”	100	NA
¾”	100	NA
½”	100	95 - 100
3/8”	99	95 - 100
#4	45	38 - 52
#10	10	3 - 17
#40	3	0 - 8
#80	2	0 - 7
#200	2	0 - 5

MIXTURE ANALYSIS:

Percent Asphalt: 3.5 (+/- 0.25%) percent (PG 67-22)

Percent Air Voids: 12.4; Range 12.0 – 18.0 Percent

Bulk Specific Gravity Mix: 2.285 / Maximum Specific Gravity Mix: 2.645 Mixing

Temperature Range: 160 – 250 Degrees F.

Recommended Compaction Temperature Range: 120 – 150 Degrees F.

Alternative binder as specified in plans: 3.5 (+/- 0.25%) percent PG 76-22

ADDITIVES TO LIQUID ASPHALT:

Asphalt Additives

- Silicone (per FDOT Specifications) {25cc/5000gals}
- Anti-Stripping Agent (per FDOT Specifications) {0.5 Percent}

LAY-DOWN OPERATIONS:

Recommended: 1 – 2 passes with maximum 30% overlap

Note: Excessive Rolling at high temperature may fracture surficial aggregate and cause premature raveling.

1.3 During construction, the Contractor shall not deviate from the approved job mix formula, rolling procedures or placement temperatures without prior written approval from the County Engineer.

1.4 The Contractor shall provide a one-year warranty of the open grade mix surface. The Contractor shall remove and replace any open grade mix that undergoes medium to high severity raveling, and develops potholes or medium severity rutting at any time during 12 months after placement.

1.5 Paving operations shall be continuous, and any lengthy delay will be cause for a transverse joint to be formed. The joint shall be constructed so that it can be cleanly removed when paving resumes.

1.6 Open grade mix shall not be produced for placement on the roadway unless the air temperature is 50 degrees Fahrenheit and rising. Additionally, for placement over base courses, no mix shall be placed on the base course unless the temperature of the base course is at least 45 degrees Fahrenheit.

1.7 Immediately upon completion of paving the Contractor shall remove all excess asphalt deposited along shoulders or gutters, as applicable. All shoulders raked smooth to produce a smooth transition following rolling and compaction of the pavement.

STRUCTURAL STANDARD APERTURE GEOGRID

1. Description.

A. The geogrid shall be composed of a single layer and integrally formed with triangular apertures and high-profile ribs exhibiting significant dimensional stability through all ribs and junctions of the geogrid structure. The geogrid shall maintain its reinforcement and aggregate confinement capabilities under repeated dynamic loads while in service. The geogrid shall also be resistant to ultraviolet degradation, damage under normal construction practices and all forms of biological and chemical degradation normally encountered in road construction. Geogrid layers shall be placed as directed by the Engineer. The geogrid should be sized appropriately to interlock with dense graded aggregate.

2. Performance Criteria.

A. The design of the pavement shall be in accordance with the *1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures* and *R50-09 Standard Practice for Geosynthetic Reinforcement of Aggregate Base Course of Flexible Pavement Structures*. Consistency and compatibility to these methods must be verified in writing by independent professional engineers in the field of pavement engineering.

B. The mechanically stabilized layer shall be incorporated into the pavement design by using modified layer coefficients. Modified layer coefficients shall be calibrated and validated with the results of full-scale laboratory, field and/or accelerated pavement testing where actual geogrids are tested in-soil and in representative conditions.

C. The design of the pavement shall be based on the following parameters:

(1) Subgrade Resilient Modulus 3,000 psi

(2) Serviceability Loss 1.7

(3) Reliability 90 %

(4) Standard Deviation 0.45

(5) Design traffic = 840,000 Equivalent Single Axle Loads (ESALs)

3. Submittals.

A. Submit representative geogrid product sample.

B. Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets the requirements of Part 3 of this section

C. Submit Manufacturer's installation instructions and general recommendations.

4. Materials.

A. The geogrid shall be integrally formed through punching and drawing of extruded sheets of polypropylene. The geogrid shall be oriented in three substantially equilateral directions, so the resulting ribs have a high degree of molecular orientation which continues at least in part through the mass of the integral node.

B. The resulting geogrid structure shall have apertures that are triangular in shape and shall have ribs with depth-to-width ratios greater than 1.0.

C. The geogrid shall have typical characteristics shown in the table below and shall be certified in writing by the manufacturer to meet these characteristics.

Properties[(1)],	**Longitudinal / Transverse**	**Diagonal**	**General**
Rib Pitch[(2)], mm (in)	40 (1.60)	40 (1.60)	
Mid-rib depth[(2)], mm (in)	1.6 (0.06)	2.0 (0.08)	
Mid-rib width[(2)], mm (in)	1.3 (0.05)	1.0 (0.04)	
Rib shape			rectangular
Aperture shape			triangular

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02.

2. Nominal dimensions.

D. Submittals. Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets all of the requirements of Section C. A minimum of one material sample may be selected at random from the material delivered and tested for compliance with the requirements of Section C. Each sample size required shall be a minimum of three (3) feet wide with a one (1) square yard minimum area.

E. Alternate Geogrid Materials. Alternate geogrid materials may be considered if they meet or exceed the design criteria of the project. Such materials must be pre-approved in writing by the Engineer. For alternate geogrid materials not meeting all the requirements of Section C, alternate material packages must be submitted meeting or exceeding the design criteria of the project to the Engineer a minimum of 14 days prior to the bid date, and must include, as a minimum, the following:

(1) Performance calibration tests of alternate geogrid material based on accelerated pavement testing (APT).

APT shall be performed at an APT facility accredited by NCHRP for geogrid testing. APT shall be conducted in accordance with NCHRP 512 and Synthesis 325 and must be evaluated with standard highway moving wheel loads. Geogrid reinforced sections must be compared to a control section. Test results of the geogrid section must demonstrate a minimum of 100,000 equivalent single axle loads at less than ½" of rutting and must be continued beyond the failure criterion. The rutting performance of the sections must be assessed by trenching. Pavement testing must take place over both soft (CBR <4%) and firm (CBR >5%) subgrade conditions.

(2) Results from ten or more in-situ automated plate load tests conducted, in compliance with AASHTO T221-90 (2012), on geogrid stabilized aggregate base, where the results confirmed that the structural requirements of the pavement foundation were achieved for the product being recommended. At a minimum, two of the tests must show results for 10,000 cycles and demonstrate near-linear elastic behavior.

(3) Independent review and verification from a third-party expert of supporting research, data, design assumptions and analyses. This will include: calibration and validation research, data normalization, product performance, design methodology and design calculations, and verification of product-specific design boundary conditions. This validation must state that the design method used by the manufacturer of the product is compatible with the *AASHTO R50-09 Standard Practice for Geosynthetic Reinforcement of Aggregate Base Course of Flexible Pavement Structures* and the *1993 AASHTO Guide for Design of Pavement Structures.*

(4) An alternate design signed and sealed by a professional engineer registered to practice in the state that the project is located that incorporates the performance benefits of the submitted geogrid in full-scale accelerated pavement testing (APT), based on the site-specific conditions of the project.

(5) A sample of the alternate geogrid material and certified specification sheets. Recommended installation instructions and additional information as requested by the Engineer to fully evaluate the application.

(6) In-air index testing of geogrid properties, or explanations of performance based on in-air index testing of geogrid properties are not sufficient to understand the complex mechanisms involved in soil/geogrid interaction and/or the performance of MSL's. Therefore, no acceptance of alternates based on material property comparisons or explanations of performance based on in-air testing of geogrid properties will be allowed.

4. DELIVERY, STORAGE AND HANDLING

A. Storage and Protection.

(1) Prevent excessive mud, wet concrete, epoxy or other deleterious materials from coming in contact with and affixing to the geogrid materials

(2) Store at temperatures above -20 degrees F (-29 degrees C).

(3) Rolled materials may be laid flat or stood on end.

(4) Geogrid materials should not be left directly exposed to sunlight for more than 6 months or as recommended by the manufacturer.

B. Examination.

(1) The Contractor shall check the geogrid upon delivery to verify the proper material has been received. The geogrid shall be inspected by the Contractor to be free of flaws or damage occurring during manufacturing, shipping or handling.

5. Execution.

A. Preparation.

(1) The subgrade soil shall be prepared as indicated on the construction drawings or as directed by the Engineer.

B. Installation.

(1) The geogrid shall be installed at the proper elevation and alignment as shown on the construction drawings.

(2) The geogrid shall be installed in accordance with these plans and specifications and any installation guidelines provided by the manufacturer or as directed by the Engineer.

(3) The geogrid may be temporarily secured in place with ties, staples, pins, sandbags or backfill as directed by the Engineer.

(4) Aggregate shall be placed and compacted in accordance with the local Department of Transportation standards. Aggregate shall be placed, spread and compacted in such a manner that minimizes the development of wrinkles in the geogrid and/or movement of the geogrid.

(5) A minimum loose aggregate thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the aggregate base material and damaging the geogrid. When underlying subgrade is trafficable with minimal rutting, rubber-tired equipment may pass directly over the geogrid reinforcement at slow speeds (less than 5 mph). Sudden braking and sharp turning movements shall be avoided.

C. Inspection and Repair.

(1) The Owner or Owner's representative may randomly inspect geogrid before, during and after (using test pits) installation.

(2) Any damaged or defective geogrid (i.e. frayed coating, separated junctions, separated layers, tears, etc.) will be repaired by removal of affected area and patching using new material with a minimum 3-foot overlap beyond the limits of the affected area.

(3) Any roll of geogrid damaged before, during and after installation shall be replaced by the Contractor at no additional cost to the Owner.

6. Measurement and Payment.

This work will be measured and paid for by the square yard, completed in place. No allowance will be made for overlap, splices or material cut off or wasted. Different manufacturer's overlap and splicing requirements for the intended application may vary. Payment for STRUCTURAL STANDARD APERTURE GEOGRID will include furnishing the material, labor, and equipment required to furnish, place and anchor the geogrid, and any hand work necessary to establish grades, make geogrid splices, and repairs to protective coatings.

PAY ITEM	**PAY UNIT**
STRUCTURAL STANDARD APERTURE GEOGRID	Square Yard

THIS COMPLETES THIS SPECIFICATIONS PACKAGE