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**SECTION 062000
FINISH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Finish carpentry items.
- B. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. PS 20 - American Softwood Lumber Standard 2021.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide instructions for attachment hardware and finish hardware.
- C. Samples: Submit two samples of wood illustrating wood grain and specified finish.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect from moisture damage.
- B. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Exterior Woodwork Items:
 - 1. Cladding material, posts and cross members.

2.02 LUMBER MATERIALS

- A. Softwood Lumber: Cedar species, as noted on drawings sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.03 FASTENINGS

- A. Fasteners: Of size and type to suit application.

2.04 WOOD TREATMENT

- A. Wood Preservative (Surface Application): as noted on drawings.
- B. Redry wood after pressure treatment to maximum nominal moisture content.

2.05 SITE FINISHING MATERIALS

- A. Stain, Shellac, Varnish, and Finishing Materials: Comply with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.06 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.

- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

3.03 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coats of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.04 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch (1.6 mm).
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

END OF SECTION

**SECTION 116813
PLAYGROUND EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Playground layout (staking).
- B. Playground slide.
- C. Location of each item of playground equipment is indicated on drawings.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Footings for playground equipment.
- B. Section 034500 - Precast Architectural Concrete.
- C. Section 312200 - Grading: Shaping subgrade to specified grade levels; removal of excess soil and rocks.
- D. Section 321816.13 - Playground Protective Surfacing: Protective surfacing in playground area.

1.03 DEFINITIONS

- A. Play Event: A piece of playground equipment that supports one or more play activities.
- B. Use Zone: Area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.
- C. Fall Height: Vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.
- D. Protective Surfacing: Resilient ground surfacing, specified in Section 32 1816.13. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
- E. Subgrade: Surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

1.04 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe 2021.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- D. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing 2020a.
- E. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.
- F. ASTM D648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position 2018.
- G. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment 2018, with Editorial Revision (2020).
- H. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use 2021.
- I. CPSC Pub. No. 325 - Public Playground Safety Handbook 2015.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
 - 1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
 - 2. Include representatives of Contractor.
 - 3. Notify Architect at least 2 weeks prior to meeting.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Proposals for Substitutions: Substitutions that will increase fall height, platform height, or maximum equipment height will not be considered; submit shop drawings with proposed modifications clearly identified and sufficient information to determine compliance with specified criteria.
- C. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.
 - 1. Certifications: Provide International Play Equipment Manufacturers Association (IPEMA) certification that product complies with ASTM F1487, excluding section 10 and 12.6.1.
- D. Samples: For each item that a color must be selected, provide color chart showing full range of colors and finishes.
- E. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.
- B. Manufacturer Qualifications: Company regularly engaged in manufacturing materials and products specified in this section, with not less than three years of experience.
 - 1. Provide documentation showing that playground equipment similar to that specified has been installed in at least ten sites and in successful service for at least five years; provide addresses.
 - 2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.
 - 3. Manufacturer's Representative: Provide product rep's name, company name and address, and playground safety training certificate.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.
- B. Store materials in a dry, covered area, elevated above grade.

1.09 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum 3 year warranty for playground equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Playground Equipment:
 - 1. Embankment Curved Slide Chute. Model, 1650-53-EMB, Color Yellow:
www.timberform.com (Contractor Supplied / Contractor Installed)

Correction noted in
Addendum No. 2

2. ~~All other play equipment. (Owner Supplied / Owner Installed)~~
3. Substitutions: See Section 016000 - Product Requirements.

2.02 PLAYGROUND EQUIPMENT - GENERAL

- A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
 1. Playground has been designed for children ages 2 through 5.
 2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.
- B. Mount equipment on concrete footings, unless otherwise indicated.
 1. Playground protective surfacing constitutes a resilient layer installed over a subbase (non-resilient) that is installed over subgrade; top of footings and anchorage devices is to be covered by full depth of resilient portion of protective surfacing.
 2. Protective Surfacing Depth within Engineered Wood Fiber:
 3. Provide supports as required to mount equipment at proper height above finish and subgrades to allow installation of sufficient depth of protective surfacing; portion of support below top of surfacing must comply with specified requirements for equipment.
 4. Paint portion of support that is intended to be installed below top surface of protective surfacing a different color, or mark in other permanent way, so that installers and maintainers of protective surfacing can easily determine whether sufficient depth has been installed.
- C. Provide permanent label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

2.03 PLAYGROUND EQUIPMENT

- A. Comply with ASTM F1487 and CPSC Pub. No. 325; provide equipment complying with specified requirements for relevant age group(s).
 1. Provide components having factory-drilled holes; do not use components with extra holes that will not be filled by hardware or covered by other components.
- B. Slides: Slide bed.
 1. Model: As noted in drawings.
 2. Location: As indicated on drawings.
 3. Slide Bed: Rigid, molded ultraviolet stabilized polyethylene, with anti-static additives, segmented enclosed tube construction.
 4. Treads and Handrails: Solid wood with stringers of wood.
 5. Maximum Slope: 1:5.1.
 6. Supports and Platform: Galvanized steel with PVC coating.
 7. Color: Yellow.
 8. Certification: Provide International Play Equipment Manufacturers Association (IPEMA) certification that indicates product complies with ASTM F1487, excluding sections 7.1.1, 10, and 12.6.1.

2.04 CUSTOM PLAY STRUCTURES

- A. Materials, Configuration, and Dimensions: As indicated on drawings.
- B. Fabricate in accordance with ASTM F1487, unless otherwise indicated; in particular, requirements for sharp points and edges, protrusions, entanglement hazards, crush and shear points, and head and neck entrapment.

2.05 MATERIALS

- A. Steel Pipe and Tube: Comply with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M; hot-dipped galvanized and free of excess weld and spatter.
 1. Tensile Strength: 45,000 psi (310 MPa), minimum.
 2. Yield Point: 33,000 psi (225 MPa), minimum.

3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A123/A123M; remove tailings and sharp protrusions and burnish edges.
- B. Extruded Aluminum: ASTM B221 or ASTM B221M, Alloy 6061, 6062, or 6063.
 1. Tensile Strength: 39,000 psi (270 MPa), minimum.
 2. Yield Point: 36,500 psi (250 MPa), minimum.
- C. Hardware: Provide without hazardous protrusions, corners, or finishes, and that require tools for removal after installation; countersunk fasteners are preferred.
 1. Use stainless steel for metal-to-metal connections; select type to minimize galvanic corrosion of materials connected by hardware.
 2. Use stainless steel for wood-to-wood and wood-to-metal connections.
 3. Use stainless steel with plastic components.
 4. Bearings: Self lubricating.
 5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches (1 mm), less than the thickness of a dime.
 6. Rails, Loops, and Hand Bars: Same metal as item is mounted on or aluminum; with powder coating.
 7. Anchors: In accordance with manufacturer's recommendations.
- D. Boards and Timbers: Free of holes, cracks, and loose knots; do not use wood or wood coatings that contain pesticides; do not utilize used lumber.
 1. Species: As noted on drawings.
- E. Wood Sealer: Transparent dampproofing.
- F. Concrete: As specified in Section 033000.
- G. Concrete: ASTM C94/C94M ready mix concrete; 28 days strength of 3,000 psi (20.7 MPa).
- H. Precast Concrete: As specified in Section 034500.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that playground equipment footings have been installed in proper locations and at proper elevations.
- B. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor's expense.

3.02 PREPARATION

- A. Stake location of playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.
- B. Stake layout of entire Use Zone perimeter before starting any work and before subbase under resilient surfacing is laid.
 1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
 2. Verify that Use Zones are free of obstructions that would extend into resilient portion of protective surfacing.
 3. If conflicts or obstructions exist, notify Architect.
 4. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

3.03 INSTALLATION

- A. Coordinate work with preparation for and installation of protective surfacing specified in Section 321816.13; install resilient portion of protective surfacing after playground equipment.
- B. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

- C. Anchor equipment securely below bottom elevation of resilient surfacing layer.
- D. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.
- E. Do not modify play events on site without written approval of manufacturer.
- F. Install required signage if not factory-installed.

3.04 FIELD QUALITY CONTROL

- A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.
- B. Owner or Owner's representative will inspect playground equipment after installation to verify that playground meets specified design safety and accessibility requirements.
- C. Repair or replace rejected work until compliance is achieved.

3.05 CLEANING

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- C. Clean playground area of excess construction materials, debris, and waste.
- D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

3.06 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 320190
OPERATION AND MAINTENANCE OF PLANTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Maintain plants in manner that promotes health, growth, color and appearance, to quality levels specified; replace dead, dying, and damaged plants at no extra cost to Owner.
 - 1. It is Contractor's responsibility to determine type and quantity of soil amendments and fertilizer required.
- B. Maintain newly planted landscape plants, including turf (lawns), turf (playfields), trees, shrubs, hedges, vines, ground cover, perennials, flowering bulbs, and annuals.
- C. Operate permanent irrigation system.
- D. Clean up landscaped areas.
- E. Maintenance Period: The time frame covered by these requirements is 365 days:
 - 1. Start Date: Project Date of Substantial Completion.

1.02 RELATED REQUIREMENTS

- A. Section 312200 - Grading.
- B. Section 328423 - Underground Sprinklers.
- C. Section 329219 - Seeding.
- D. Section 329300 - Plants.

1.03 REFERENCE STANDARDS

- A. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning) 2017.
- B. ANSI Z133.1 - American National Standard for Arboricultural Operations - Safety Requirements 2017.
- C. ASTM D4972 - Standard Test Methods for pH of Soils 2019.
- D. ASTM D5883 - Standard Guide for Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes 2018.

1.04 PROPOSAL SUBMITTALS

- A. Submit complete maintenance plan, showing:
 - 1. Irrigation volume and frequency.
 - 2. Fertilizer type, quantity, and schedule of application.
 - 3. Soil amendment type, quantity, and schedule of application.
 - 4. Personnel assigned, including supervisor.
 - 5. Inspection procedures, diagnostics, and remedies.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Soil Tests and Analysis: Submit report showing number of samples, test results, and recommendations for soil amendments and fertilizer.
- C. Product Data: Manufacturer's data sheets on each fertilizer, herbicide, pesticide, and other chemical material to be used, showing trade name, chemical composition, mixing instructions, recommended application rate, storage and handling instructions, and application instructions.
 - 1. Pesticides and Herbicides: Also include U.S. EPA registration number and Material Safety Data Sheets.
- D. Shop Drawings:
 - 1. Maintenance plan.

2. Recommendations of the local Cooperative Extension Service office for maintenance and care of turf.
 3. Pesticide application plan; obtain approval of Owner for each individual pesticide application.
- E. Certificates: Certification of composition of the following as delivered:
1. Fertilizer.
 2. Pesticides.
 3. Herbicides.
 4. Other chemical materials.
- F. Installer Qualifications: As specified.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Maintenance Contractor: The contractual entity that performed the planting installation.
 2. Pesticide Applicators: Certified by authorities having jurisdiction.
 3. Herbicide Applicators: Certified by authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver U.S. EPA-controlled materials to site in original containers with legible labels indicating registration number and registered uses.
- B. Deliver fertilizer and manufactured soil amendments to site in original containers bearing manufacturer's chemical analysis, name, trade name or trademark, and indication of compliance with applicable state and federal laws and regulations ; alternatively, bulk delivery with equivalent certificate is acceptable.
- C. Store fertilizer, soil amendments, and mulch in dry locations away from contaminants.
- D. Do not store pesticides, herbicides, or other chemical treatment materials in locations where they could damage seeds or plants.

PART 2 PRODUCTS

2.01 FERTILIZERS AND SOIL AMENDMENTS

- A. Fertilizers: Free flowing granular organic type containing nitrogen, phosphorus, and potassium, plus trace minerals and micro-nutrients; controlled release type is preferred.
1. Determine type and quantity based on soil analysis.
 2. Non-Turf Plant Fertilizer: As specified in Section 329300.
- B. Soil Amendments: Type and quantity as required to achieve specified results, based on soil analysis; do not use vermiculite.
- C. Recycled Compost: Well decomposed, stable, weed free; derived from food, agricultural or industrial residuals, biosolids, yard trimmings, or source-separated or mixed solid waste; with no objectionable odors and not resembling the raw material from which it was made; no substances toxic to plants.
1. Gradation: 100 percent passing 3/8 inch (10 mm) screen.
 2. Moisture Content: 35 to 55 percent by weight.
 3. pH: 5.5 to 8.9.
 4. Not more than 1 percent man-made matter and without plastic items more than 2 inches (50 mm) in length.

2.02 APPLIED MATERIALS

- A. Organic Mulch: Maintain general appearance of existing mulched areas; use one of the following types:
1. Ground or shredded bark, or as noted in drawings.
- B. Pesticides: U.S. EPA registered.
- C. Herbicides for Use on Turf: U.S. EPA registered.

1. Pre-Emergence Type: supply product cut sheet for review prior to use..
- D. Water: Suitable for irrigation; Owner's water supply may be used.

PART 3 EXECUTION

3.01 EXAMINATION

- A. If soil analysis has not already been performed, take sufficient samples to obtain a comprehensive analysis; perform analysis in accordance with ASTM D4972.

3.02 LANDSCAPE MAINTENANCE - GENERAL

- A. Protect existing vegetation, pavements, and facilities from damage due to maintenance activities; restore damaged items to original condition or replace, at no extra cost to Owner.
- B. General Cleanup: Remove debris from all landscape areas at least once a week and from turf areas before each mowing.
 1. Debris consists of trash, rubbish, dropped leaves, downed branches and limbs of all sizes, dead vegetation, rocks, and other material not belonging in landscaped areas.
 2. Remove debris from site and dispose of properly.
- C. Watering, Soil Erosion, and Sedimentation Control: Comply with federal, state, local, and other regulations in force; prevent over-watering, run-off, erosion, puddling, and ponding.
 1. Repair temporary erosion control mechanisms provided by others.
 2. Repair eroded areas and replant, when caused by inadequate maintenance.
 3. Prevent sediment from entering storm drains.
- D. Trees: Exercise care to avoid girdling trees; provide protective collars if necessary; remove protective collars at end of maintenance period.
- E. Fertilizing: Apply fertilizer only when necessary.
- F. Earth Mound Watering Basins: Maintain in good condition and as required to permit efficient application of water without waste; reapply mulch if soil surface shows.
- G. Drainage Channels: Remove obstructions in gutters, catch basins, storm drain inlets, yard drains, swales, ditches, and overflows.
 1. Remove grates from catch basins to clean.
 2. Prevent encroachment of other vegetation on turfed surface drainage channels.
- H. Health Maintenance: Inspect all plants regularly for health:
 1. Eradicate diseases and damaging pests, regardless of severity or speed of effect.
 2. Treat accidental injuries and abrasions.
 3. If a plant is unhealthy but not yet dead, according to specified definitions, determine reason(s) and take remedial action immediately.
 4. Remove dead plants immediately upon determining that they are dead.
- I. Pesticide and Herbicide Application: Comply with manufacturer's instructions and recommendations and applicable regulations.
 1. Obtain Owner's approval prior to each application.
 2. Apply in manner to prevent injury to personnel and damage to property due to either direct spray or drifting, both on and off Owner's property.
 3. Use backflow preventers on hose bibbs used for mixing water; prevent spills.
 4. Inspect equipment daily before application; repair leaks, clogs, wear, and damage.
 5. Do not dispose of excess mixed material, unmixed material, containers, residue, rinse water, or contaminated articles on site; dispose of off site in legal manner.
 6. Rinse water may be used as mix water for next batch of same formulation.
 7. Contractor is responsible for all recordkeeping, submissions, and reports required by laws and regulations.
- J. Replanting: Perform replacement and replanting immediately upon removal of dead plant.

3.03 IRRIGATION

- A. Irrigation: Do not allow plants to wilt; apply water as required to supplement rainfall; do not waste water; do not water plants or areas not needing water; do not water during rainfall; shut off water flow when finished; repair leaks.
 - 1. New automatic irrigation system may be used.
 - 2. Owner's water source may be used.
 - 3. Provide backflow preventers on hose bibbs used for irrigation hoses.
- B. Automatic Irrigation System: Obtain and follow manufacturer's operating and maintenance instructions.
 - 1. Adjust to water landscape areas only.
 - 2. Adjust sprinkler heads, drippers, valves, pumps, and controllers as required for optimum operation.
 - 3. Drain and prepare for freezing weather; prepare and start up in spring.
 - 4. During system warranty period notify Architect and system installer promptly of defects and leaks that adversely affect irrigation performance.
 - 5. After end of system warranty period, service and repair all defects and leaks.

3.04 TURF MAINTENANCE

- A. Maintain turf in manner required to produce turf that is healthy, uniform in color and leaf texture, and free from weeds and other undesirable growth.
 - 1. Grass Density - Lawns: 20 plants per square foot (200 plants per square meter), minimum.
 - 2. Bare Spots - Lawns: 2 percent of total area, maximum; 6 inches (150 mm) square, maximum.
 - 3. Keep turf relatively free of thatch, woody plant roots, diseases, nematodes, soil-borne insects, stones larger than 1 inch (25 mm) in diameter, and other materials detrimental to grass growth.
 - 4. Limit broadleaf weeds and patches of foreign grass to a maximum of 2 percent of the total area.
- B. Mowing: During growing season(s) mow turf to uniform height, in manner that prevents scalping, rutting, bruising, and uneven or rough cutting.
 - 1. Prior to mowing clean all debris and leaves from turf surface.
 - 2. Schedule frequency of mowing so that no more than one-quarter to one-third of grass leaf length is removed during a cutting.
 - 3. Make each successive mowing at approximately 45 degrees to the previous mowing, if practical.
 - 4. Cool Season Grasses:
 - a. Reduce mowing height in fall and spring.
 - b. Use rotary type mowers; mulcher type mowers may be used.
 - 5. Warm Season Grasses:
 - a. Increase mowing height slightly as fall approaches.
 - b. Use reel type mowers; do not use mulcher mowers.
- C. Summer Mowing Height for Lawns:
- D. Trimming: Immediately after each mowing, neatly trim perimeter of each turf area and around obstructions within turf area; match height and appearance of adjacent turf.
 - 1. Adjacent to Pavements: Cut edges of turf to form a distinct, uniform turf edge.
 - 2. Adjacent to Planting Beds and Permanently Mulched Areas: Cut edges of turf to form a distinct, uniform turf edge.
 - 3. Around Other Trees and Poles: Where no planting bed or mulched area exists, trimming with string trimmer is acceptable.
 - 4. At Fences: Trim on both sides of fence.
 - 5. Irrigation Heads and Valve Boxes: Trim neatly so grass doesn't interfere with operation.

- E. Fertilizer: Apply as recommended by manufacturer and at rate indicated by soil analysis.
 - 1. Cool Season Grasses: Apply at least once, in Fall before first frost; do not apply high nitrogen fertilizer during Summer; Spring application is optional but must be reduced in quantity.

3.05 PLANTING BED MAINTENANCE

- A. Planting beds include all planted areas except turf.
- B. Begin maintenance immediately after plants have been installed; inspect at least once a week and perform needed maintenance promptly.
- C. Keep planting beds free of pests; remove weeds and grass by hand or with an approved herbicide before reaching 1 inch (25 mm) height.
- D. Do not allow climbing, twining, or creeping plants to encroach into other species.
- E. Replace mulch as required and remove debris.

3.06 TREE AND SHRUB MAINTENANCE

- A. Trees will be considered dead when main leader has died back or when 25 percent or more of crown has died ; except as otherwise indicated for palm trees.
- B. Shrubs will be considered dead when 25 percent or more of plant has died.
- C. Inspect woody plants for health by scraping up to 1/16 inch (2 mm) square area of bark; no green cambium layer below bark shall be evidence of death.
- D. Adjust stakes, guys and turnbuckles, ties, and trunk wrap as required to promote growth and avoid girdling.
- E. All stakes shall be removed at no costs to the owner during the last week of the project's (1) year warranty period.
- F. Fertilizing: Fertilize all trees at least once during maintenance period, preferably in the Fall; use accepted standards for determining type and method of fertilization.
- G. Pruning: Unless otherwise indicated, prune only to maintain balanced natural shape; follow recommendations of ANSI A300 and ANSI Z133.1 and best local practices for species involved.
- H. Shrubs: Prune at least once during maintenance period at best time to influence ultimate shape and size for the particular species.
 - 1. Prune to balance the plant's form and according to its natural growth characteristics.
 - 2. Remove water shoots, suckers, and branches not complying with desired shape and size.
- I. Hedges: Trim to encourage growth into voids and gaps.
- J. Young Trees: Prune at least once during maintenance period at best time to influence ultimate shape and size for the particular species; do not remove or cut off leader.
- K. Renovation of Established Shrubs: Prune and trim as required to improve shape and balance as appropriate to the particular species; remove dead, damaged, and diseased branches and limbs; do not remove excess growth except as follows:
 - 1. Remove growth in front of windows, above or obstructing entranceways and walkways, leaning against structures, and obstructing vision at street intersections.
 - 2. Where indicated, remove excess growth by pruning technique best suited to future growth for the particular species.
- L. Renovation of Established Trees (Except Palm Trees):
 - 1. Remove dead, damaged, and diseased branches and limbs and structurally weak limbs that may be a safety hazard.
 - 2. Remove growth in front of windows, above or obstructing entranceways and walkways, and leaning against structures.
 - 3. Remove growth obstructing traffic signs or vision at street intersections.
 - 4. Remove branches that extend over buildings or otherwise endanger roofs.

5. Remove low-hanging branches over vehicular traffic routes to height necessary to clear expected traffic including buses and moving vans.
6. Where indicated, remove excess growth by pruning technique best suited to future growth for the particular species.

3.07 CLEANING

- A. Remove fallen deciduous leaves in Fall; removal may wait until all leaves have fallen.
- B. Clean adjacent pavements of plant debris and other debris generated by maintenance activities.
- C. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner; Owner's trash collection facilities may be used.
- D. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner.
 1. Biodegradable Debris: Owner will designate a compost pile on site where biodegradable debris may be deposited; branches and bark are not considered biodegradable.
 2. Branches and Bark: Owner will designate a wood chip storage area; machine-chip all branch and bark debris.
 3. Non-Biodegradable Debris: Owner's trash collection facilities may be used.

3.08 CLOSEOUT ACTIVITIES

- A. 10 days prior to end of maintenance period, submit request for final inspection.
- B. Final inspection will be conducted by Owner.

END OF SECTION

**SECTION 321123
AGGREGATE BASE COURSES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Paving aggregates.

1.02 RELATED REQUIREMENTS

- A. Section 312200 - Grading: Preparation of site for base course.
- B. Section 312323 - Fill: Topsoil fill at areas adjacent to aggregate base course.
- C. Section 312323 - Fill: Compacted fill under base course.
- D. Section 321500 - Aggregate Surfacing: Additional aggregate base course requirements.
- E. Section 321313 - Concrete Paving: Finish concrete surface course.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 012200 - Unit Prices for general requirements applicable to unit prices for earthwork.
- B. Coarse Aggregate Type [as noted on plans]: By the cubic yard (cubic meter). Includes supplying aggregate material, stockpiling, scarifying substrate surface, placing, and compacting.

1.04 REFERENCE STANDARDS

- A. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- B. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- C. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2017a, with Editorial Revision (2021).

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When aggregate materials need to be stored on site, locate where directed by Owner.
- C. Aggregate Storage, General:
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coarse Aggregate 3/4" minus or **as noted on drawings**.

2.02 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for general requirements for testing and analysis of aggregate materials.
- B. If tests indicate materials do not meet specified requirements, change material and retest.

- C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

- A. Spread aggregate over prepared substrate to a total compacted thickness as noted on drawings.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6.4 mm) measured with 10 foot (3 m) straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch (6.4 mm).
- C. Variation From Design Elevation: Within 1/2 inch (12.8 mm).

3.05 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.06 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

**SECTION 321313
CONCRETE PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks, integral curbs, and patios

1.02 RELATED REQUIREMENTS

- A. Section 032000 - Concrete Reinforcing.
- B. Section 312200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- C. Section 321123 - Aggregate Base Courses: 3/4" minus base course.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Provide concrete paving by the unit price method.
- B. See Section 012200 - Unit Prices, for additional unit price requirements.
- C. Concrete Placed: Measurement by the square yard (meter) per inch (25 mm) thickness. Includes preparing base, placing, floating and finishing, testing.

1.04 REFERENCE STANDARDS

- A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- G. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- H. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.
- I. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- J. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES

- A. Comply with applicable requirements of ACI 301.
- B. Concrete Sidewalks and Median Barrier: 3,000 psi (20.7 MPa) 28 day concrete, 4 inches (100 mm) thick, or as noted on drawings, buff color Portland cement, exposed aggregate finish.

2.02 FORM MATERIALS

- A. Wood form material, profiled to suit conditions.

- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).

2.03 REINFORCEMENT

- A. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi (280 MPa) yield strength; deformed billet steel bars; unfinished finish.

2.04 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Cement: ASTM C150/C150M, Normal - Type I Portland cement, gray color.
- C. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- D. Water: Clean, and not detrimental to concrete.

2.05 ACCESSORIES

2.06 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

2.07 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 321123 for construction of base course for work of this Section.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement as indicated.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Do not place concrete when base surface is wet.

- C. Ensure reinforcement, inserts, embedded parts, formed joints and [] are not disturbed during concrete placement.

3.07 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch (10 mm) wide expansion joints at 20 foot (6 m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
- C. Provide scored joints.
 - 1. At 3 feet (1 m) intervals or as shown on drawings.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16 inch (5 mm) wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.08 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius (6 mm radius).
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

3.09 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch (6 mm) in 10 ft (3 m).
- B. Maximum Variation From True Position: 1/4 inch (6 mm).

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 32 1343
POROUS RIGID PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Permeable concrete below playground surfacing.

1.02 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International ; 1991 (Reapproved 2002).
- B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International ; 2000.
- C. ACI 305R - Hot Weather Concreting; American Concrete Institute International ; 1999.
- D. ACI 306R - Cold Weather Concreting; American Concrete Institute International ; 1988 (Reapproved 2002).
- E. ASTM C 29 - Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate; latest edition.
- F. ASTM C 33 - Standard Specification for Concrete Aggregates ; 2008.
- G. ASTM C 1701 - Standard Test Method for Infiltration Rate of In Place Pervious Concrete; latest edition.

1.03 SUBMITTALS

- A. Submit plant mix design.
- B. Samples: Submit one sample panel, 12 x 12 inch in size illustrating finish.
- C. Contractor qualifications.
- D. Submit delivery tickets for porous concrete which include the following information:
 - 1. Supplier's name, delivery date, and mixing time.
 - 2. Quantities of cement, water, and aggregate.
 - 3. Type and quantity of admixtures.
 - 4. Testing results.

1.04 QUALITY ASSURANCE

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.

1.05 QUALIFICATIONS

- A. Contractor shall have the following minimum requirements:
 - 1. Certified by the National Ready Mixed Concrete Association's (NRMCA) Pervious Concrete Contractor Certification program.
 - 2. A minimum of 3 projects or similar size and products. Provide a description of the project, mix design, address, and contact person.
 - 3. A project foreman and workers who fully understand the requirements for placing and finishing porous concrete.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. See Section 32 13 13 - Concrete Paving & Footings

2.02 CONCRETE MATERIALS

- A. Cement: ASTM C 150 Normal - Type I or II portland cement or ASTM C 595 Portland Cement Type IP or IS.
 - 1. Acquire cement for entire project from same source.
 - 2. Color: Gray.
- B. Aggregate: No. 89 coarse aggregate (3/8 to No. 50) per ASTM D 448 with a minimum void content of 40 percent.
- C. Fly Ash: ASTM C 618, Class C or F.
- D. Water: Clean, and not detrimental to concrete.
- E. Chemical Admixtures: ASTM C 494/C 494M, Type A - Water Reducing, Type B - Retarding, and Type D - Water Reducing and Retarding.
 - 1. Hydration stabilizer meeting ASTM C 494.

2.03 CONCRETE MIX DESIGN

- A. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- B. Concrete Properties:
 - 1. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 2. Silica Fume Content: Maximum 10 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 600 lb per cubic yard.
 - 4. Water-Cement Ratio: Between 0.27 to 0.34.
 - 5. Aggregate/Cement Ratio: Between 4:1 to 4.5:1. Volume of aggregate per cubic yard shall be equal to 27 cubic feet.

2.04 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685.
- B. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Subgrade under permeable concrete should not be compacted. Where subgrade is compacted scarify to a minimum depth of 4 inches.
- B. Remove compacted materials as necessary to expose existing subgrade.
- C. Verify gradients and elevations of base are correct.

3.02 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Notify Owner's Representative minimum 24 hours prior to commencement of concreting operations.

3.03 FORMING

- A. Place and secure forms to correct location (only located below Softfall Tiles), dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

3.04 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.05 MIXING AND HAULING

- A. Cement mixture shall be mixed on site with a volumetric mixer and used within 60 minutes (120 minutes if a hydration stabilizer is used).
- B. Follow recommendation of the mix company for the required RPM of the drum during loading and transport.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete as near to the finish horizontal and vertical location as possible. Shoveling concrete should be minimized.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Install concrete 1/2 inch above finish grade using a riser strip to account for required compaction.
- E. Compact using a steel roller which spans the width of the forms. Ensure forms are placed to the specified elevation.

3.07 CURING

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Place polyethylene sheet (min. of 6 mils) or approved curing blanket.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.08 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

3.09 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014500 - Quality Control.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
 - 3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

- B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.10 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Owner's Representative and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Owner's Representative. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Owner's Representative for each individual area.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

**SECTION 321500
AGGREGATE SURFACING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Crushed stone surfacing.

1.02 RELATED REQUIREMENTS

- A. Section 311000 - Site Clearing.
- B. Section 312200 - Grading: Preparation of subbase.
- C. Section 312316 - Excavation.
- D. Section 312323 - Fill.
- E. Section 321123 - Aggregate Base Courses.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Unit Prices: See Section 012200 - Unit Prices for additional unit price requirements.
 - 1. Measure paved surface by square foot.
- B. Alternates: See Section 012300 - Alternates for product alternatives affecting this section.

1.04 REFERENCE STANDARDS

- A. ASTM C131/C131M - Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine 2020.
- B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 2019.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Installer's qualification statement.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing work of the type specified in this section, and with at least three years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. See Section 016000 - Product Requirements for additional requirements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Crushed Stone Surfacing: #10 minus crushed stone; free of shale, clay, friable material, and debris.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subgrade has been prepared correctly, is smooth, and is at proper grade and level.
- B. Do not begin work until subgrade is correct.

3.02 INSTALLATION

- A. Place aggregate base course, see Section 321123.
- B. Place surfacing or aggregate-turf pavement in maximum 4 inch (100 mm) layers.
 - 1. Roller compact to specified density.

3.03 CLEANING

- A. See Section 017419 - Construction Waste Management and Disposal for additional requirements.
- B. Remove unused or stockpiled fill, base, and reinforcement.
- C. Clean adjacent surfaces of excess sand, gravel, soil, and debris. Sweep broom clean.

END OF SECTION

**SECTION 321816.13
PLAYGROUND PROTECTIVE SURFACING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of existing protective surfacing and correction of grades as necessary.
- B. Protective surfacing for playground area.
- C. Subbase under resilient surfacing.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 321123 - Aggregate Base Courses: Subbase for resilient surfacing.
- C. Section 321313 - Concrete Paving: Subbase for resilient surfacing.

1.03 REFERENCE STANDARDS

- A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 2019.
- B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- D. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment 2018, with Editorial Revision (2020).
- E. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use 2021.
- F. ASTM F2075 - Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment 2020.
- G. CPSC Pub. No. 325 - Public Playground Safety Handbook 2015.

1.04 DEFINITIONS

- A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.
- B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.
- C. High Play Activity Area: Areas where the fall height is especially great, such as at swings. A high play activity area is defined only where the protective surfacing of the entire playground area is not designed for the greatest fall height. High play activity areas are defined on the drawings.
- D. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.
- E. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
- F. Subbase: A layer under the resilient layer of the protective surfacing but over the subgrade; may be rigid, as in concrete or bituminous, or aggregate.
- G. Subgrade: The surface of the ground on which the protective surfacing is installed.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements - Administrative Requirements, for submittal procedures.
- B. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.
 - 1. Include IPEMA certifications where required.
 - 2. Treated Wood Products: Provide information on wood treatment chemical content, toxicity level, and life-cycle durability.
- C. Product Data: For natural surfacing materials, provide supplier's certification or mill certificate showing compliance with specified requirements.
- D. Shop Drawings: Detailed scale drawings showing locations of existing playground equipment and exposed footings, bases, and anchorage points.
 - 1. Clearly identify footing and base elevations in relation to a fixed survey point on site and to subgrade elevation and depth of protective surfacing, surveyed by land surveyor licensed in the State in which the Project is located.
 - 2. Show locations of underground utilities, storm-drainage system and irrigation system.
 - 3. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.
 - 4. Show measured fall height for each playground equipment item, determined in accordance with ASTM F1487.
 - 5. Show Use Zone perimeters, determined in accordance with ASTM F1487.
- E. Samples: For each product for which color must be selected provide color chart showing full range of colors.
- F. Samples: Provide actual material samples for Softfall Material, Softfall Tile..
- G. Maintenance Data:
 - 1. For manufactured surfacing products, provide manufacturer's recommended maintenance instructions and list of repair products, with address and phone number of source of supply.
 - 2. For loose fill surfacing products, provide detailed re-ordering information to enable Owner to match installed material exactly.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.
- B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than three years of documented experience.
 - 1. Surfacing installed in minimum 10 sites and been in successful service minimum 5 years.
 - 2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.
 - 3. Manufacturer's Representative: Provide name, company name and address, and qualifications.
- C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store protective surfacing to project site in accordance with manufacturer's recommendations.
- B. Store materials in a dry, covered area, elevated above grade.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum Soft Tile [100%, 6 year warranty with a 50%, >6 warranty] year for playground surfacing.

PART 2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- A. Because the safety of the playground depends on strict compliance with the performance criteria, this information is provided for Contractor's information.
 - 1. The protective surfacing constitutes a resilient layer installed over a non-resilient layer, which is installed over the subgrade, with the top of playground equipment footings and anchorage devices covered by full depth of the resilient portion of the protective surfacing.
 - 2. The top elevation of the protective surfacing is intended to be flush with adjacent grades.
 - 3. Pre-k Zone: The protective surfacing has been designed to provide acceptable impact attenuation as defined in ASTM F1292 for Critical Height of 4 feet ([] m).
 - 4. High Play Activity Area: The protective surfacing has been designed to provide impact acceptable attenuation as defined in ASTM F1292 for Critical Fall Height of 10 feet ([] m).
- B. If deviation from specified depth is required, it is the Contractor's responsibility to make all changes required to maintain specified top elevation and required impact attenuation at no extra cost to Owner; obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

2.02 MATERIALS

- A. Tile Surfacing: Factory-molded rubber tile with impact attenuating design and solid, uniform top surface, flat bottom and solid sides (dual durometer); adhered to a rigid subbase.
 - 1. Tile Size: As indicated on drawings.
 - 2. Coefficient of Friction, when wet: 0.8, minimum, when tested in accordance with ASTM D2047.
 - 3. Resilient Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
 - 4. Color: As indicated on drawings.
 - 5. Manufacturers:
 - a. DuraSafe Rubber Playground Tiles: sofsurfaces.com
- B. Engineered Wood Fiber Fill: Manufactured for the purpose of protective surfacing; complying with ASTM F2075; do not use mulch manufactured from recycled pallets, or lumber containing nails or metal fasteners.
 - 1. Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
 - 2. Depth - Other Than High Play Activity Area: 12 inches (305 mm), maximum.
 - 3. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
 - 4. Manufacturers:
 - a. ASTM Tested Douglas Fir Chips. Highdesert Mulching: highdesertmulching.com
- C. Geotextile: Nonwoven polypropylene sheet.
- D. Aggregate Subbase: See Section 321123.

PART 3 EXECUTION

3.01 PREPARATION FOR REPLACEMENT OF EXISTING LOOSE FILL SURFACING

- A. Remove existing loose fill.

- B. Measure the location of all playground elements, including perimeter of existing protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.
- C. Stake the layout of the entire Use Zone perimeter before starting any work, based on Contract Documents.
 - 1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
 - 2. Do not proceed until revised drawings have been provided, showing corrected layout.
- D. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.
- E. After subgrade is correct, mark intended depth of surfacing on the base supports of each item of playground equipment using paint or tape in a manner that will be easily verifiable during installation of surfacing.
- F. Perform percolation test at the lowest elevation of the subgrade in the areas to be covered by protective surfacing.
 - 1. Report results to Architect.
 - 2. If percolation is less than 1 inch (25 mm) in a 3 hour period, do not proceed.

3.02 EXAMINATION

- A. Playground equipment installer will perform playground layout prior to installation of footings; verify correctness of layout before starting this work.
- B. Verify that playground equipment and site furnishings and irrigation system located within playground area are complete.
- C. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities will be repaired at Contractor's expense.
- D. Verify that subgrades are at proper elevations and that smooth grading is complete.
- E. Verify that proper depth of surfacing is marked on base supports of playground equipment.

3.03 PREPARATION

- A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in accordance with manufacturer's requirements.
- B. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.
- C. Remove rocks, debris, and other similar items.

3.04 SUBBASE

- A. Install aggregate subbase as indicated on drawings and in Section 321123. Compact aggregate to maximum 95 percent, in accordance with ASTM D1557.
- B. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch (6 mm) lower than grades and levels indicated.
- C. Install in true, even plane, sloped to provide positive drainage.
- D. Flatness Tolerance: 1/4 inch in 10 feet (6 mm in 3 m), maximum.

3.05 RESILIENT SURFACING LAYER

- A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).
- B. Install proper thickness throughout Use Zone(s).
- C. Clean and dry surface of subbase.
- D. Cover aggregate subbase with geotextile:
 - 1. Verify that aggregate is free of ruts or protruding objects.

2. Lap minimum 4 inches (100 mm) width at seams. Adhere seams in accordance with manufacturer's recommendations.
 3. Install smooth, and free of tensile stresses, folds, or wrinkles.
 4. Protect from clogging, tears, or other damage during surfacing installation.
 5. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.
- E. Tiles: Lay tile with cut end tiles of equal width.
1. Bond tile to substrate with adhesive recommended by manufacturer.
 2. Make cutouts around equipment not more than 3/8 inch (10 mm) in width; remove and refit tile as required to reduce gaps.
 3. Fill and seal gaps around equipment with sealant.

3.06 LOOSE FILL SURFACING

- A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, and requirements of authorities having jurisdiction (AHJ).
- B. Cover Subgrade with Geotextile:
 1. Lap minimum 4 inches (100 mm) width at seams. Adhere seams in accordance with manufacturer's recommendations.
 2. Install smooth, and free of tensile stresses, folds, or wrinkles.
 3. Protect from clogging, tears, or other damage during surfacing installation.
 4. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.
- C. Install loose fill to depths indicated, with smooth even surface flush with tops of containment curbs.

3.07 FIELD QUALITY CONTROL

- A. Owner or Owner's representative will inspect playground surfacing after installation to verify that surfacing is of proper type and depth and that playground meets specified design safety and accessibility requirements.
- B. Repair or replace rejected work until compliance is achieved.

3.08 CLEANING AND PROTECTION

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- C. Clean playground area of excess construction materials, debris, and waste.
- D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.
- E. Protect installed products until Date of Substantial Completion.
- F. Replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 323300
SITE FURNISHINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shade Sails

1.02 RELATED REQUIREMENTS

- A. Section 055000 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or group of units, elevations with model number, overall dimensions, construction, and anchorage details.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty against defects in materials or workmanship for ductile iron castings for a period of 5 from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Shade Sails: Design Build by Contractor.
 - 1. Shade Sail, Type 1: Skyclipse 370, Right Triangle (17' x 17' x 24') Color of sail to be selected by owner. Posts to be steel per manufacutre's recommendations. Color of posts to be selected by owner. <https://shadesails.com>. Or approved equal.
 - 2. Shade Sail, Type 2: Skyclipse 370, Right Triangle (20' x 20' x 28') Color of sail to be selected by owner. Posts to be steel per manufacutre's recommendations. Color of posts to be selected by owner. <https://shadesails.com>. Or approved equal.
- B. Site furnishings and manufactured play equipment: See plan & detail sheets.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.
- B. See manufacturer's recommendations, requirements for anchors to attach site furnishings to mounting surfaces.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.
- B. Provide level mounting surfaces for site furnishing items.

END OF SECTION

**SECTION 328423
UNDERGROUND SPRINKLERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and fittings, valves, sprinkler heads, emitters, bubblers, and accessories.
- B. Control system.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 312316 - Excavation: Excavating for irrigation piping.
- D. Section 312316.13 - Trenching: Excavating and backfilling for irrigation piping.
- E. Section 312323 - Fill: Backfilling for irrigation piping.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 012200 - Unit Prices, for additional unit price requirements.
- B. Piping:
 - 1. Basis of Measurement: By the linear foot (meter).
 - 2. Basis of Payment: Includes trenching, placing pipe and fittings, valves, control box, conduit and wiring, and accessories.
- C. Sprinkler Heads:
 - 1. Basis of Measurement: By the unit.
 - 2. Basis of Payment: Includes sprinkler head and fittings.

1.04 REFERENCE STANDARDS

- A. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings 2022.
- B. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series) 2020.
- C. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with site backfilling, landscape grading and delivery of plant life.
- B. Preinstallation Meeting: Convene one week prior to commencing work of this Section.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component and control system and wiring diagrams.
- C. Operation and Maintenance Data:
 - 1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
 - 2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.
- D. Record Documents: Record actual locations of all concealed components piping system.
- E. Maintenance Materials: Provide the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Sprinkler Heads: One of each type and size.

3. Extra Valve Box Keys: One.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with applicable code for piping and component requirements.

2.02 IRRIGATION SYSTEM

- A. Manufacturers:
 1. As noted in drawings.
 2. Substitutions: See Section 016000 - Product Requirements.

2.03 PIPE MATERIALS

- A. PVC Pipe: ASTM D2241; 200 psi (1.38 MPa) pressure rated upstream from controls, 160 psi (1.10 MPa) downstream; solvent welded sockets.
- B. Sleeve Material: PVC.

2.04 OUTLETS

- A. Manufacturers:
 1. As noted on drawings.
 2. Substitutions: See Section 016000 - Product Requirements.

2.05 VALVES

- A. Manufacturers:
 1. As noted on drawings.
 2. Substitutions: See Section 016000 - Product Requirements.

2.06 CONTROLS

- A. Manufacturers:
 1. As noted on drawings.
 2. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify location of existing utilities.
- B. Verify that required utilities are available, in proper location, and ready for use.

3.02 PREPARATION

- A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.
- B. Layout and stake locations of system components.
- C. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

3.03 TRENCHING

- A. Trench and backfill in accordance with Section 312316 and Section 312323.
- B. Trench to accommodate grade changes and slope to drains.
- C. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.04 INSTALLATION

- A. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.
- B. Connect to utilities.
- C. Set outlets and box covers at finish grade elevations.
- D. Provide for thermal movement of components in system.
- E. Use threaded nipples for risers to each outlet.
- F. Install control wiring in accordance with Section 260519. Provide 10 inch (250 mm) expansion coil at each valve to which controls are connected, and at 100 ft (30 m) intervals. Bury conduit beside pipe.
- G. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

3.05 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 014000 - Quality Requirements.
- B. Prior to backfilling, test system for leakage at main piping to maintain 100 psi (690 kPa) pressure for one hour.

3.06 BACKFILLING

- A. Provide 18" cover over mainline, 12" cover over lateral lines. No more than 24" of cover shall be placed over irrigation lines.
- B. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

3.07 SYSTEM STARTUP

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Adjust control system to achieve time cycles required.
- C. Adjust head types for full water coverage as directed.

3.08 CLOSEOUT ACTIVITIES

- A. Instruct Owner's personnel in operation and maintenance of system, including adjusting of sprinkler heads. Use operation and maintenance data as basis for demonstration.

3.09 MAINTENANCE

- A. See Section 017000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide one complete spring start-up and a fall shutdown by installer, at no extra cost to Owner.

END OF SECTION

**SECTION 329219
SEEDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Hydroseeding, mulching and fertilizer.
- D. Maintenance.

1.02 RELATED REQUIREMENTS

- A. Section 312200 - Grading: Topsoil material.
- B. Section 312200 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.
- C. Section 312323 - Fill: Topsoil material.
- D. Section 320190 - Operation and Maintenance of Planting: Post-occupancy maintenance.
- E. Section 321500 - Aggregate Surfacing: Additional seeding requirements.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 012200 - Unit Prices, for additional unit price requirements.
- B. Topsoil:
 - 1. Basis of Measurement: By the cubic yard (meter).
 - 2. Basis of Payment: Includes topsoil, placing topsoil.

1.04 REFERENCE STANDARDS

- A. ASTM D7322/D7322M - Standard Test Method for Determination of Erosion Control Product (ECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions 2017.

1.05 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass. Or any plant which is not noted in the planting schedule and / or approved by The owner's Representative.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Topsoil samples.
- C. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer ; and [_____].
- D. Maintenance Contract.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

2.02 SEED MIXTURE

- A. Seed Mixture:
 - 1. As noted on drawings.

2.03 SOIL MATERIALS

- A. Topsoil: ¼" minus fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

2.04 ACCESSORIES

- A. Mulching Material: Thermally refined wood fiber, nontoxic, free of growth or germination inhibiting ingredients, dust form.
- B. Fertilizer: Recommended for grass, slow-release nitrogen, biological materials, and biostimulant materials; of proportion necessary to eliminate deficiencies of topsoil.
- C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare subgrade in accordance with Section 312200.
- B. Place topsoil in accordance with Section 312200.

3.02 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.03 SEEDING

- A. Apply seed at a rate noted on drawings. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Do not sow immediately following rain, when ground is too dry, or during windy periods.
- D. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches (3 mm). Maintain clear of shrubs and trees.
- E. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches (100 mm) of soil.
- F. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches (100 by 100 mm).

3.04 HYDROSEEDING

- A. Apply seeded slurry with a hydraulic seeder at a rate of 50 lbs per 1000 sq ft ([_____] Kg per 1000 sq m) evenly in two intersecting directions.
- B. Do not hydroseed area in excess of that which can be mulched on same day.
- C. Immediately following seeding, apply mulch to a thickness of 1/8 inches (3 mm). Maintain clear of shrubs and trees.

- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches (100 mm) of soil.
- E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches (100 by 100 mm).

3.05 PROTECTION

- A. Identify seeded areas with stakes and string around area periphery. Set string height to 30 inches ([] mm). Space stakes as required to support string continuously level.
- B. No application of an approved pre-emergent shall be applied within seeded areas.

3.06 MAINTENANCE

- A. See Section 320190 - Operation and Maintenance of Planting for post-occupancy maintenance.
- B. Provide maintenance at no extra cost to Owner; Owner will pay for water.
- C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides. All weeds shall be removed at no costs to the owner during the last week of the project's (1) year warranty period.
- D. Immediately reseed areas that show bare spots.
- E. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

**SECTION 329300
PLANTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Topsoil bedding.
- C. New trees, plants, and ground cover.
- D. Relocated trees, plants, and ground cover.
- E. Mulch and Fertilizer.
- F. Tree Pruning.

1.02 RELATED REQUIREMENTS

- A. Section 312200 - Grading: Topsoil material.
- B. Section 312323 - Fill: Topsoil material.
- C. Section 320190 - Operation and Maintenance of Planting: Post-occupancy maintenance.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Unit Prices:
 - 1. See Section 012200 - Unit Prices, for additional unit price requirements.
 - 2. Topsoil: By the cubic yard (meter). Includes topsoil, placing topsoil.
 - 3. Plants: By the unit. Includes preparation of subsoil, placing topsoil, planting, watering and maintenance to specified time period.

1.04 DEFINITIONS

- A. Weeds: Any plant which is not noted in the plant schedule and / or approved by The Owner's Representative.
- B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.05 REFERENCE STANDARDS

- A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock 2014.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning) 2017.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.
- C. Maintenance Data: Include cutting and trimming method ; types, application frequency, and recommended coverage of fertilizer ; and [_____].
- D. Submit list of plant life sources.
- E. Maintenance Contract.

1.07 QUALITY ASSURANCE

- A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.
- B. Installer Qualifications: Company specializing in installing and planting the plants with 5 years experience.
- C. Tree Pruning: Comply with ANSI A300 Part 1.
- D. Maintenance Services: Performed by installer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- B. Protect and maintain plant life until planted.
- C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.09 FIELD CONDITIONS

- A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or rise above 90 degrees F (32 degrees C).
- B. Do not install plant life when wind velocity exceeds 30 mph (48 k/hr).

1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year warranty.
- C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.
- D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of plants, fertilizer and herbicide mixture.
- C. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

2.02 PLANTS

- A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.03 SOIL MATERIALS

- A. Topsoil: 1/4" minus fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

2.04 SOIL AMENDMENT MATERIALS

- A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis.
- B. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

2.05 MULCH MATERIALS

- A. Mulching Material: as noted on drawings, free of growth or germination inhibiting ingredients.

2.06 ACCESSORIES

- A. Wrapping Materials: Burlap.
- B. Stakes: Softwood lumber, pointed end.
- C. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared subsoil and planters are ready to receive work.
- B. Saturate soil with water to test drainage.
- C. Verify that required underground utilities are available, in proper location, and ready for use.

3.02 PREPARATION OF SUBSOIL

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. Scarify subsoil to a depth of 3 inches (75 mm) where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- D. Dig pits and beds 6 inches (150 mm) larger than plant root system.

3.03 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 6 inches (150 mm) over area to be planted. Rake smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches (150 mm).

3.04 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after initial raking of topsoil.
- C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
- D. Lightly water to aid the dissipation of fertilizer.

3.05 PLANTING

- A. Place plants for best appearance.
- B. Place plants for best appearance for review and final orientation by Architect.
- C. Set plants vertical.
- D. Remove non-biodegradable root containers.
- E. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches (of 150 mm) under each plant. Remove burlap, ropes, and wires, from the root ball.
- F. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch (150 mm) layers. Maintain plant life in vertical position.
- G. Saturate soil with water when the pit or bed is half full of topsoil and again when full.
- H. In all planting beds, apply an approved pre-emergent per the manufactures recommendations (2) twice. Once before installation of mulch and once after installation of mulch.

3.06 PLANT RELOCATION AND RE-PLANTING

- A. Relocate plants as indicated by Architect.
- B. Replant plants in pits or beds, partly filled with prepared topsoil mixture, at a minimum depth of 6 inches (of 150 mm) under each plant. Remove burlap, ropes, and wires, from the root ball.

- C. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch (150 mm) layers. Maintain plant materials in vertical position.
- D. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.07 PLANT SUPPORT

- A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:
 - 1. Tree Caliper: 1 to 2 inches (25 to 50 mm); Tree Support Method: 2 stakes with two ties
 - 2. Tree Caliper: 2 to 4 inches (50 to 100 mm); Tree Support Method: 3 guy wires with eye bolts and turn buckles
 - 3. Tree Caliper: Over 4 inches (100 mm); Tree Support Method: 4 guy wires with eye bolts and turn buckles

3.08 TREE PRUNING

- A. Prune trees as recommended in ANSI A300 Part 1.
- B. Prune newly planted trees as required to remove dead, broken, and split branches.

3.09 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 014000.
- B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.10 MAINTENANCE

- A. See Section 320190 - Operation and Maintenance of Planting for post-occupancy maintenance.

END OF SECTION