

TECHNICAL SPECIAL PROVISION

CFCRT Station Finishes Contract
Landscape Architecture
Financial Project ID: 412994-3-52-01

Prepared by:
Dix.Lathrop & Associates, Inc.
150 W. Jessup Ave.
Longwood, FL 32750

The official record of this Technical Special Provision is the electronic file signed and sealed under Rule 61G 15-23.003, F.A.C.

T. Blake Gunnels, R.L.A. # 6666927

Date: May 27, 2009

Table of Contents

SECTION 02480 – LANDSCAPE	3
SECTION 02813 – IRRIGATION	12
SECTION 02820 – POLYOLEFIN COATED CHAIN LINK FENCING	18
SECTION 02870 – SITE FURNISHINGS	24
SECTION 02871 – STEEL PIPE BOLLARDS	38
SECTION 02872 – SKATEBOARD DETERRENT CLIPS.....	43
SECTION 02900 – CEMENTED DECORATIVE GRAVEL	47
SECTION 02901 – DECORATIVE GRAVEL WALL BAND	50
SECTION 03320 – EXPOSED COQUINA SHELL AGGREGATE CONCRETE	56
SECTION 03330 – EXPOSED GLASS AGGREGATE CONCRETE	60
SECTION 03355 – STAMPED COLORED CONCRETE	63
SECTION 03451 – CAST STONE.....	66
SECTION 03460 – PRECAST CONCRETE SITE WALL	72
SECTION 06050 – BARRIER PROTECTED, GLASS-WOOD FUSION LUMBER.....	77
SECTION 09240 – COQUINA SHELL WALL COATING	83
SECTION 09965 – PERMANENT NON-SACRIFICIAL ANTI-GRAFFITI COATING.....	89

SECTION 02480 – LANDSCAPE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The work included in this section consists of furnishing, planting, watering, fertilizing, and mulching all plants and lawn areas of the species, size, and quality in the locations indicated on the drawings or as discussed with the Landscape Architect.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Transportation and Inspection: Plant transportation shall comply with all federal and state regulations and accompany each shipment with the required inspection certificates.

1.03 GUARANTEE

- A. The Landscape Contractor shall take responsibility for the proper maintenance, survival, and condition of all plants and sod for a period of one year after final acceptance.
- B. Inspection requirements: The Landscape Contractor shall certify monthly, on a form provided by the Florida Department of Transportation (FDOT), that the plants have been installed and are being maintained per the Contract Documents.
- C. Replacement of defective plants: During the establishment period, any dead plants or plants showing indication of probable no-survival or lack of health and vigor, or which fall below specified minimum grade, shall be replaced. All replacement plants shall be furnished/installed at no additional cost to the Owner and shall be guaranteed for one year. All replacements shall meet original specifications.

1.04 JOB CONDITIONS

- A. Protection: The Landscape Contractor shall protect all materials and work against injury from any causes and shall provide and maintain all necessary safeguards for the protection of the public. He shall be held responsible for any damage or injury to person or property that may occur as a result of the negligence in the prosecution of the work.
- B. Existing Conditions:
 - 1. The Landscape Contractor shall exercise care in digging and other work so as not to damage existing work, including underground pipes and cables, and the pipes and hydrants of watering systems. Should such overhead or underground obstructions be encountered which interfere with planting, the Landscape Contractor shall be responsible for the immediate repair of any damage caused by his work. (See Section 3.01)

2. Should any objectionable material such as old concrete, brick, or other debris be encountered during planting operations, they shall be removed from the site by the Landscape Contractor.
3. The Landscape Contractor shall be responsible for proper plant growth in existing on-site soils. Prior to commitment of plant shipments, the Landscape Contractor shall examine the soils in all areas of work by conducting soil tests and filling test holes with water to determine if soil chemistry and drainage are satisfactory. Any unsatisfactory conditions shall be brought to the immediate attention of the Landscape Architect for possible corrective action or plant material substitutions. The Owner/Landscape Architect reserves the right to make changes or substitutions in plant type or quantities for the purposes of insuring proper plant growth.
4. Prior to work: Landscape Contractor shall become fully familiar with the site and the work of all other trades, including hardscape and grading, in order to understand the full extent of the work.

1.05 QUALITY CONTROL

- A. The Landscape Architect/Owner shall have the right, at any stage of the operations, to reject any and all work and material that, in his/her opinion, do not meet the requirements of these specifications.
- B. All planting shall be performed by personnel familiar with planting procedure and under the supervision of the Landscape Contractor.
- C. All work shall comply with applicable codes and regulations.
- D. The work shall be coordinated with other trades to prevent conflicts.

1.06 QUANTITIES

- A. In the event of a conflict between quantities shown on the plant list and plans, the plans shall control.
- B. Mulch quantity provided on plant list is an estimate only. Landscape Contractor shall perform own mulch quantity takeoff to determine accurate quantity required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:

1. Nomenclature: All trees, shrubs, and plants shall be true to name as established by the American Joint Committee on horticultural nomenclature publication "Standard Plants Names". The designated authority for the identification of all material shall be the two publications of L.H. Baily, "Hortus III" and "Manual of Cultivated Plants", and all specimens shall be true to type, name, etc., as described therein.
2. Grade standards and quality: All plants shall be nursery grown, purchased from Florida based Nurseryman Stock, and shall comply with all required inspection, grading standards, and plant regulations as set forth in the Florida Department of Agriculture. "Grades and Standards for Nursery Plants", Parts 1 and 2 including revisions.
 - a. The minimum grade for all trees and shrubs shall be Florida #1 or better unless otherwise indicated and all plants shall be sound, healthy, and vigorous, well-branched, and densely foliated when in leaf. They shall have healthy, well-developed root systems and shall be free of disease and insect pests, eggs, or larvae.
3. Size: The minimum acceptable size of plants, at time of delivery to site, measured after pruning, with branches in normal positions shall conform to the specified sizes as shown on the plans. Sizes specified are minimum standards. Plants shall be equal to or larger than all categories of size specification (height, spread, and caliper). Substantial deviations from these measurements must be approved by Landscape Architect. Caliper of tree trunks shall be measured one foot above root ball for trees over six inches in caliper, and shall be measured six inches above the root ball for trees under six inches in caliper. Plants must be maintained at the specified sizes (minimum) throughout the project construction period and plant establishment period.
4. Grade: Plants must be maintained at the specified grade (minimum) throughout the project construction period and plant establishment period.
5. Plant protection: Plants shall be protected upon arrival at the site, by being thoroughly watered, kept moist, and properly maintained until planted.

B. Plant materials: With reference to method of cultivation, root system status, etc., plants for landscaping shall be classified under the following designations:

1. Balled and burlapped: Plants so classified shall be dug with firm natural root balls of earth coming from similar climatic and soil conditions as those on project site and of sufficient diameter and depth to include most of the fibrous roots. The root ball of these plants shall be properly wrapped with burlap sack material and remain protected and wet until they are planted. The plants shall be handled only by the earth ball and not by the plant itself. All balled and burlapped plants, which cannot be planted immediately upon delivery, shall be set on the ground and shall be well protected with soil, wet soil, wet moss, or other acceptable material. The plants shall be set with the burlap cover intact

and with the burlap showing, until inspection. At final inspection, the burlap may be cut away to ground level and then completely covered with soil. The burlap shall be pure burlap, organic fiber with the ability to decompose.

2. Container grown plants:
 - a. Container grown plants shall have been grown in containers large enough and for sufficient time for the root system to have developed well enough to hold its soil together firm and whole. No plants shall be loose in the container. Plants that have become root bound or whose root system is too large for the size of the container, will not be acceptable.
 - b. All containers shall be cut and opened fully in a manner that will not damage the root system. Container grown plants shall not be removed from the container until immediately before planting, when all due care shall be taken to prevent damage to the root system.
3. Bare root plants: No bare root plants shall be used, unless specifically specified.
4. Grow bag plants: No grow-bag plants shall be used.

C. Planting materials:

1. Topsoil:
 - a. Topsoil shall be friable loam, typical of cultivated topsoil locally, containing at least five percent of decayed organic matter (humus). It shall occur as on-site natural topsoil with good characteristics or be taken from a well-drained, arable site. It shall be reasonably free of weeds, subsoil, stones, clods, sticks, roots or other objectionable extraneous matter or debris. It shall not contain toxic materials and shall have an acidity range between pH 6.0 and 7.0. Topsoil from nut grass infested areas will not be acceptable.
 - b. Soil testing shall be performed and analyzed by a laboratory registered by the state. Testing shall include fertility and suitability analysis with written recommendations for fertilizer or amendments that shall take precedence over rates or analysis specified in this section. Soil testing shall be the Landscape Contractor's responsibility. Submit test results to the Landscape Architect for review.
 - c. Particle size distribution in top six to twelve inches of soil (Soil analysis for particle size shall be obtained through project geotechnical engineer):
 - i. Coarse sand (1 - 2 mm)/Medium Sand (.25 - .5mm): Minimum of sixty percent of particles shall fall within this range.
 - ii. Fine sand (.15 - .25 mm): Not more than twenty percent of particles shall fall within this range.
 - iii. Very fine sand (.05 - .15 mm): Not more than five percent of particles shall fall within this range.
 - iv. Silt (.002 - .05 mm): Not more than five percent of particles shall fall within this range.
 - v. Clay (Less than .002 mm): Not more than three percent of particles shall fall within this range.
 - d. Infiltration or percolation rate of soil: Desired level is two inches per hour.
 - e. Soil preparation: Prior to placing mix and backfill, or commencing with planting, rototill any or all areas that have been previously compacted over ninety percent for other construction purposes.

2. Fertilizer: Fertilizer shall be a complete balanced blend formula, of which part of the elements shall be derived from organic sources. It shall contain nitrogen, phosphorous, and potassium as well as recommended micronutrients such as magnesium, iron, copper, zinc, boron, and manganese in sulfate form. Nitrogen shall be applied over all turf, shrub, and tree areas at a rate of one and a half pounds per one thousand square feet. The complete fertilizer analysis shall be approved by the Landscape Architect.
3. Mulch: Pine straw mulch shall be clean, bright, and free of weeds, moss, sticks, and other debris.
4. Water: Suitable water for the irrigation of the new plantings during the process of construction shall be provided and paid for by the Landscape Contractor, who shall also furnish adequate watering equipment.
5. Stakes and ties: Stakes and tree ties shall be provided in accordance with the requirements of FDOT Standards, Index No. 544.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Underground obstructions:

1. The Landscape Contractor, prior to construction, shall verify all utilities.
2. Upon request from the Landscape Contractor, the Owner shall provide plans showing locations of underground utilities and/or will assist the Landscape Contractor in securing underground locations from other public utility companies, such as telephone, electricity, etc.
3. In the event that rock, underground construction work, utility lines or obstruction out of the ordinary are encountered in any plant pit excavation; alternative locations shall be selected by the Landscape Architect. Where locations cannot be changed and the obstructions may be removed, the obstructions shall be removed to a depth of not less than three feet below grade and no less than six inches below bottom of balls or roots when plant is properly set at the required grade.

B. Excavation of planting beds and/or plant holes:

1. Where excavation encounters materials which are suitable for plant growth, the plant hole excavations shall be roughly cylindrical in shape, with the sides approximately vertical. Plants shall be centered in the hole, with the trunk location as shown in the drawings, Bottoms of the holes shall be undisturbed natural subgrade preventing the plant from settling.

C. Protection of existing trees: The Landscape Contractor shall protect existing trees from damage. Where damage does occur, the Landscape Contractor shall remove the damaged tree, then replace it in kind and size in accordance with the instructions of the Landscape Architect and the appropriate specifications, all at no additional cost to the Owner.

D. Grades: It shall be the responsibility of the Landscape Contractor to finish (fine) grade all landscape areas eliminating all surface irregularities, depressions, sticks, stones, and other debris to the satisfaction of the Landscape Architect. No plant material shall be planted until final grade has been established, ensuring positive drainage, compacted to the required depth, and approved by the Landscape Architect.

3.02 PLANTING:

A. Layout: The Landscape Contractor shall mark proposed bedlines and locations of trees, palms, and accent plants per the Contract Documents for review by the Landscape Architect prior to planting.

- B. Soil drainage: Planting holes and planting beds must drain sufficiently before plant installation. Notify Landscape Architect for corrective action should any drainage or percolation problems arise.
- C. Installation of plants:
 - 1. For plant installation, comply with the requirements of FDOT Design Standards, Index No. 544.
 - 2. When lowering into the hole, the plant shall rest on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance. The Landscape Contractor, when setting plants in holes, shall make allowances of any anticipated settling of the plants. If wet conditions are anticipated, plants shall be set two inches to three inches higher than normal.
 - 3. The backfill shall be made with native topsoil, and shall be firmly rodded and watered in, so that no air pockets remain. The quantity of water applied immediately upon planting shall be sufficient to thoroughly moisten all of the backfilled earth. Plants shall be kept in a moistened, but not saturated, condition for the duration of the establishment period.
- D. Staking and guying: It is the responsibility of the Landscape Contractor to maintain all plants in a plumb, upright position until the end of the guarantee period. Comply with the requirements of FDOT Design Standards, Index No. 544 for staking and guying of plants.
- E. Pruning:
 - 1. All broken or damaged roots shall be cut off smoothly and the tops of all trees shall be pruned in a manner complying with standard horticultural practice. At the time pruning is completed, all remaining wood shall be alive. All cut surfaces of one inch or more in diameter, above the ground, shall be treated with an approved commercial tree paint. Fine pruning for tree shape and appearance shall be done only under the direction of the Landscape Architect.
 - 2. At the end of the guarantee period, at least eighty percent of the wood remaining shall be alive.
- F. Mulching: Within one week after the planting, mulch material shall be uniformly applied to a minimum loose thickness of two and a half inches over the entire area of the backfilled hole or bed. The mulch shall be maintained continuously in place until the time of final inspection.
- G. Watering: The Landscape Contractor shall continue watering for as long as is necessary to properly establish the new plantings. Care shall be taken to prevent staining of new construction where temporary well water is used.
- H. Pest control: Prior to final acceptance, occurrence of scales, borers, folial feeders, aphids, mites, leaf spot and dieback, nematodes, and canker-producing fungi, shall be treated with appropriate pesticide.
- I. All plants shall receive the specified fertilizer prior to final acceptance.

3.03 BERMING:

- 1) Fill dirt shall be locally obtained material from naturally drained sources, free from dry, organic debris, stones larger than one inch diameter and other materials harmful to successful drainage and plant growth. Soil shall be well mixed and contain no more than twenty five percent muck.
- 2) Grade areas indicated with uniform levels or slopes with no more than 4:1 maximum slope. Berms shall be gently rolling and parabolic.
- 3) Repair and re-establish grades in settled, eroded, rutted, or otherwise damaged areas.

3.04 SODDING:

- A. The sod shall be of firm, tough texture having a compact growth of grass with good root development. It shall contain no, weeds or any other objectionable vegetation. The soil embedded in the sod shall be good clean earth, free from stones and debris. The sod shall be free from fungus, vermin and other diseases. Final turf shall have no area greater than six square inches of unsodded area.
- B. Solid sod shall be laid with closely abutting joints with a tamped or rolled even surface. It shall be the responsibility of the Landscape Contractor to bring the sod edge in a neat, clean matter to the edge of all paving and shrub areas. After the sod is laid, a top dressing of clean sand will be evenly applied over the entire surface and thoroughly washed in, if determined necessary. Peg sod on slopes as required to prevent slippage. Fertilize all sod: one pound of nitrogen per one thousand square feet.

3.05 FIELD QUALITY CONTROL:

- A. Maintenance prior to final acceptance:
 1. Maintenance shall begin immediately after each plant is planted. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected, to assure specified minimum grade of Florida No. 1 or better, throughout the duration of the project construction period and the establishment period. Sod shall be mowed, if required.
 2. Settled plants shall be re-set to proper grade position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.
 3. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit. Upon completion of planting, the Landscape Contractor shall remove from the site excess soil and debris, and repair any damage to structures, etc., resulting from planting operations.
 4. The Landscape Contractor is responsible for protection against mechanical damage. This shall include providing protection from vehicles, including the posting of approved warning signs and barricades, as needed. The Landscape Contractor shall repair, restore or replace any plants or planting areas which might become damaged as a result of any negligence by the Landscape Contractor in complying with these requirements. As a specific requirement of these conditions, the Landscape Contractor shall be responsible for assuring that all plants at the time of final acceptance, exhibit the characteristics and qualifications required for the grade of plant as originally specified.

5. The Landscape Contractor shall be responsible for any additional watering required if irrigation proves to be inadequate for freshly planted material.
6. Except as otherwise specified, the Landscape Contractor's work shall conform to accepted horticultural practices as used in the trade.

B. Final acceptance:

1. Upon completion of installation of all plants, the Landscape Contractor shall notify the Landscape Architect and arrange for a final review. The landscape work may be reviewed for acceptance in parts, provided the work comprises an area of substantial size.
2. Date of final acceptance shall mark the beginning of the guarantee period.

C. Guarantee review: The Landscape Architect shall make interim inspections of all landscape items during the plant establishment period, as well as at the end of the establishment period. The Landscape Contractor shall replace all plants found not to meet minimum specifications per the Contract Documents within ten days after each inspection and at no cost to the Client as part of the Warranty. At the end of the establishment period, the Client will release the Landscape Contractor from further Warranty work and responsibility provided all plants are established and all previous warranty and remedial work, if any, has been completed to the satisfaction of the Client.

3.06 ADJUSTMENT AND CLEANING:

- A. Site cleanup: Upon completion of any landscape project, the Landscape Contractor must thoroughly clean up the project site. In addition to removing all equipment, unused materials, deleterious material, and surplus excavated material, the Landscape Contractor shall fine grade all disturbed areas and the areas adjacent to the new plantings to provide a neat and uniform site. All damaged or altered existing structures, as a result of the landscape work, shall be corrected.

END OF SECTION 02480

SECTION 02813 – IRRIGATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **Scope of Work:** The work consists of installing a complete automated underground irrigation system as shown on the Drawings and hereinafter specified. The work shall include the furnishing of all labor, equipment, materials, permits, meeting and coordination time, and supervision in performing all operations in connection with the construction of the irrigation system. The Bidders are advised that all work will be performed in a thorough, proper, and professional manner, and that the implementation of substandard or otherwise unapproved materials or methods is considered non-acceptable.
- B. **General Description:** The irrigation system shall be constructed using the materials and methods shown on the Drawings and as called for in these Specifications. The system shall be constructed to grades and conform to areas and locations as shown on the Drawings. Location of irrigation lines and equipment shown on the Drawings are largely diagrammatic. Mainline, valve, pump & well (if used) and supply P.O.C. locations shall be staked out by the Contractor and approved by the Owner prior to installation. Location of all other equipment shall be as close as practical to those shown on the Drawings. Mainline locations shall also be coordinated to avoid conflicts with pavement, easements, proposed and existing planting and/or other obstructions. The construction of the irrigation system shall include the furnishing, installation, and testing of all main, sub-mains, lateral piping, fittings, sprinkler heads, swing joints, valves, controller equipment, wiring, pumping equipment (if used), all other pertinent materials and accessories, the removal and/or restoration of existing improvements, excavation and backfill, and all other work in accordance with the Drawings and Specifications, as required for a complete, functional, and fully warranted system. Although architectural considerations may result in some differences of criteria between various areas of the project, the Contractor shall maintain uniformity of construction methods and materials throughout.
- C. **Relationship of the Documents:** The Drawings for this project and these Written Specifications are to be considered totally integral, with neither considered complete without the other. The Bidders shall thoroughly examine and familiarize themselves with all the information contained in the Documents, and by submitting a bid for this work, agree to accept and be bound by all the provisions made in the Documents. Should a discrepancy arise between the Drawings and these Specifications, the Drawings shall control, unless the item in question is part of an Addendum, dated later than the Drawings. The Owner or his chosen Representative shall be immediately notified of any such discrepancies, and shall take any corrective action deemed necessary.
- D. **Alternate Products and Methods:** Specific equipment, performances, installation methods, and other such criteria have been chosen for use in the design of this project, and these shall be considered the basis for the Base Bid. The use of alternate equipment and/or methods shall not be acceptable without prior approval. Consideration shall be given only for those materials and methods whose performance most closely matches that which is contained in the original Documents, and most reasonably serves the intent of this design. Any modifications or other impact to this design, which may be necessitated by the submission of alternate equipment

and/or methods, shall be clearly noted within the submittal, and subsequently acted upon by the Owner. The Bidders shall warrant that any bid submitted for any equipment shall include all materials and work necessary for the proper and fully warranted installation of the equipment, including, but not limited to, increased pipe or wire size, fittings, concrete, gravel, or any other associated materials and/or labor. After the Contract is awarded, any alternative material or methods that the Installer wishes considered shall be submitted in a written "Request for Substitution", which shall include full data for the proposed alternate, a cost difference (plus or minus) and a detailed reason for submitting the alternate.

- E. Related Work Specified Elsewhere: Consult the Owner for documents pertaining to other trades relative to this work.

1.02 SUBMITTALS

- A. Requirements: Prior to commencement of work under this Contract, the Contractor shall submit six sets of submittal data on all proposed materials and equipment. This data shall include copies of all manufacturers' warranty information, including documentation of any extended warranties, if applicable to this project. Submittals shall be in three-ring binders with various sections tabbed and properly indexed. Each item shall be marked as acceptable to the General Contractor before the Engineer, Landscape Architect, or the Consultant shall consider it for approval.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: The Contractor shall supply all material and equipment of the types and makes shown on the Drawings. No substitutions shall be permitted without prior written approval of the Owner. The Contractor shall inspect all material and equipment prior to installation; any defective materials or equipment shall be removed immediately from the site and replaced with the proper items. All materials shall be new and current production. Pipe shall be delivered to the site in full 20-foot lengths, and shall be clearly and permanently marked with manufacturer's name, classification, and code references. Any items used in the installation which are subsequently found to be defective, improperly installed, or not as specified herein and on the Drawings, shall likewise be removed and replaced with the proper materials and equipment, and installed in the proper manner, as interpreted by the Owner. Any work done or materials used for this purpose shall be provided by the Contractor at no cost to the Owner. All materials normally associated with the proper installation of the specified equipment, or required by the corresponding manufacturer of the equipment, shall be considered part of the work, regardless of whether every item is specifically specified in the Documents. In the event that less costly type of equipment is accepted for use on the project, or any equipment is omitted from the work, the Contractor shall discount the Contract amount (or if paid, shall fully refund the difference to the Owner) regardless of whether the action was initiated by the Owner or the Contractor.

PART 3 - INSTALLATION

3.01 GENERAL:

- E. Description: The Contractor shall install a fully operational and warranted automatic irrigation system. Any and all materials and prevalent methods necessary to do so shall be provided by the Contractor as part of this contract, even if not specifically called for in the Drawings and/or these Specifications. The Contractor shall obtain all the necessary permits and inspections for this work, and shall be responsible for penalties or damages which may result from his failure to do so. The content and enforcement of codes and regulations may vary from job to job, or change over time between Design and Construction. Information contained in these documents is for reference purposes ONLY, and shall not be considered an absolute interpretation of prevailing requirements. The responsibility for researching code requirements, and for conformance thereto, shall remain solely that of the Contractor. The Contractor shall NOT install any materials or perform any work that is known to be in violation of any standing code requirement or regulation, even if so directed by the Design Documents. Conflicts of this nature should be brought immediately to the attention of the Project Manager using a written "Request for Information".

- F. Existing Conditions: The Drawings show conditions as they are believed to exist, but it is not intended, nor should it be interpreted, that the conditions shown constitute a representation by the Owner that the conditions actually exist. The Contractor shall personally inspect the job site prior to bidding, to fully familiarize himself with the nature of the work, and shall accept full responsibility for any loss sustained as a result of differences between the conditions shown on the Drawings and any actual condition revealed during the completion of the work. (EXCEPTION: Rock Clause; See section 3.02.D.) The Contractor shall, prior to excavation, verify the location of any and all existing underground improvements, and shall take any action necessary to protect said improvements during his work, and eliminate service outages. This may include, but not be limited to, existing irrigation. If the site contains areas of protected wetland or other environmentally sensitive areas, the Contractor shall fully acquaint himself with the actual limits of these areas and any corresponding buffer zones, and shall make sure that the progress and/or result of his work shall not impact these areas. These areas may not be excavated, drained, thrown into by sprinklers, used for equipment access or storage, or otherwise disturbed in any way whatsoever. Any fees or penalties assessed upon the Owner as a result of violations by the Contractor will be paid by the Contractor. If surface water or well are used, the Contractor shall be responsible for checking the irrigation water source for salinity, odor, stain or other objectionable properties, and reporting the results to the Owner and Landscape Architect. This work should be performed as early as possible, or at initial well drilling.

- G. Trenching and Backfilling: The Contractor shall be responsible for staking out the head locations on the project. When grading has been established in a particular area, the Contractor shall, prior to beginning any excavation in the area, cause staking to be performed, and shall secure the approval of the Owner or Landscape Architect of the finished staking. Excavation shall be open vertical construction sufficiently wide to allow free working space around the work installed, and allow ample space for backfilling and tamping. Trenches for piping shall be cut to required grade lines, and compacted to provide accurate grade and uniform bearing for

the full length of the piping. Bottoms of trenches shall be free of rocks and other sharp objects. Unless specifically stated to the contrary, minimum depth of cover shall be 18" on mainline piping, and 12" on lateral piping. Minimum depth of cover on low-voltage wiring shall be as provided by the electrical codes in effect. Intersecting pipes and those sharing a common ditch shall have a minimum of three inches clearance from each other, and from other utilities. Initial backfill shall be pulverized native soil, free of foreign matter. Within four inches of the pipe shall be clean soil or sand. Remaining backfill shall be compacted to dry density equal to that of adjacent undisturbed soil, and shall conform to adjacent grades without depressions, lumps, or other irregularities. In lieu of trenching, piping may be laid by plowing, using approved equipment and methods. The Contractor shall still abide by the minimum clearances prescribed above.

- H. **Rock Clause:** If the ground should be such that the Contractor encounters large rocks, debris, or other obstructions that cannot be trenched through or otherwise removed during the normal course of construction, the Owner shall be notified, and a cost for excavation and backfill with selected materials shall be negotiated.
- I. **Pipes:** Pipe and associated fittings shall be as noted in the Drawings. Pipe shall be installed in such a manner so as to provide for expansion and contraction in accordance with the manufacturers published recommendations. Spigot ends of the pipe shall be firmly and completely seated in the fittings. Angular deflections in the joint shall not exceed manufacturer's recommendations. Lines shall be flushed before installation of heads. Heating and bending the pipe is not permitted. Pipe shall be cut in such a manner so as to provide a clean, square cut, free of chips, burrs, or splitting. Pipe shall be laid using a cleaner, primer, and cement (if solvent-weld) approved by the manufacturer of the pipe. As pipe is laid, installed pieces shall be restrained, so that slippage does not occur in previous joints. The Contractor shall monitor previous joints for slippage, until joints are set. Cemented joints shall be twisted one quarter turn as they are assembled, and excess solvent shall be immediately wiped away.
- J. **Inspections:** The Owner or his designated Representative may appear on site at any time to make periodic informal inspections. Other persons, such as the Consultant, or a representative of an equipment manufacturer may be included to offer comments. If it is determined that the provisions of the Documents or other requirements of the Work, including the proper and warranted installation of any equipment, have not been complied with, the Installer shall be directed to make immediate and satisfactory reparations. Upon completion of the Work, the Owner reserves the right to schedule a formal walk-through inspection, at which a punch list will be prepared, outlining items of concern or deficiency that must be corrected prior to the Work being considered complete.
- K. **Record Drawings:** The Installer shall be responsible for maintaining up-to-date on-site record drawings during the progress of the work. Record drawings shall show all major deviations from the Construction Drawings, and shall document installed mainline and wire routings, valve locations and designations, controllers, pavement crossings, splice boxes, pumping equipment (if used) and any other major equipment. These on-site drawings shall be available for inspection at any time during execution of the work, and shall be compiled into a complete, legible and reproducible (or CAD) "As-Built" drawing once work is complete. This completed drawing shall be provided to the Owner prior to Final Acceptance.
- H. **Warranty:** The entire system, including parts and labor, shall be warrantied by the Installer for a period of not less than one year from date of acceptance by the Owner. Manufacturers'

warranties of greater than one year shall be fully honored for their duration. The Owner reserves the right to seek damages for improper or substandard work beyond the expiration of the warranty, to the extent allowed by law.

END OF SECTION 02813

SECTION 02820 – POLYOLEFIN COATED CHAIN LINK FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Polyolefin coated chain link fencing and accessories for commercial and industrial use.

B. Related sections:

1. Section 03310 “Concrete Work” for post concrete fill.

1.2 SUBMITTALS

A. Shop drawings: Layout of fences with dimensions, details, and finishes of components, accessories, and post foundations.

B. Product data: Manufacturer’s catalog cuts indicating material compliance and specified options.

C. Samples: Color selection for polyolefin finishes. If requested, samples of materials (e.g., fabric, wires, and accessories).

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to set quality standards for fabrication and installation.

1. Include 10-foot length of fence complying with requirements.
2. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Preinstallation conference: Conduct conference at Project site.

1.4 SPECIAL WARRANTY

A. Provide Manufacturer’s standard limited warranty that its Polyolefin Coated Chain Link Fence is free from color coating flaking and peeling and other defects in material or workmanship for a period of 15 years from the date of purchase. See Manufacturers Warranty for full details.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Products from qualified manufacturers having a minimum of five years experience manufacturing thermally fused chain link fencing will be acceptable by the landscape architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.
- B. Obtain chain link fences, including accessories, fittings, and fastenings, from a single source.
- C. Approved product and manufacturer: Permafused II by Master Halco, Inc., 4000 W. Metropolitan Drive, Suite 400, Orange, CA 92868. Tel. 800-229-5615. Web. www.fenceonline.com.

2.2 CHAIN LINK FENCE FABRIC

- A. Polyolefin elastomeric coating, 6 mil to 10 mil thickness, thermally fused to zinc-coated steel core wire: Per ASTM F668 Class 2b. Minimum core wire tensile strength of 75,000 psi (517 MPa).
- B. Size: Helically wound and woven with 2-inch diamond mesh, 9 gauge, with a core wire diameter of .148-inch and a minimum breaking strength of 1290 lbf (5740 N).
- C. Height: See Drawings for locations of different heights of fencing.
 - 1. 4 feet
 - 2. 3-1/2 feet
- D. Color: Per ASTM F 934. See Materials Schedule on Drawings for color selection.
- E. Selvage of fabric: Knuckled at top and bottom.

2.3 STEEL FENCE FRAMING

- A. Steel pipe - Type I: ASTM F 1083, standard weight schedule 40; minimum yield strength of 30,000 psi (205 MPa); sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz/ft² (550 g/m²) of coated surface area.
- B. Polyolefin coated finish: In accordance with ASTM F1043, apply supplemental color coating of minimum 10 mils of thermally fused polyolefin. Color to match fabric.
- C. End and corner post: 2.375 inches O.D., 3.65 lbs/ft (13.6 kg/m). See Drawings for spacing of posts.
- D. Line post: 1.9 inches O.D., 2.72 lbs/ft (3.65 kg/m).

- E. Rails and braces: 1.66 inches O.D., 2.27 lbs/ft (3.4 kg/m).

2.4 POLYOLEFIN COATED ACCESSORIES

- A. Chain link fence accessories: Provide items required to complete fence system per ASTM F 626. Galvanize each ferrous metal item and finish to match framing. Fittings should match these specifications.
 - 1. Post caps: Formed steel, cast malleable iron, or weather tight closure cap for tubular posts. Provide one cap for each post. Tops to permit passage of top rail.
 - 2. Top and bottom rail and rail ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.
 - 3. Top and bottom rail joint sleeves: 7 inch expansion sleeve with a minimum .137 inch wire diameter and 1.80 inch length spring, allowing for expansion and contraction of top rail.
 - 4. Wire ties: 9 gauge galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge for rails and braces. Hog ring ties of 12-1/2 gauge for attachment of fabric to tension wire.
 - 5. Brace and tension (stretcher bar) bands: Pressed steel, minimum 300 degree profile curvature for secure fence post attachment.
 - 6. Tension (stretcher) bars: One piece lengths equal to 2 inches less than full height of fabric with a minimum cross-section of 3/16 inch by 3/4 inch. Provide tension (stretcher) bars where chain link fabric meets terminal posts.
 - 7. Tension wire: Thermally fused polyolefin applied to zinc coated steel wire: Per ASTM F 1664 Class 2 b, 6 gauge, 0.192 inch diameter core wire with tensile strength of 75,000 psi (517 MPa).
 - 8. Truss rods and tightener: Steel rods with minimum diameter of 5/16 inch. Capable of withstanding a tension of minimum 2,000 lbs.
 - 9. Nuts and bolts to be galvanized but not polyolefin coated. Manufacturer to provide cans of touch up paint to coat nuts and bolts.

2.5 MISCELLANEOUS MATERIALS

- A. Concrete: Normal-weight, air entrained, ready-mix concrete complying with requirements of Division 3 Section "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size.
- B. Non-shrink grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

2.6 WARRANTY

- A. Manufacturer's standard limited warranty that its fence is free from color coat flaking and peeling and other defects in materials and workmanship.
 - 1. Warranty period: 15 years

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAIN LINK FENCE FRAMING INSTALLATION

- A. Verify measurements at site. Install chain link fence in accordance with ASTM F 567 and manufacturer's instructions.
- B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.
- C. Space line posts uniformly at 8 feet and 10 feet on center. See Drawings for locations of different line post spacing.
- D. Concrete set terminal and line posts per Drawings.
 - 1. Posts for 4 foot fence to be set permanently.
 - 2. Posts for 3-1/2 fence to be removable. Place posts in PVC sleeves set into concrete footing.
- E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
- F. Bracing: Install horizontal pipe brace at mid-height on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Adjust truss rod, ensuring posts remain plumb.
- G. Tension wire: Provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties. Secure tension wire to fabric with 12-1/2 gauge hog rings 24 inches on center.
- H. Top rail: Install lengths, 21 feet. Connect joints with top rail joint sleeves for rigid connections for expansion/contraction.
- I. Bottom rails: Install bottom rails between posts with fittings and accessories.

3.3 CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on security side and attach so that fabric remains in tension after pulling force is released. Leave 2 inches between finish grade and bottom selvage. Attach fabric with

wire ties to line posts at 15 inches on center and to rails, braces, and tension wire at 24 inches on center.

- B. Tension (stretcher) bars: Pull fabric taut. Thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15 inches on center.

3.4 ACCESSORIES

- A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.
- B. Fasteners: Install nuts on side of fence opposite fabric side for added security.

3.5 CLEANING

- A. Clean up debris and unused material, and remove from the site.

END OF SECTION 02820

TABLE OF CONTENTS

PART 1-GENERAL	24
1.1 SECTION INCLUDES	24
1.2 REFERENCE STANDARDS	24
1.3 REFERENCES	24
1.4 QUALITY CONTROL	24
1.5 PROJECT CONDITIONS	25
PART2- PRODUCTS	26
2.1 PRODUCT DELIVERY, STORAGE, AND HANDLING	26
2.2 BENCHES	26
2.3 TRASH RECEPTACLES	30
2.4 BIKE RACKS	32
2.5 LEAN RAILS	33
2.6 PLANTER POTS	33
PART3- EXECUTION	36
3.1 EXAMINATION	36
3.2 FABRICATION AND FORMING	36
3.3 INSTALLATION	36
3.4 PROTECTION	36
3.5 CLEANING	37

SECTION 02870 – SITE FURNISHINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- C. Benches.
- D. Trash receptacles.
- E. Bike racks.
- F. Lean rails.
- G. Planter pots.

1.2 REFERENCE STANDARDS

Including but not limited to:

- A. The Governmental Rules of the jurisdictional authorities.
- B. American Society for Testing and Materials (ASTM).

1.3 REFERENCES

- C. Submit certifications for all materials incorporated in the Work.
- D. Product Data: Manufacturer's descriptive literature for specified products, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements/recommendations.
 - 3. Installation methods.
- E. Shop Drawings: Complete details of layout and assembly, showing member sizes and part identification, fasteners, anchors, and fittings.
- F. Selection Samples: Two sets of color chips representing manufacturer's full range of available colors.
- G. Manufacturer's warranties.

1.4 QUALITY CONTROL

- B. Quality Control shall be by the Contractor and as required by the Contractor's Quality Plan and applicable Reference Standards.

1.5 PROJECT CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- D. Deliver products in good condition.
- E. Store products in manufacturer's unopened packaging until ready for installation to prevent corrosion, deterioration and damage.
- F. Handle products with care to prevent damage.
- G. Storage: Store materials in a clean, dry area indoors out of the elements.

2.8 BENCHES

1. Steel benches with backrests.

1. Bench B-1 (see Drawings):

- a. Welded seat and back.
- b. End frames: Cast iron bench supports with curved armrests and (3) decorative floral plaques inset into frame on each end. Each support shall have (2) integral mounting brackets at base.
- c. Center arm rest: Cast iron to match end frame style.
- d. Seat: 1/4 inch by 1-1/2 inch steel bars and 2-3/8 inch O.D. steel pipe. Back and seat to be one-piece continuous bars. The ends of the bars at each end shall curve around steel pipe.
- e. Fasteners: Stainless steel.
- f. Bracing: 1-1/16 inch O.D. steel pipe.
- g. Seat height: 17-1/16 inches.
- h. Width: 27-9/16 inches.
- i. Length: 6 feet.
- j. Mounting: Provide with 1/2 inch by 3-3/4 inch zinc plated anchor bolts.
- k. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Blast: Sandblast to a white finish.
 - iii. Wash: Multiple stage wash system.
 - iv. Primer: Zinc-rich primer.
 - v. Topcoat: Colored UV resistant polyester powder.
 - vi. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.
- l. Acceptable product and manufacturer: 58 Series Bench, Model # 58-6C by Dumor, Inc., P.O. Box 142, Mifflintown, PA 17059-0142. Tel. 800-598-4018. Web. www.dumor.com.
- m. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
- n. Warranty:

- i. Limited twenty-year warranty against structural failure of all steel bench frames or complete steel bench assemblies.
 - ii. Limited twenty-year warranty against structural failure of all cast iron bench supports.
- 2. Bench B-2 (see Drawings):
 - a. Welded seat and back.
 - b. Grid seat: Steel wire grid panel constructed of 1/8 inch diameter cross wires spaced 3/8 inch apart supported by 3/16 inch diameter perimeter and reinforcing wires spaced 2 inches apart. Panel to be welded to 7/8 inch O.D. by .120 inch wall tubular steel frame. Mounting brackets to be type 304 stainless steel brackets.
 - c. Grid seat dimensions: Each seat to be 18 inches wide and 22 inches deep with a 2 inch gap to the next seat to accommodate the option of an armrest. Seat height is 18 inches.
 - d. Armrest: Constructed of 7/8 inch O.D. by .120 inch wall steel tube with type 304 stainless steel mounting brackets.
 - e. Seat options:
 - i. Two seat/three armrest option (one in center and one at each end).
 - ii. Backless two seat/three armrest option (one in center and one at each end).
 - iii. Three seat/four armrest option (one between each seat and one at each end).
 - iv. Four seat/three armrest option (one between two center seats and one at each end).
 - v. Backless four seat/three armrest option (one between two center seats and one at each end).
 - vi. See Materials' Schedules on Drawings for locations of two, three, and four seat options.
 - f. Mounting options:
 - i. Embedded.
 - ii. Surface mount.
 - iii. See Materials' Schedules on Drawings for locations of different mounting options.
 - g. Horizontal support: 3 inch diameter by .120 inch wall steel tube with .134 inch thick end caps.
 - h. Vertical support: 2-1/2 inch by .120 wall steel tube.
 - i. Surface mount plates: 5-1/2 inch diameter by 5/16 inch thick steel plate with 6 inch diameter by 14 gauge spun steel covers.
 - j. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Wash: Multiple stage wash system.
 - iii. Primer: Zinc-rich primer.
 - iv. Topcoat: Colored UV resistant polyester powder.
 - v. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.
 - k. Acceptable product and manufacturer: Plexus II Collection, Rialto Bench, by Landscape Forms, Inc., 431 Lawndale Ave., Kalamazoo, MI 49048. Tel. 800-521-2546. Web. www.landscapeforms.com.
 - l. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - m. Warranty:
 - i. Limited three-year warranty against defect in material and/or workmanship.

3. Bench B-3 (see Drawings):
 - a. Welded seat and back.
 - b. Legs: Square steel with integral curved armrests.
 - c. Seats: Steel flat bars. The ends of the bars at each end shall curve around the support bars.
 - d. Support bars: 1 inch solid round steel bar.
 - e. Seat back height: 35 inches.
 - f. Seat height: 17 inches.
 - g. Length: 6 feet.
 - h. Mounting: Each leg shall have tabs for surface mounting.
 - i. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Corrosion resistance: Hot dipped galvanized.
 - iii. Primer: 2-part epoxy primer.
 - iv. Topcoat: Coat of acrylic enamel.
 - j. Acceptable product and manufacturer: Savannah Series Bench, Model # SB356 by Sternberg Lighting, 555 Lawrence Ave., Roselle, IL 60712. Tel. 847-588-3400. Web. www.sternberglighting.com.
 - k. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - l. Warranty:
 - i. Limited three-year warranty against defect in material and/or workmanship.

4. Bench B-4 (see Drawings):
 - a. Welded seat and back.
 - b. Legs and arms: 1-1/2 inch square steel tubing.
 - c. Seat slats: 1 inch by 2 inch rectangular steel tubing.
 - d. Vertical back slats: 3/8 inch by 2 inch flat steel bar.
 - e. Horizontal support bars: 1-1/2 inch square steel tubing.
 - f. Decorative arched bar in seat back: 1 inch by 2 inch rectangular steel tubing and 1/4 inch by 1 inch flat steel bar as cap for arch. Top of seat back to arch to where it is 6 inches +/- higher in the center than on the ends.
 - g. Seat back height (in center of seat back): 37 inches.
 - h. Seat height: 17 inches.
 - i. Width: 24-7/16 inches.
 - j. Length: 6 feet.
 - k. Mounting: Each leg shall have tabs for surface mounting.
 - l. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Blast: Sandblast to a white finish.
 - iii. Corrosion resistance: Corrosion-inhibiting phosphate coating.
 - iv. Primer: Zinc-rich epoxy powder primer.
 - v. Topcoat: Colored UV resistant polyester powder.
 - vi. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 7 mils.
 - m. Acceptable product and manufacturer: McConnell Bench, Model # MC 26 by Keystone Ridge Designs, Inc., P.O. Box 16003, Butler, PA 16003. Tel. 800-284-8208. Web. www.keystoneridgedesigns.com.

- n. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - o. Warranty:
 - i. Limited three-year warranty against defect in material and/or workmanship.
5. Bench B-5 (see Drawings):
- a. Welded seat and back.
 - b. End frames: Ductile iron bench supports with curved armrests, scroll and inset plaque detailing.
 - c. Seat: 1/4 inch by 1-1/2 inch solid steel bars and 1-5/16 inch O.D. tubular steel. Back and seat to be one-piece continuous bars. The ends of the bars at each end shall curve around steel pipe.
 - d. Bracing: 1-5/16 inch O.D. tubular steel pipe.
 - e. Seat height: 16-3/4 inches.
 - f. Width: 23-3/8 inches.
 - g. Length: 6 feet.
 - h. Mounting: Each end frame support shall have (2) integral mounting brackets at its base.
 - i. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Blast: Sandblast to a white finish.
 - iii. Wash: Multiple stage wash system.
 - iv. Primer: Zinc-rich primer.
 - v. Topcoat: Colored UV resistant polyester powder.
 - vi. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 8 mils.
 - j. Acceptable product and manufacturer: Classic Series Bench, Model # CR-10 by Victor Stanley, Inc., P.O. Box 330, Dunkirk, MD 20754. Tel. 301-855-8300. Web. www.victorstanley.com.
 - k. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - l. Warranty:
 - i. Limited three-year warranty against defect in material and/or workmanship.
6. Bench B-6 (see Drawings):
- a. Welded seat and back.
 - b. End frames: Ductile iron bench supports with curved armrests.
 - c. Seat: 1/4 inch by 1-1/2 inch solid steel bars and 1-5/16 inch O.D. tubular steel. Back and seat to be one-piece continuous bars. The ends of the bars at each end shall curve around steel pipe.
 - d. Bracing: 1-5/16 inch O.D. tubular steel pipe.
 - e. Seat height: 17-1/2 inches.
 - f. Width: 25-1/4 inches.
 - g. Length: 6 feet.
 - h. Mounting: Each support shall have (2) integral mounting brackets at base.
 - i. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Blast: Sandblast to a white finish.
 - iii. Wash: Multiple stage wash system.

- iv. Primer: Zinc-rich primer.
 - v. Topcoat: Colored UV resistant polyester powder.
 - vi. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 8 mils.
 - i. Acceptable product and manufacturer: Classic Series Bench, Model # CR-138 by Victor Stanley, Inc., P.O. Box 330, Dunkirk, Maryland 20754. Tel. 301-855-8300. Web. www.victorstanley.com.
 - j. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - k. Warranty:
 - 1. Limited ten-year warranty against breakage of all cast iron bench supports.
7. Bench B-7 (see Drawings):
- a. Welded seat and back.
 - b. Steel seat and back panels: 10 gauge HRPO steel with plasma cut “grass” design.
 - c. Fasteners: Seat panels to attach to frame with stainless steel hardware.
 - d. End frames and armrests: 1/4 inch by 3 inch flat bar steel frame bolted together with stainless steel hardware.
 - e. Bench frame: 1/4 inch thick steel angles welded to end frames.
 - f. Seat height: 17 inches.
 - g. Back height: 35-1/4 inches.
 - h. Width: 24-1/2 inches.
 - i. Length: 67 inches.
 - j. Mounting: Each leg shall have tabs for surface mounting.
 - k. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Wash: Multiple stage wash system.
 - iii. Primer: Zinc-rich primer.
 - iv. Topcoat: Colored UV resistant polyester powder.
 - v. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.
 - l. Acceptable product and manufacturer: Lakeside Collection Bench by Landscape Forms, Inc., 431 Lawndale Ave., Kalamazoo, MI 49048. Tel. 800-521-2546. Web. www.landscapeforms.com.
 - m. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - n. Warranty:
 - i. Limited three-year warranty against defect in material and/or workmanship.

2.9 TRASH RECEPTACLES

A. Trash receptacles TR-1 (see Drawings):

- 1. Welded trash receptacle.
- 2. Mounting: Surface mount through integral tabs using non-corrosive hardware.
- 3. Perforated metal sides: 11 gauge HRPO steel with 2 inch square holes, 1/4 inch radius corners, and minimum 2 inch square solid metal border.
- 4. Lid: Fixed dome type lid of 11 gauge spun steel with minimum spin lines, 16-3/4 inch diameter with (2) 5 inch by 10-3/4 inch side openings.

5. Liner: Linear low-density polyethylene of .100 inch nominal thickness with (8) large openings for clear visibility to trash within.
6. Diameter: 16-3/4 inches.
7. Height: 31-7/8 inches.
8. Opening: Side opening with hinged door.
9. Capacity: 30 gallon.
10. Finish:
 - a. Color: See Materials Schedule on the Drawings for color selection.
 - b. Wash: Multiple stage wash system.
 - c. Primer: Zinc-rich primer.
 - d. Topcoat: Colored UV resistant polyester powder.
 - e. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.
11. Acceptable product and manufacturer: Petoskey Style Custom Receptacle by Landscape Forms, Inc., 431 Lawndale Ave., Kalamazoo, MI 49048. Tel. 800-521-2546. Web. www.landscapeforms.com.
12. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
13. Warranty:
 - a. Limited three-year warranty against defect in material and/or workmanship.

B. Trash receptacles TR-2 (see Drawings):

1. Welded trash receptacle.
2. Mounting: Surface mount through integral tabs using non-corrosive hardware.
3. Metal sides: 1/4 inch by 1 inch flat steel bar vertical slats with 2 inch gaps between bars. Horizontal banding using 1/4 inch by 2 inch flat steel bars at top and bottom of receptacle and one band 6 inches below top band. Decorative rings using 1/2 inch diameter steel rod between top two horizontal bands welded in place
4. Lid: Fixed dome type lid of 11 gauge spun steel with minimum spin lines and four large side openings.
5. Liner: Linear low-density polyethylene of .100 inch nominal thickness with (8) large openings for clear visibility to trash within.
6. Diameter: 16-3/4 inches.
7. Height: 31-7/8 inches.
8. Opening: Side opening with hinged door.
9. Capacity: 30 gallon.
10. Finish:
 - a. Color: See Materials Schedule on the Drawings for color selection.
 - b. Wash: Multiple stage wash system.
 - c. Primer: Zinc-rich primer.
 - d. Topcoat: Colored UV resistant polyester powder.
 - e. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.

11. Acceptable product and manufacturer: Chase Park Style Custom Receptacle by Landscape Forms, Inc., 431 Lawndale Ave., Kalamazoo, MI 49048. Tel. 800-521-2546. Web. www.landscapeforms.com.
12. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
13. Warranty:
 - a. Limited three-year warranty against defect in material and/or workmanship.

2.10 BIKE RACKS

A. Bike Rack BR-1 (see Drawings):

1. Welded bike rack to accommodate two bikes.
2. Horizontal bar and legs: 2 inch O.D. by .120 inch wall tubular steel. Horizontal bar to be curved.
3. Mounting: Embedded in concrete.
4. Overall height: 55 inches (12 inches embedded).
5. Width: 21-1/2 inches
6. Finish:
 - a. Color: See Materials Schedule on the Drawings for color selection.
 - b. Wash: Multiple stage wash system.
 - c. Primer: Zinc-rich primer.
 - d. Topcoat: Colored UV resistant polyester powder.
 - e. Curing: Oven cure for a minimum of twenty minutes to produce an average minimum film thickness of 3 mils.
7. Acceptable product and manufacturer: PI Rack Bicycle Rack by Landscape Forms, Inc., 431 Lawndale Ave., Kalamazoo, MI 49048. Tel. 800-521-2546. Web. www.landscapeforms.com.
8. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
9. Warranty:
 - a. Limited three-year warranty against defect in material and/or workmanship.

B. Bike Rack BR-2 (see Drawings):

1. Welded bike rack to accommodate two bikes.
2. Center Post: 2 inch schedule 40 steel pipe.
3. Ring: 1-1/2 inch O.D. 11 gauge steel tube.
4. Mounting: Embedded in concrete.
5. Overall height: 44 inches (10 inches embedded).
6. Width: 16-1/2 inches
7. Finish:
 - a. Color: See Materials Schedule on the Drawings for color selection.
 - b. Blast: Sandblast to a white finish
 - c. Wash: Multiple stage wash system.

- d. Primer: Epoxy primer electrostatically applied.
 - e. Topcoat: Colored UV resistant polyester powder.
 - f. Curing: Oven cure for a minimum of twenty minutes to produce a minimum film thickness of 6 mils.
8. Acceptable product and manufacturer: Bike Hitch by DERO BIKE RACK CO., 2657 32ND Avenue South, Minneapolis, MN 55406. Tel. 612-331-2731. Web. www.dero.com.
 9. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 10. Warranty:
 - a. Limited one-year warranty against defect in material and/or workmanship.

2.11 LEAN RAILS

A. Lean Rail:

1. Wood and solid cast aluminum rail.
 - a. Wood leaning surface.
 - b. End frames: Solid cast aluminum supports
 - c. Leaning surface: 70 inches by 10 inches x 1-3/8 inches Ipe hardwood.
 - d. Fasteners: Corrosion-resistant steel.
 - e. Height: 36 inches.
 - f. Length: 70 inches.
 - g. Mounting points: Two 1/2 inch holes in each solid cast aluminum support. Secure to concrete using 3/8 inch lag bolts.
 - h. Finish:
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Powdercoat: Six stage clean, rinse, and electrostatic powder application process.
 - iii. Curing: Oven cure for a minimum of twenty minutes to produce a minimum film thickness of 6 mils.
 - iv. Acceptable product and manufacturer: Model # MLR1200W by Maglin Site Furniture Inc., 1875 Lawrence St. # 1400, Denver, CO 80202. Tel. 800-716-5506. Web. www.maglin.com.
 - v. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
 - vi. Warranty:
 - a. Limited five-year warranty against defects in components, finishes, or workmanship.

2.12 PLANTER POTS

A. Planter pot PP-1 (see Drawings):

1. Cast stone planter pot.

- a. Shape: Round.
- b. Height: 30 inches.
- c. Diameter: 3 feet.
- d. Material:
 - i. Cast stone: A mixture of cement, aggregates and mineral colors.
 - a. Cement shall be Portland Cement conforming to ASTM C-150 Types I, II or III.
 - b. Integral color, shall be pure mineral oxide, lime proof and non-fading.
 - c. Aggregates for concrete shall conform to the ASTM C-33 with a maximum size of 3/4 inch.
 - d. Reinforcing steel shall conform to ASTM 615 and deformations shall conform to ASTM M-305.
 - e. Quality: Minimum strength of 5,000 psi at age 28 days, as determined by tests of 6-inch and 12-inch cylinders. Absorption shall not exceed 5 percent.
- e. Finish: See Materials Schedule on the Drawings for finish selection.
 - i. Color: See Materials Schedule on the Drawings for color selection.
 - ii. Sealers:
 - a. Inside of planter to be sealed with a black or gray elastomeric membrane.
 - b. Exterior of planter to receive anti-graffiti sealers per Section 09965, Permanent Non-Sacrificial Anti-Graffiti Coatings.
- f. Acceptable product and manufacturer: Art Moderne Series Model # 919 by Dura Art Stone. 1324 Southern Rd., Morrow, GA, 30260. Tel. 800-232-0332. Web. www.duraartstone.com.
- g. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
- h. Warranty:
 - i. Limited one-year warranty against defect in material and/or workmanship.

B. Planter pot PP-2 (see Drawings):

- 1. Cast stone planter pot.
 - a. Shape: Round.
 - b. Height: 36 inches.
 - c. Diameter: 4 feet.
 - d. Material:
 - i. Cast stone: A mixture of cement, aggregates and mineral colors.
 - a. Cement shall be Portland Cement conforming to ASTM C-150 Types I, II or III.
 - b. Integral color, shall be pure mineral oxide, lime proof and non-fading.
 - c. Aggregates for concrete shall conform to the ASTM C-33 with a maximum size of 3/4 inch.
 - d. Reinforcing steel shall conform to ASTM 615 and deformations shall conform to ASTM M-305.
 - e. Quality: Minimum strength of 5,000 psi at age 28 days, as determined by tests of 6-inch and 12-inch cylinders. Absorption shall not exceed 5 percent.
 - e. Finish: See Materials Schedule on the Drawings for finish selection.
 - f. Color: See Materials Schedule on the Drawings for color selection.

- g. Sealers:
 - i. Inside of planter to be sealed with a black or gray elastomeric membrane.
 - ii. Exterior of planter to receive anti-graffiti sealers per Section 09965, Permanent Non-Sacrificial Anti-Graffiti Coatings.
- h. Acceptable product and manufacturer: Art Moderne Series Model # 919 by Dura Art Stone. 1324 Southern Rd., Morrow, GA, 30260. Tel. 800-232-0332. Web. www.duraartstone.com.
- i. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
- j. Warranty:
 - i. Limited one-year warranty against defect in material and/or workmanship.

PART 3 - EXECUTION

3.6 EXAMINATION

- A. Examine surfaces to receive site furnishings. Notify Landscape Architect of conditions that would adversely affect installation or subsequent utilization of site furnishings. Do not proceed with installation until unsatisfactory conditions are corrected.

3.7 FABRICATION AND FORMING

- J. General: Verify dimensions before proceeding with Work. Verify measurements at site.
- K. Coordinate finishes and colors with other Work. Obtain acceptance from FDOT, Architect, and/or Landscape Architect prior to fabrication.

3.8 PREPARATION

- A. Clean surfaces of all products thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Ensure surfaces to receive site furnishings are clean, flat, and level.

3.9 INSTALLATION

- A. Install in accordance with manufacturer's instructions, and using the installation method described in the Drawings and at locations indicated on the Drawings.
- B. Install site furnishings level, plumb, square, accurately aligned, correctly located, and without warp.
- C. Embedded mounting: Place those site furnishings specified to be embedded by direct burying in accordance with manufacturer's instructions and the Drawings.
- D. Surface mounting: Place those site furnishings specified to be surface mounted in accordance with manufacturer's instructions and the Drawings.
- E. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Landscape Architect.
- F. Remove and replace damaged components that cannot be successfully repaired as determined by Landscape Architect.

3.10 PROTECTION

- A. Protect installed products until completion of project.

3.11 CLEANING

- A. Clean up debris, trash, and unused material, and remove from site.

END OF SECTION 02870

SECTION 02871 – STEEL PIPE BOLLARDS

PART 1 - GENERAL

1.6 SUMMARY

A. Section includes:

1. Steel pipe bollards.

B. Related sections:

1. Section 03310 “Concrete Work” for structural concrete.
2. Section 09960 “High Performance Coatings” for finish for pipe.

C. References:

1. ASTM A 36 - Carbon Structural Steel.
2. ASTM A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A 500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
4. ASTM A 513 - Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
5. ASTM A 570 - Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.

1.7 SUBMITTALS

- A. Product data: Submit manufacturer's product data, including installation instructions.
- B. Shop Drawings: Submit manufacturer's shop drawings, indicating materials, dimensions, tolerances, welding, fasteners, hardware, mounting, finish, and accessories.
- C. Samples: Submit manufacturer's standard color samples.
- D. Warranty: Submit manufacturer's standard warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation.
- B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.
- C. Handling: Protect materials and finish from damage during handling and installation.

PART 2 - PRODUCTS

2.13 MATERIALS

A. Carbon Steel:

1. Pipe: ASTM A 53, Schedule 40.
2. Tubing: ASTM A 500 or A 513.
3. Sheet: ASTM A 570.
4. Round Bar and Flat Bar: ASTM A 36.

2.14 STEEL BOLLARDS

A. Embedded bollard

1. Fabrication: 8 inch I.D. by .322 inch wall schedule 40 steel pipe.
2. Height: 42 inches (above grade), 84 inches (total length of pipe).
3. Top: Round off concrete above pipe to a height of 2".
4. Sidewall options: Plain.
5. Mounting: Embedded.
6. Finish: High performance coating. See Section 09960.
7. Color: See Material's Schedule on Drawings for color selection.
8. Acceptable product and manufacturer: Creative Series Bollards #CBR-8-E-CL by Creative Pipe, Inc., PO Box 2458, Rancho Mirage, CA 92270-1087. Toll Free (800) 644-8467. Phone (760) 340-5555. Fax (760) 340-5883. Web Site www.creativepipe.com.
9. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
10. Warranty:
 - a. Limited three-year warranty against defects in material and/or workmanship.

B. Removable bollard

1. Fabrication: 6 inch I.D. by .280 inch wall schedule 40 steel pipe.
2. Height: 36 inches (above grade).
3. Top: Removable flat cap.
4. Sidewall options: Plain.
5. Mounting: Removable embedded with internal locking mechanism.
6. Finish: Stainless steel with a #4 satin finish.
7. Options:
 - a. Round flange with hole cover.
 - b. Internal lifting handle.
8. Acceptable product and manufacturer: Creative Series Bollards #ELBR-6-LRE-SS-F-IH-HHC-SS by Creative Pipe, Inc., PO Box 2458, Rancho Mirage, CA 92270-1087. Toll Free (800) 644-8467. Phone (760) 340-5555. Fax (760) 340-5883. Web Site www.creativepipe.com.
9. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.
10. Warranty:

- a. Limited three-year warranty against defects in material and/or workmanship.

PART 3 - EXECUTION

3.12 EXAMINATION

- A. Examine surfaces to receive bollards. Notify Landscape Architect of conditions that would adversely affect installation or subsequent utilization of bollards. Do not proceed with installation until unsatisfactory conditions are corrected.

3.13 SURFACE PREPARATION

- A. Ensure surfaces to receive bollards are clean, flat, and level.

3.14 INSTALLATION

- A. Install bollards in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Install bollards level, plumb, square, accurately aligned, and correctly located.
- C. Mounting: See Materials Schedules on the Drawings for locations of the different bollard types.
 - 1. Embedded mounting: Embed bollards in concrete in accordance with manufacturer's instructions and the Drawings.
 - 2. Removable embedded: Bollard to be placed inside steel sleeve embedded in concrete per manufacturer's instructions and the Drawings. Provide locking tabs.
- D. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Landscape Architect.
- E. Remove and replace damaged components that cannot be successfully repaired as determined by Landscape Architect.

3.15 CLEANING

- A. Clean bollards in accordance with manufacturer's instructions.
- B. Remove temporary protective coverings.
- C. Do not use harsh cleaning materials or methods that would damage finish.
- D. Clean up debris, trash, and unused material, and remove from site.

3.16 PROTECTION

- B. Protect installed bollards from damage during construction.

END OF SECTION 02871

SECTION 02872 – SKATEBOARD DETERRENT CLIPS

PART 1 - GENERAL

1.9 SUMMARY

A. Section includes:

1. Skateboard deterrent clips.

B. Related sections:

1. Section 03310 “Concrete Work” for structural concrete.
2. Section 03451 “Cast Stone” for cast stone wall caps.

C. References:

1. ASTM B 308 – 6061-T6 Aluminum Alloy.

1.10 SUBMITTALS

A. Product data: Submit manufacturer's product data, including installation instructions.

B. Shop drawings: Submit manufacturer's shop drawings, indicating materials, dimensions, tolerances, welding, fasteners, hardware, mounting, finish, and accessories.

C. Samples: Submit manufacturer's standard color samples.

D. Warranty: Submit manufacturer's standard warranty.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.

C. Handling: Protect materials and finish from damage during handling and installation.

PART 2 - PRODUCTS

2.15 SKATEBOARD DETERRENT CLIPS

A. Chamfered bracket.

1. Material: 6061-T6 Aluminum Alloy
2. Dimensions:
 - a. Length:
 - i. Top face: 3.75 inches.
 - ii. Chamfered face: 1 inch.
 - b. Width: 2 inches.
 - c. Thickness: 0.375 inches.
 - d. Chamfer angle: 45 degrees.
3. Mounting: Clip to have two offset thru holes; one in top face and one in chamfered face. Attach to wall cap surface using pins that are tamper-resistant, hardened steel with zinc plate and JS500 coat.
4. Finish:
 - a. Smooth.
 - b. Hard tumble to remove all machined and/or cut edges.
 - c. Clear anodized finish.
5. Spacing: 18 inches from ends of planter walls and approximately 36" on center.
6. Acceptable product and manufacturer: FA-135 Fixed Angle by Skatestoppers, 1444 Pioneer Way, Suite 13, El Cajon, CA 92020-1640. Tel. (619) 447-6374. Web. www.skatestoppers.com.
7. Substitutions: Equal alternatives will be considered and must be approved by FDOT, and/or Landscape Architect prior to placing order.
8. Warranty:
 - a. Limited one-year warranty against defects in material and/or workmanship.

B. Radius bracket.

1. Material: Cast Aluminum #319
2. Dimensions:
 - a. Length: Approx. 4-1/2 inches to six inches (depending on radius).
 - b. Width: 3 inches.
 - c. Thickness: 1/2 inch.
 - d. Radius: 1-1/4 inches.

3. Mounting: Clip to have two offset thru holes each in top face. Attach to wall cap surface using pins that are tamper-resistant, hardened steel with zinc plate and JS500 coat in conjunction with impact resistant epoxy.
4. Finish:
 - a. "Waffle" texture.
 - b. Hard tumble to remove all machined and/or cut edges.
 - c. Type II clear anodized finish.
5. Spacing: See plans for spacing.
6. Acceptable product and manufacturer: ASBullnose1.25 by Skatestoppers, 1444 Pioneer Way, Suite 13, El Cajon, CA 92020-1640. Tel. (619) 447-6374. Web. www.skatestoppers.com.
7. Substitutions: Equal alternatives will be considered and must be approved by FDOT, and/or Landscape Architect prior to placing order.
8. Warranty:
 - a. Limited one-year warranty against defects in material and/or workmanship.

PART 3 - EXECUTION

3.17 EXAMINATION

- A. Examine surfaces to receive skateboard deterrent clips. Notify Landscape Architect of conditions that would adversely affect installation or subsequent utilization of skateboard deterrent clips. Do not proceed with installation until unsatisfactory conditions are corrected.

3.18 SURFACE PREPARATION

- B. Ensure surfaces to receive skateboard deterrent clips are clean, flat, and level.

3.19 INSTALLATION

- A. Install skateboard deterrent clips in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Install skateboard deterrent clips level, plumb, square, accurately aligned, and correctly located.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Landscape Architect.
- D. Remove and replace damaged components that cannot be successfully repaired as determined by Landscape Architect.

3.20 CLEANING

- A. Clean skateboard deterrent clips in accordance with manufacturer's instructions.
- B. Remove temporary protective coverings.
- C. Do not use harsh cleaning materials or methods that would damage finish.
- D. Clean up debris and unused material, and remove from the site.

3.21 PROTECTION

- C. Protect installed skateboard deterrent clips from damage during construction.

END OF SECTION 02872

SECTION 02900 – CEMENTED DECORATIVE GRAVEL

PART 1 - GENERAL

1.12 SUMMARY

- D. Section includes:
 - 2. Cemented decorative gravel.
- E. Related sections:
 - 3. Section 02480 "Landscape".
 - 4. Section 02813 "Irrigation".

1.13 SUBMITTALS

- A. Samples: Provide two samples of decorative gravel for verification in one quart plastic bags.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver gravel to site in covered dump trucks. Coordinate the location for placement of gravel with Contractor on site.
- B. Storage: Store gravel in a location away from site work so that contamination by sand, gravel, and other debris can be avoided. Cover gravel with water proof sheeting, securely tied.
- C. Handling: Protect gravel from damage during handling and installation.

1.15 QUALITY ASSURANCE

- A. Mockup: Provide a 3 foot by 3 foot sample to demonstrate workmanship, material mix, texture, and finish.

PART 2 - PRODUCTS

2.16 MATERIALS

B. Calcium carbonate gravel.

1. Size range: 1/8 inch to 1/2 inch stones.
2. Color range: White, tan, buff, and brown color tones.
3. Shape: Angular.
4. Acceptable product and manufacturer: Smoky Garden Path Stone by Smokey Valley Stone Company, Inc., 15015 Pine Valley Blvd., Clermont, FL 34711-7603. Tel. (407) 654-2178. Web. www.smokeyvalleystone.com.
5. Substitutions: Equal alternatives will be considered and must be approved by FDOT, and/or Landscape Architect prior to delivery.

C. Portland cement:

1. See Division 3 Section "Concrete Work" for Portland cement specification.

D. Sand:

1. Coarse sand.

E. Proportions of design mix:

1. One part Portland cement.
2. One part coarse sand.
3. Ten parts decorative gravel aggregate.

PART 3 - EXECUTION

3.22 EXAMINATION

- A. Examine surfaces to receive cemented decorative gravel. Notify Landscape Architect of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.23 SURFACE PREPARATION

- C. Ensure surfaces to receive cemented decorative gravel mix are clean, flat, and level.

3.24 INSTALLATION

- A. Mix gravel, sand and Portland cement as specified.
- B. Place cemented decorative gravel mix in prepared beds in locations shown on the Drawings.
- C. Fill prepared beds so that top of gravel is flush with adjacent paving.
- E. Create flat surface on cemented decorative gravel mix by lightly tamping.

3.25 CLEANING

- A. Clean up debris and unused material and remove from site.

3.26 PROTECTION

- D. Protect installed cemented decorative gravel mix from damage during construction.

END OF SECTION 02900

SECTION 02901 – DECORATIVE GRAVEL WALL BAND

PART 1 - GENERAL

1.16 SUMMARY

F. Section includes:

3. Decorative gravel in concrete seat wall.

G. Related sections:

5. Section 03310 "Concrete Work" for concrete wall.
6. Section 04810 "Unit Masonry" for mortar.

1.17 DEFINITIONS

- A. FDOT - Florida Department of Transportation.

1.18 SUBMITTALS

- A. Samples: Provide two samples of gravel for verification in one quart plastic bags.

1.19 QUALITY ASSURANCE

- A. Source limitation: Obtain decorative gravel from one source.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Mockup shall consist of a section of seat wall 4 feet in length.
 2. Demonstrate application method, stone size and color blending, joint finishing, and aesthetic qualities of workmanship.
 3. Clean exposed faces of mockups with masonry cleaner as indicated.
 4. Protect accepted mockups from the elements with weather-resistant membrane.
 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Preinstallation Conference: Conduct conference at Project site.

1.20 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver gravel to site in covered dump trucks. Coordinate the location for placement of gravel with Contractor on site.
- B. Storage: Store gravel in a location away from site work so that contamination by sand, gravel, and other debris can be avoided. Cover gravel with water proof sheeting, securely tied.
- C. Handling: Protect gravel from damage during handling and installation.

1.21 PROJECT CONDITIONS

- A. Protection of Masonry: Cover partially completed masonry when construction is not in progress.
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.17 MATERIALS

F. Decorative gravel.

6. Size range: One inch to three inch stones.
7. Color range: Brown, buff, tan, and cream color tones.
8. Shape: Rounded, smooth.
9. Acceptable product and manufacturer:
 - a. River Jack Stones #2430-T by Pebble Junction Inc., 702 S. French Ave., Sanford, FL 32771. Tel. (407) 323-3838. Web. www.pebblejunction.com.
 - b. 1”- 3” Pompanos by Smokey Valley Stone Company, Inc., 15015 Pine Valley Blvd., Clermont, FL 34711-7603. Tel. (407) 654-2178. Web. www.smokeyvalleystone.com.

G. Mortar and grout.

1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color.
2. Hydrated Lime: ASTM C 207, Type S.
3. Masonry Cement: ASTM C 91.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - i. Cemex S.A.B. de C.V.; Citadel Type S.
 - ii. Essroc, Italcementi Group; Brixment.
 - iii. Lafarge North America Inc.; Magnolia Masonry Cement.
 - iv. Lehigh Cement Company; Lehigh Masonry Cement.
4. Aggregate for Mortar: ASTM C 144.
 - a. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
5. Aggregate for Grout: ASTM C 404.
6. Water: Potable.
7. Mixes.

- a. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - i. Do not use calcium chloride in mortar or grout.
 - ii. Use portland cement-lime or masonry cement mortar unless otherwise indicated.

- b. Grout for Unit Masonry: Comply with ASTM C 476.
 - i. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - ii. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - iii. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.27 EXAMINATION

- A. Examine wall surfaces to receive decorative gravel band. Notify Landscape Architect of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

3.28 INSTALLATION

- A. Mortar decorative gravel in place in locations shown on the Drawings.
- B. Arrange gravel so that widest face of stone faces out.
- C. Arrange stones to produce a uniform blend of colors and sizes of stones.

3.29 JOINTS

- A. Width of joints between stones to range from 3/8 inch to 5/8 inch.
- B. Provide raked joints leaving approximately one-half of each stone exposed.

3.30 REPAIRING AND CLEANING

- A. Remove and replace stones that are loose, broken, stained, or otherwise damaged. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Landscape Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean up debris and unused material, and remove from the site.

3.31 PROTECTION

- E. Protect installed decorative gravel banding from damage during construction.

END OF SECTION 02901

SECTION 03320 – EXPOSED COQUINA SHELL AGGREGATE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Specialty concrete flatwork with exposed coquina shell aggregate.

B. Related section:

1. Section 03301 “Miscellaneous Cast-in-Place Concrete”.
2. Section 03310 “Concrete Work”.

1.2 SUBMITTALS

A. Product Data: Submit product data from supplier for coquina shell.

B. Samples: Submit samples of coquina shell in one quart bags for verification.

1.3 QUALITY ASSURANCE

A. Mockups: Cast concrete slab-on-grade panels to demonstrate typical joints, surface finish, texture, and standard of workmanship prior to commencement of Work.

1. Build panel approximately 8 Feet by 8 Feet for slab-on-grade in location as directed by Landscape Architect.
2. Landscape architect to be on site when applying coquina shell to concrete surface to help determine amount of coquina shell needed for desired look and texture.
3. Maintenance: Maintain mockup for workmanship comparison through Substantial Completion of Work.
4. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.

B. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 CONCRETE

1. See “Concrete Work” Section 03310 for concrete material specifications.

2.2 COQUINA SHELL

- A. Composition: Shell material to be used for shell finish material, shall consist of naturally occurring deposits formed essentially of coquina shell materials, broken shell, corals and the skeletal remains of other marine invertebrates, which are primarily found as “dry land” deposits and which have been cemented together by carbonate or other natural cementing agents.
- B. Deleterious substances: Cemented coquina shell materials shall be reasonably free of lumps of clay, organic matter, and other substances not defined which may possess undesirable characteristics. The material shall not contain loose, free silica sand in sufficient quantity to prevent bonding.
- C. Physical and Chemical Properties: Cemented coquina shell shall meet the following physical and chemical properties:
 1. Limerock bearing ratio (FM-515): The materials shall have an average LBR value of not less than 100. Material represented by any individual LBR values of less than 90 is unacceptable.
 2. Plasticity (FM 1-T 089 and FM 1-T 090): That portion of the material passing the 425 mm sieve shall be non-plastic.
 3. Carbonates (FM 5-514): The average percentage of carbonates of calcium and magnesium shall be 45. Material represented by any individual carbonate and magnesium lot average of less than 40.5% is unacceptable.
- D. Gradation requirements: Coquina Shell material shall have the following gradation requirements:
 1. Passing 90 mm sieve – 97% minimum (maximum dimension not to exceed 150 mm).
 2. Passing 4.75 mm sieve – 70% maximum.
 3. Passing 75 mm sieve (dry weight) – 20% maximum (by washing).
- E. Color: Coquina Shell material color range to include brown, tan, white, and buff colors.
- F. Source:
 1. Approved sources:
 - a. Smokey Valley Stone Company, Inc., 15015 Pine Valley Blvd., Clermont, FL 34711-7603. Tel. (407) 654-2178. Web. www.smokeyvalleystone.com.
 - b. Conrad Yelvington Distributors, Inc., P.O. Box 11637, Daytona Beach, FL 32120-1637. Tel. (800) 472-8357. Web. www.cydi.com.

2. Coquina shell material to come from only one source.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. See "Concrete Work" Section 03310 for concrete execution specifications.

3.2 COQUINA SHELL APPLICATION

- A. Concrete shall be placed and screeded to the desired grade, and then floated as per Division 3 Section "Cast-in-Place Concrete".
- B. Apply coquina shell by hand by broadcasting across surface of concrete at a rate of approximately 100 pounds per 100 square feet of concrete surface to achieve desired look and texture as established with the approved "mockup". Two applications shall be required. Float after each application.

3.3 FINISHING CONCRETE

- A. Allow formed and poured concrete to cure for 2 days.
- B. Sandblast concrete, in areas indicated on the Drawings, to achieve desired look and texture as established with the approved "mockup".

3.4 CLEANING

- A. Clean up debris, sand, trash and unused materials, and remove from site.

END OF SECTION 03320

SECTION 03330 – EXPOSED GLASS AGGREGATE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Specialty concrete flatwork with exposed glass aggregate.

B. Related section:

1. Section 03301 "Miscellaneous Cast-in-Place Concrete".
2. Section 03310 "Concrete Work".

1.2 SUBMITTALS

A. Product Data: Submit product data from supplier for glass aggregate.

B. Samples: Submit samples of glass aggregate in one quart bags for verification.

1.3 QUALITY ASSURANCE

A. Mockups: Cast concrete slab-on-grade panels to demonstrate typical joints, surface finish, texture, and standard of workmanship prior to commencement of Work.

1. Build panel approximately 3 feet by 3 feet for slab-on-grade in location as directed by Landscape Architect.
2. Landscape architect to be on site when applying glass aggregate to concrete surface to help determine amount of glass aggregate needed for desired look and texture.
3. Maintenance: Maintain mockup for workmanship comparison through Substantial Completion of Work.
4. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.

B. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 CONCRETE

2. See "Concrete Work" Section 03310 for concrete material specifications.

2.2 GLASS AGGREGATE

- A. 100% post-consumer recycled glass.
- B. Sizes:
 1. 40% of aggregate to be 1/8" – 1/4".
 2. 40% of aggregate to be 1/4" – 3/8".
 3. 20% of aggregate to be 3/8" – 5/8".
- C. Color: See Materials Schedule on the Drawings for color selections.
- D. Source:
 1. Approved sources:
 - a. EnviroGLAS, 7704 San Jacinta Place, Suite 200, Plano, TX 75024, Tel. (972) 608-3790. Web. www.enviroglasproducts.com.
 2. Substitutions: Equal alternatives will be considered and must be approved by FDOT, and/or Landscape Architect prior to fabrication.
 3. Glass aggregate material to come from only one source.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. See "Concrete Work" Section 03310 for concrete execution specifications.

3.2 BLENDING AGGREGATE

- A. Blend different colors and sizes of glass aggregate at rates specified in this Section into a single batch before installation.

3.3 GLASS AGGREGATE APPLICATION

- A. Concrete shall be placed and screeded to the desired grade, and then floated as per Division 3 Section "Cast-in-Place Concrete".
- B. Apply glass aggregate by hand by broadcasting across surface of concrete at a rate of approximately 500 pounds per 100 square feet of concrete surface to achieve desired look and texture as established with the approved "mockup". Two applications shall be required. Float after each application.

3.4 FINISHING CONCRETE

- A. Allow formed and poured concrete to cure for 2 days.
- B. Sandblast concrete, in areas indicated on the Drawings, to achieve desired look and texture as established with the approved "mockup", and to smooth down any sharp edges to the glass. Final texture to be equivalent to a medium broom finish.

3.5 CLEANING

- A. Clean up debris, sand, trash and unused materials, and remove from site.

END OF SECTION 03330

SECTION 03355 – STAMPED COLORED CONCRETE

PART 1 - GENERAL

1.22 SUMMARY

H. Section Includes:

1. Stamped, integrally colored concrete.

I. Related Sections:

1. Section 03301 "Miscellaneous Cast-In-Place Concrete" for integrally colored concrete slabs.
2. Section 03310 "Concrete Work" for concrete jointing.

1.23 SUBMITTALS

- A. Product data:** Submit manufacturer's product data, including application instructions.
- B. Shop Drawings:** Submit manufacturer's shop drawings, indicating limits and dimensions of areas to receive stamped concrete.
- C. Samples:** Submit manufacturer's standard stamp patterns.

1.24 QUALITY ASSURANCE

- A. Mockup:** Cast concrete panel mockup at the Project site to demonstrate color, texture and workmanship.
1. Build mockup panel 8 feet by 8 feet, in the location as directed by Landscape Architect.
 2. Approved mockup shall remain on site throughout construction as a standard for judging finished stamped concrete work.
 3. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation conference:** Conduct conference at project site.

PART 2 - PRODUCTS

2.18 MANUFACTURER

- H. L.M. Scofield Company, 4155 Scofield Rd., Douglasville, GA 30134, Tel. (770) 920-6000. Web. www.scofield.com.
- I. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.

2.19 MATERIALS

- C. Stamped concrete tools: Lithotex Pavecrafters imprinting tools and embossing skins by L.M. Scofield Company or approved equal.
 - 1. Pattern: See Materials Schedules on the Drawings for pattern selection.
- D. Integral concrete coloring agent: Chromix admixtures for color-conditioned concrete by L.M. Scofield Company or approved equal.
 - 1. Color: See Materials Schedules on the Drawings for color selection.
- E. Dry shake surface coloring agent (if used): Lithochrome color hardener by L.M. Scofield Company or approved equal.
 - 1. Color: See Materials Schedules on the Drawings for color selection (if used).
- F. Clear liquid release agent: Lithotex liquid release by L.M. Scofield Company or approved equal.
- G. Curing and sealing: Scofield Selectseal-W by L.M. Scofield Company or approved equal.

PART 3 - EXECUTION

3.32 INSTALLATION

- A. Install integral colored concrete per Division 3 Section “Miscellaneous Cast-in-Place Concrete”.
- B. Concrete shall be placed and screeded to the desired grade, and then floated, using standard construction practices.
- C. If using color hardener, apply an even application to the concrete surface using the standard dry shake method. Product shall be applied in accordance with manufacturer’s specifications. At least two applications shall be required. Float after each application.
- D. Before stamping and/or embossing tools are applied to the concrete surface, apply release agent in accordance with manufacturer’s specifications.
- E. While concrete is still in its plastic state, apply the desired stamping/embossing tool pattern to the surface of the concrete. Tools shall be properly tamped into the surface to achieve the desired texture.
- F. Control joint shall be cut at pre-determined areas as shown on the Drawings no later than 12 hours after the concrete has been placed. Excess release agent shall be removed at this time.
- G. Concrete shall then be sealed with a minimum of one coat of clear seal. Product shall be applied in accordance with manufacturer’s specifications.

3.33 CLEANING

- A. Clean up debris and unused materials and remove from site.

3.34 PROTECTION

- F. Once stamped concrete is properly installed, protect it against undue soilage and damage by other trades by the use of reasonable care and precaution.

END OF SECTION 03355

SECTION 03451 – CAST STONE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast stone wall caps, column caps, and trim units.

B. Referenced documents: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. ASTM C 150 - Specification for Portland Cement.
2. ASTM C 33 - Specification for Concrete Aggregates.
3. ASTM C 979 - Specification for Pigments for Integrally Colored Concrete.
4. ASTM C 494 - Specification for Chemical Admixtures for Concrete.
5. ASTM A 615 - Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
6. ASTM C 1194 - Test Method for Compressive Strength of Architectural Cast Stone.
7. ASTM C 1195 - Test Method for Absorption of Architectural Cast Stone.
8. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
9. ASTM D 2244 - Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.
10. ASTM C 666 - Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

C. Related section:

1. Section 04810 "Unit Masonry" for masonry construction.

1.2 SUBMITTALS

A. Submit for approval the following:

1. Samples of the Cast Stone specified which will be representative of the general range of color and finish to be furnished.
2. Shop Drawings: Submit for approval the following:

- a. Copies of shop drawings showing details of the stone to be provided including: profiles, cross-sections, reinforcement, exposed faces, arrangement of joints (optional for semi-custom installation), anchoring methods, anchors, annotation of stone types and their location.
3. Unless otherwise shown on contract drawings:
 - a. Provide suitable wash (slope) on all exterior sills, coping, projecting courses and pieces with exposed top surfaces.
 - b. Provide drips as specified.

1.3 QUALITY ASSURANCE

- A. Mockups: Install at project site a job mockup using acceptable products and manufacturer approved installation methods. Obtain Landscape Architect's acceptance of finish color, texture and pattern and workmanship standard prior to commencement of Work.
 1. Mockup Size:
 - a. Wall cap: Six linear feet, including one wall end.
 - b. Column cap: One full column cap package.
 - c. Column trim: One full column trim package.
 2. Maintenance: Maintain mockup for workmanship comparison through Substantial Completion of Work.
 3. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.
- B. Manufacturer: Must have sufficient experience and facilities to produce the shapes, quantities and size of Cast Stone required in accordance with the Materials Schedules on the Drawings.
- C. Stone setter: Must have sufficient experience setting cast or natural building stone.
- D. Testing: Test three specimens per 500 cubic feet at random from job site or from plant production for compressive strength and absorption in accordance with referenced standards.
- E. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Physical properties: Provide the following:
 - 1. Compressive Strength, ASTM C 1194: 4,000 to 6,000 psi.
 - 2. Absorption, ASTM C 1195: 6% max.
- B. Raw materials.
 - 1. Portland cement - Type I or III, white and/or grey, ASTM C 150.
 - 2. Coarse aggregates - Granite, quartz or limestone, ASTM C 33.
 - 3. Fine aggregates - Manufactured or natural sands, ASTM C 33.
 - 4. Colors - Inorganic iron oxide pigments, ASTM C 979.
 - 5. Admixtures - ASTM C 494.
 - 6. Water - Potable.
 - 7. Reinforcement - ASTM A 615.

2.2 MANUFACTURER

- A. Acceptable manufacturer:
 - 1. Stone Legends, Inc., 301 Pleasant Dr., Dallas, TX, 75217, Tel. (800) 398-1199. Web. www.stonelegends.com.
 - 2. St. Augustine Cast Stone and Architectural Precast, 4960 Crescent Technical Center, St. Augustine, Florida, 32086, Tel. (904) 794-2626, Web. www.staugustinecaststone.com.

2.3 FABRICATION METHODS ALLOWED

- A. Use Forged Stone, often as a Vibrant-Tamp placement method, using a zero slump mixture to achieve desired appearance and physical properties. Placement of a zero slump material hammered into a rigid form will increase density, durability, and create a surface texture found in quarried limestone surface.
- B. For certain colors, textures, or other requirement manufacturer may substitute placement techniques but only after samples are approved. The placement method can radically change the finish appearance. Again samples must be submitted for approval.
- C. Tooling the stone is required ridding it from seams found in most molded products.

2.4 COLOR AND FINISH

- A. Match approved sample.
- B. Exposed surfaces shall exhibit a fine-grained texture similar to natural stone. No bug-holes or air voids will be permitted.
- C. Variation:
 - 1. Must match color and finish of approved sample when viewed in direct daylight at a 10 foot distance.
 - 2. Color variation allowed - 2%, hue; 6% lightness, chroma and hue combined.

2.5 REINFORCING

- A. New billet steel reinforcing bars - ASTM A 615.
- B. Reinforce units when necessary for safe handling and structural stress.
- C. Reinforcement shall be galvanized or epoxy coated when covered with less than 1-1/2" of material. Minimum cover shall be twice the diameter of the bars.
- D. Area of reinforcement in panels greater than 12" wide shall be not less than 1/4 percent of the cross section area when steel is specified.

2.6 CURING AND FINISHING

- A. Cure units in a warm, moist curing chamber at 95% relative humidity in enclosed during room under dense fog and water-spray for 16 hours.
- B. Yard cure for 350 degree-days (i.e. 7 days @ 50F or 5 days @ 70F) prior to shipment.
- C. Acid-etch exposed surfaces to remove cement film on site, by installer.

2.7 RELATED MATERIALS

- A. Anchors - Non-corrosive; galvanized, brass or stainless steel type 304. Fasteners shall be rated for the intended requirements.
- B. Mortar - Type N, ASTM C 270 for integrity of the structure the mortar should never exceed the PSI of the stone, forming a gasket allowing for normal expansion and contraction.
- C. Alternate adhesives for the protection of the mortar will be specified if approved.

PART 3 - EXECUTION

3.1 TOLERANCES

- A. Set stones 1/8" within plane of adjacent unit.
- B. Joints, +1/8", -1/8".

3.2 JOINTING

- A. Joint size.
 - 1. Exterior.
 - a. At stone/brick joints - 3/8".
 - b. At stone/stone joints in vertical position - 3/8".
 - c. Stone/stone joints exposed on topside - 3/8".
- B. Joint material.
 - 1. Use a full bed of mortar at all bed joints.
 - 2. Flush vertical joints full with mortar.
 - 3. Only when applying adhesive sealant specified, leave mortar recessed slightly.
- C. Location of joints.
 - 1. As shown on approved shop drawings.

3.3 SETTING

- A. Drench stones with clear, running water just prior to setting to enhance capillary action.
- B. Fill all dowel holes and anchor slots completely with mortar or non-shrink grout.
- C. Set all stones in a full bed of mortar. Leave head joints in coping and similar stones open for sealant.
- D. Rake mortar joints 3/4" for pointing.
- E. Sponge the face of each stone to remove excess mortar.
- F. Tuck point stone joints to a slight concave, raked, or flush as specified. In the absence of a specification, default to a flush pointing.
- G. Protect stone while on ground (and after setting) from splashing, mortar and damage from other trades.

3.4 CLEANING AND REPAIR

- A. Clean stone by wetting with clear running water and applying a solution of "Sure Kleen #600" by ProSoCo Products, Inc. or equal.
- B. Repair obvious chips with touchup material furnished by the manufacturer.
- C. Clean up debris and unused material and remove from site.

END OF SECTION 03451

SECTION 03460 – PRECAST CONCRETE SITE WALL

PART 1 - GENERAL

1.5 SUMMARY

- H. Section includes: This section includes manufacturing specifications, engineering requirements, and design criteria for the construction of a precast concrete site wall.
- I. Related sections:
 - 1. Section 03301 “Miscellaneous Cast-in-Place Concrete” for structural concrete.
 - 2. Section 03450 “Architectural Precast Concrete”.
- J. Related documents include the following:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Section, apply to this Section.

1.6 DEFINITIONS

- A. General:
 - 1. FDOT - Florida Department of Transportation.
 - 2. CMEC - Construction Materials Engineering Council.
 - 3. FBC - Florida Building Code.
 - 4. QC - Quality Control.
 - 5. PCI - Precast Pre-Stressed Concrete Institute.

1.7 SUBMITTALS

- D. Site Specific Engineering: Each precast concrete site wall design shall have a structural design based on the most current Florida Building Code(s) that is “site specific”.
 - a. Engineering design shall conform to the following:
 - a. Wind Speed: Site Specific.
 - b. Exposure: Site Specific.
 - c. Structure Category: “I”.
 - d. Importance Factor: 0.77.
 - e. F.S (Overturning): 1.5.
 - f. Construction Type: I or II (noncombustible materials).
- E. Concrete Mix Design: All design(s) submittal(s) shall derive from an FDOT certified batching plant that employs FDOT certified personnel.
 - a. Design Criteria:

- a. Design shall utilize a high performance self consolidating concrete mix.
 - b. Design shall utilize a mix that achieves a 28 day compressive strength of 5000 PSI.
- F. QC Plan: Manufacturer's technical information regarding quality control procedures relative to precast concrete manufacturing.
- G. Warranty: Manufacturer's warranty information.

1.8 QUALITY ASSURANCE

- H. Manufacturer Qualifications: Engage an experienced precast concrete manufacturer with 8 or more years of experience in permitting, manufacturing, and installing precast concrete walls similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.
- I. Manufacturing Specifications: Precast concrete product(s) shall be poured in a covered area to protect precast concrete components from the elements and shall be cast on a vertical axis.
- 1. Precast Concrete Manufacturer shall meet the requirements of PCI MNL 116.
- J. Source Limitations: Precast Concrete Manufacturer must have an FDOT approved concrete batching plant that employs CMEC and FDOT certified quality control technician(s) and batch plant operator.
- 1. Precast Concrete Manufacturer must also encompass an FDOT approved concrete testing laboratory.
- K. Mockups: Build mockups to verify selections made under sample submittals and to set quality standards for fabrication and installation.
- 3. Include 20-foot length of wall and two columns, complying with requirements.
 - 4. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion.
- L. Preinstallation conference: Conduct conference at Project site.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver material(s) to Project site in the vertical or near-vertical position during transport on vehicles that are owned and operated by the precast concrete manufacturer.
- B. Storage of material(s) on-site shall at all times be in the vertical to near-vertical position and placed on dunnage and/or racks.
- C. Erection shall be accomplished in such a way that precast concrete components are in the vertical to near-vertical position at all times.
- D. All products to be delivered to the project site ready for installation clean and free of surface defects.

PART 2 - PRODUCTS

2.20 MANUFACTURER

- H. All precast concrete product(s) shall be manufactured, transported, and erected by Duratek Precast Technologies, 2180 American Flyer Way, Brooksville, FL 34604-6829, Tel. 800-754-3641, Web www.duratek.net.
- I. Substitutions: Equal alternatives will be considered and must be approved by FDOT, Architect, and/or Landscape Architect prior to fabrication.

2.21 PRODUCT SPECIFICATION

- A. Profile Design: All aspects of precast concrete product shall consist of concrete components. Applied foam finish is not acceptable.
 - 1. Architectural decorative coping shall conform to the following design criteria:
 - a. Top decorative coping:
 - i. Approximate Dimension (6 inches by 7 inches).
 - b. Bottom decorative coping:
 - i. Approximate Dimension (5 inches by 6 inches).
 - 2. Precast Concrete Panel design criteria:
 - a. Precast concrete panel thickness:
 - i. Approximate Dimension (2-3/4 inches).
 - b. Precast concrete panel length:
 - i. Approximate Dimension (19 feet 7 inches) unless designed layout warrants otherwise.

2.22 WARRANTY

- B. Warranty Period: (1) year(s) from date of Substantial Completion.

PART 3 - EXECUTION

3.35 EXAMINATION

- C. Verify areas to receive site walls are completed to final grades and elevations.

3.36 PREPARATION

- L. Verify measurements at site. Site shall have a minimum of 25 feet of clear and stable access along layout for crew and heavy equipment.
- M. Survey of layout shall be offset from wall line and be staked at approximately 50 feet intervals along with all stop, start, and transition locations.
- N. All underground obstruction(s) shall be located through state agency(s), prior to mobilization.
- O. All property lines and legal boundaries of work shall be clearly established.

3.37 ERECTION

- A. Post foundation(s) shall be verified for depth by local municipality. (If applicable).
- B. Precast post(s) shall be set in the foundations and checked for plumb, prior to setting concrete.
 - 1. Foundation(s) shall be poured with a minimum of 2500 PSI concrete mix design.
 - 2. Precast post(s) shall be re-checked for plumb after concrete has set.
- C. Precast panel(s) shall be set between post(s) from overhead to assure proper tolerance(s) and to protect precast post(s).
 - 1. Precast panel(s) shall be set on shim(s) to level off panel and to assure that precast product has enough clearance to allow for proper drainage.

3.38 REPAIRS

- A. Repairs will be permitted provided structural adequacy of unit(s) and appearance(s) are not impaired.
- B. Mix patching materials and repair unit(s) so cured patches blend with color, texture, and uniformity of adjacent exposed surface(s).

3.39 CLEANING

- A. Clean all surfaces of precast concrete to be exposed to view, as necessary, prior to shipping.

- B. Clean mortar, mud, and any other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean up debris and unused material, and remove from the site.

END OF SECTION 03460

SECTION 06050 – BARRIER PROTECTED, GLASS-WOOD FUSION LUMBER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Insoluble Barrier Protected, Glass–Wood Fusion Lumber Product
- B. Related Sections include the following:
 - 1. Section 09911 "Exterior Painting" for finishing wood members.

1.3 PERFORMANCE REQUIREMENTS

- C. General: Provide barrier-protected, glass-wood fusion lumber products that comply with performance requirements specified as determined by testing manufacturer's standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- D. EPA Exempt, Non-toxic Barrier Product: determined by EPA under 40 CFR Part 152.10. Only such determination achieved in EPA history.
- E. Class A Fire Retardant: Surface-burning characteristics per ASTM E 84, provide wood products with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Spread Index Class A rating of 25 or less.
 - 2. Smoke-Developed Index Class A rating of 450 or less.
- F. Ignition Resistant Material: Class A rating when tested in accordance with 30 minute extended ASTM E 84. Criteria: a listed flame spread index of 25 or less and show no evidence of significant progressive combustion.
 - l. Flame-Spread Index Class A rating of 25 or less.
 - m. Smoke-Developed Index Class A rating of 450 or less.
- G. Corrosion of Fasteners, per AWWA E12-94: Below allowable loss level of 25 mils/year.

- H. Superior strength:
 1. Modulus of Rupture, per ASTM D4761, ASTM D143: 9,283 psi.
 2. Modulus of Elasticity at L/360, per ASTM D4761, ASTM D143: 1,920,700 psi.
- I. Superior strength: Fungus Resistance (White & Brown Rot), per ASTM D1413: No decay.
- J. Termite Resistance, per AWWPA E1-72: 10 (Sound, no decay).
- K. Insolubility of glass in situ, per molybdate assay: insoluble.
- L. Microscopic Evaluation: With polarized lenses, barrier-protected whole wood versus unprotected control by independent testing laboratory; Cellular structures undamaged.
- M. Toxic Chemical Content and Known Carcinogens: None. Per X-ray diffraction, glass portion is non-toxic amorphous glass.
- N. Meet or exceed standards for accelerated weathering of wood without coatings, per ASTM G151.
- O. Meet or exceed standards for accelerated weathering of 5 wood stains on wood, per ASTM G151.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's printed data indicating the usage of barrier-protected, glass-wood fusion products, environmentally safe preservatives, and instructions for installation and finishing.
- B. Shop Drawings: Indicate materials and details of construction, methods of fastening, erection, and installation.
- C. Samples for verification: For each paint system and each color and gloss of topcoat as indicated on the Drawings.
 1. Submit 12" long Samples.
 2. Step coats on samples to show each coat required for system.
 3. Label each coat of each sample.
- D. Material Certificates: For barrier-protected, glass-wood fusion products, signed by manufacturer of barrier-protecting process.
- E. Research/Evaluation Reports: For barrier-protected, glass-wood fusion products.

- F. Maintenance Data: For barrier-protected, glass-wood fusion products, to include in maintenance manuals.
- G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain materials through authorized distributor from manufacturer.
- B. Identify each piece or each bundle of barrier-protected, glass-wood fusion product, by the grade mark and manufacturer's certification tag of barrier-protecting process.
- C. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Build mockup of indicated barrier-protected, glass-wood fusion product assemblies on site a minimum of 10 ft. long, including supports and fasteners.
 - 2. Approval of mockups is for material and construction qualities specifically approved by Architect in writing.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect against dampness from weather or adjacent surfaces, before, during, and after delivery, and comply with manufacturer's delivery storage and handling instructions. Deliver materials to job site in an undamaged condition. Stack materials flat to avoid twisting or warping, and using spacers to ensure ventilation and drainage. Store materials under cover or in a well-ventilated enclosure, with adequate ventilation around each stack or covering, and protect against extreme changes in temperature and humidity.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard transferable warranty form in which manufacturer agrees to repair or replace quantity of barrier-protected, glass-wood fusion products proven to fail to meet the accepted standards of wood resistant to termites, rot and decay within specified warranty period, not including incorrect installation, cracking, or splitting.
 - 1. Failures include the following:

- a. Biological degradation, including termite damage, damage in exposed environments and damage from common wood protection problems.
 - b. Decay or termite damage as would make barrier-protected, glass-wood fusion product structurally unfit for the purpose for which it was used.
2. Warranty Period: Forty years from date of purchase.

PART 2 - PRODUCTS

2.23 MANUFACTURERS

- J. TimberSIL® Products; 7481 Huntsman Blvd, Suite 520, Springfield, VA 22153; (703) 644-0991; www.timbersilwood.com; info@timbersilwood.com or approved equal.

2.24 BARRIER PROTECTED, GLASS-WOOD FUSION LUMBER

- H. Provide glass-wood fusion products barrier-protected with GreenSpec approved insoluble wood protective barrier, a non-toxic, non-carcinogenic, non-corrosive, non-leaching, stainable, paintable, fire-retardant, redried, fusion of whole wood and aqueous glass solution that retains a natural wood appearance, while improving strength and insulation properties. Products contain no arsenic, chromium, or copper. Microscopic particles of aqueous glass solution combined with an energy source are thoroughly fused with wood forming a protective barrier, making the material unavailable as a food source to insects and decay. Barrier-protected glass wood fusion products to be manufactured using kiln-dried Southern Yellow Pine, inspected by SPIB or TPI.
 - 1. Provide glass-wood fusion products where barrier-protected is indicated unless noted otherwise.

2.25 HARDWARE

- A. Provide sizes, types, and spacing of materials recommended by manufacturers, except where otherwise indicated.

2.26 FINISHES, GENERAL

- vi. Appearance of Finished Work: Variations in appearance of materials are acceptable if they are within the range of approved samples.
- vii. Field Finishing: See Materials Schedules in the Drawings for specific finishes.

PART 3 - EXECUTION

3.40 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, supports, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.41 PREPARATION

- A. Prepare substrates to be clean and dry, and free of projections and detrimental substances.

3.42 INSTALLATION, GENERAL

- A. General: Install barrier-protected wood to comply with manufacturer's written instructions.
- B. Install barrier-protected wood of sizes, types, and configurations indicated. Place members to keep warranty end tags in inconspicuous locations. Where both ends are exposed, relocate end tags to underside of other unexposed surface. Apply primer to finish work before installing.
- C. Install items in maximum lengths practical. Construct tight joints, except where spacing between members is indicated. Construct in a manner to conceal shrinkage.

3.43 FINISH WORK

- A. Sand exposed flat members and square edges until surfaces are smooth and even in appearance.
- B. Wire brush or sand to remove occasional chalky deposits. Machine-finish semi-exposed surfaces.
- C. Apply finishes indicated.

3.44 CLEANING AND PROTECTION

- G. Protect finished work from other trades.
- A. Remove and replace products that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- B. Clean up debris and unused material and remove from site.

END OF SECTION 06050

SECTION 09240 – COQUINA SHELL WALL COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior Portland based cement based coating with coquina shell finish.

B. Referenced documents:

1. ASTM International (ASTM):
 - a. ASTM C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - b. ASTM C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - c. ASTM C150 Standard Specification for Portland Cement.
 - d. ASTM C897 Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.
 - e. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster.
 - f. ASTM C932 Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
 - g. ASTM C1063 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
 - h. ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

C. Related section:

1. Section 00310 "Concrete Work" for concrete wall construction.
2. Section 09220 "Portland Cement Plaster".

1.2 SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. Samples: Submit 12 inch by 12 inch samples of specified coating showing texture and color.

1.3 QUALITY ASSURANCE

- A. Mockups: Install at project site a job mockup using acceptable products and manufacturer approved installation methods. Obtain Landscape Architect's acceptance of finish color, texture and pattern and workmanship standard prior to commencement of Work.

1. Mockup Size: 6 feet × 6 feet.
 2. Maintenance: Maintain mockup for workmanship comparison through Substantial Completion of Work.
 3. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.
- B. Installer Qualifications: Coatings shall be applied by installers who have attended the manufacturer's basic installation instruction session and have completed a minimum of 2 projects of similar size and scope.
- C. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements: Apply coatings when ambient temperature is greater than 40 degrees F (4 degrees C) and when temperature is expected to remain above 40 degrees F (4 degrees C) for 48 hours following application.

1.6 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT COATINGS

A. Manufacturer: ArcusStone Distributors:

1. Contact: 947 N. Pennsylvania Ave., Winter Park, FL 32789, Tel. (407) 628-6400. Web. www.arcusstone.com.

B. Plaster coating: Blend of limestone aggregate, bonding agents and Portland cement.

3. Weight: One psf (4.88 kg per m²), average, for each 1/8 inch (3.2 mm) of thickness when tested in accordance with ASTM C67.
4. Thickness: 3/16 inch (4.8 mm).
5. Maximum Area Requirement: 144 ft² (13.4 m²), with a maximum length to width ratio of 2.5 to 1.
6. Color: See Materials Schedule on Drawings for integral plaster color selection.
7. Texture: See Materials Schedule on Drawings for texture description.

2.2 COQUINA SHELL

A. Composition: Shell material to be used in wall coating shall consist of naturally occurring deposits formed essentially of Coquina Shell materials, broken shell, corals and the skeletal remains of other marine invertebrates, which are primarily found as “dry land” deposits.

B. Deleterious Substances: Coquina Shell materials shall be reasonably free of lumps of clay, organic matter, and other substances not defined which may possess undesirable characteristics. The material shall not contain loose, free silica sand in sufficient quantity to prevent bonding.

C. Gradation Requirements: Coquina Shell material shall have the following gradation requirements:

1. Passing 90 mm sieve – 97% minimum (maximum dimension not to exceed 150 mm).
2. Passing 4.75 mm sieve – 70% maximum.
3. Passing 75 mm sieve (dry weight) – 20% maximum (by washing).

D. Color: Coquina Shell material color range to include brown, tan, white, and buff colors.

2.3 MATERIALS

- A. Limestone Aggregates: ASTM C897.
- B. Bonding Agents: ASTM C932.
- C. Portland Cement: ASTM C150.
- D. Water: Potable.

2.4 ACCESSORIES

- A. General: Control joints, corner mesh, corner beads, base screeds, casing beads, reveal screeds and vented screeds shall comply with ASTM C1063 and ASTM D1784.

2.5 MIXES

- A. Proportion and mix coating(s) in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.3 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions:
 1. Clean concrete and masonry surfaces in accordance with ASTM C926.
 2. Apply bonding agent in accordance with ASTM C932.
 3. Protect adjacent work from soiling and moisture deterioration caused by coating application.
 4. Provide temporary covering to minimize spattering of coating materials on other work.

3.4 PLASTER APPLICATION

- A. General: Comply with ASTM C 926
 1. Do not deviate more than plus or minus 1/4 inch in 5 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
 2. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Coquina Shell Finish:
 1. Before finish coat of plaster sets, broadcast the Coquina Shell material by hand or apply using a rock gun. Then, tamp in place with trowel to achieve desired, heavy coquina texture that matches approved sample and mockup.

3.5 PROTECTION

- A. Protect coatings against uneven and excessive evaporation and from strong flows of dry air. Provide covers and barriers to deflect sunlight and wind.

3.6 CLEANING

- A. Clean up debris and unused materials and remove from site.

END OF SECTION 09240

SECTION 09965 – PERMANENT NON-SACRIFICIAL ANTI-GRAFFITI COATING

PART 1 - GENERAL

1.1 SUMMARY

K. This section includes surface preparation and field application of anti-graffiti coating systems for the following vertical and horizontal surfaces:

1. Cast stone.
2. Brick masonry.
3. Concrete unit masonry (unpainted and unglazed).
4. Cast-in-place concrete.

L. Related sections include the following:

1. Section 03301 "Miscellaneous Cast in Place Concrete" for structural concrete.
2. Section 04810 "Unit Masonry" for masonry construction.
3. Section 07920 "Joint Sealants."
4. Section 09911 "Exterior Painting".
5. Section 09960 "High Performance Coatings".

M. Related documents include the following:

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

1.25 DEFINITIONS

P. General: Standard coating terms defined in ASTM D 16 apply to this Section. Low-sheen refers to a finish with a gloss range between 30 and 40 when measured at a 60-degree meter.

Q. General: Standard anti-graffiti properties defined in ASTM D 6578 apply to this Section.

1.3 SUBMITTALS

B. Product Data: For each coating system indicated. Include primers and undercoats.

C. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

D. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material specified.

- E. Certification by manufacturer that products supplied comply with requirements indicated that limit the amount of VOCs in coating products.
- F. Samples for Verification: For each material to be applied, on representative samples of the actual substrate.
 - 1. Provide stepped Samples defining each separate coat.
 - 2. Resubmit until required sheen is achieved.
 - 3. List of material and application for each coat of each sample.
 - 4. Label each sample for location and application.
 - 5. Submit samples on the following substrates for Architect's review of shade and sheen:
 - a. Cast-in-place Concrete: Provide two 4-inch- (100-mm-) square samples.
 - b. Concrete and Brick Masonry: Provide two 8-inch- (200-mm-) square samples of masonry, with mortar joint in the center, for each different masonry unit.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- M. Applicator Qualifications: Engage an experienced applicator who has completed anti-graffiti coating system applications similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.
- N. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.
- O. Mockups: Provide a full-coat benchmark finish sample for each substrate required. Duplicate finish of approved sample Submittals.
 - 1. Architect will select one area or surface of each different substrate to represent surfaces and conditions for application.
 - 2. Wall surfaces: Provide samples on at least 100 sq. ft. (9 sq. m), or as directed by Architect, of wall surface for each different substrate.
 - 3. Apply coatings to each surface as specified. Provide the required sheen of each surface.
 - 4. After finishes are accepted, Architect will use the surface to evaluate coating systems of a similar nature.
 - 5. Final approval of coatings will be from benchmark samples.
- P. Preinstallation conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- C. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the following information:
 - 1. Name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Handling instructions and precautions.
- D. Store materials not in use in tightly covered containers in a well-ventilated area at a temperature range between 40 and 95 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
- E. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying coatings.

1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 and 85 deg F.
- B. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit coatings to be applied according to manufacturers' written instructions and warranty requirements:
 - 1. Concrete surfaces and mortar have cured for more than 28 days.
 - 2. Rain or snow is not predicted within 24 hours.
 - 3. Application proceeds more than 24 hours after surfaces have been wet, unless otherwise recommended by manufacturer.
 - 4. Windy conditions do not exist that may cause anti-graffiti coatings to be blown onto vegetation or surfaces not intended to be treated.
- C. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- D. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.
- E. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and applicator agree(s) to repair or replace materials that fail to maintain graffiti repellency within specified warranty period.
- B. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.27 MANUFACTURERS

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

2.28 COATINGS, MATERIALS, GENERAL

- I. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- J. Material Quality: Provide manufacturer's highest grade of the various anti-graffiti coatings specified. Materials not displaying manufacturer's product identification are not acceptable.
- K. Proprietary Names: Use of manufacturer's proprietary product names to designate materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- L. VOC Classification: Provide anti-graffiti coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 100 g/L or less.

2.29 EXTERIOR ANTI-GRAFFITI COATING SYSTEMS

- B. Provide the following coating system over exterior cast-in-place concrete; concrete and brick masonry vertical surfaces; and where otherwise indicated:
 - 1. One finish coat over an intermediate coat and a primer.
 - 2. Primer: Acrylic/Silicon UV stable bonding primer applied at spreading rate recommended by manufacturer.
 - a. SCS-002SP Sealer Prime Waterborne Sealer; SEI Chemical, (SEI) 323-263-4575 www.seichemical.com or approved, compatible, equal product by another manufacturer.
 - 3. Intermediate Coat: One component non-stick coating applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.0.
 - a. GPA-200 Graffiti Proofer Anti-Stick; SEI Chemical (SEI) 323-263-4575 or approved, compatible, equal product by another manufacturer.
 - 4. Finish Coat: One component non-stick coating applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 mils.

- a. GPA-200 Graffiti Proofer; SEI Chemical (SEI) 323-263-4575 or approved, compatible, equal product by another manufacturer.
- b. Product must meet Anti-graffiti test defined in ASTM D 6578.

PART 3 - EXECUTION

3.45 EXAMINATION

- A. With Applicator present, examine substrates and conditions under which anti-graffiti coatings will be applied, for compliance with coating application requirements.
- B. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
 - 1. Start of application is construed as Applicator's acceptance of surfaces within that particular area.
- C. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.

3.46 PREPARATION

- D. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item; provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- B. Cleaning: Before applying anti-graffiti coatings, clean substrates of substances that could impair bond of coatings.
 - 1. Remove oil and grease before cleaning.
 - 2. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Prepare concrete, brick, concrete masonry block, and cast stone surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
 - 2. Use abrasive blast-cleaning methods if recommended by coating manufacturer.
 - 3. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
- D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
 2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application.
 3. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
 4. Use only the type of thinners approved by manufacturer and only within recommended limits.
- C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of coating system components. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of components being deposited on surfaces. Cover live plants and grass.
- D. Coordination with Sealants: Do not apply anti-graffiti coatings until sealants for joints adjacent to surfaces receiving coatings have been installed and cured.
1. Anti-graffiti coating work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, anti-graffiti coatings, and sealant materials identical to those used in the work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.47 APPLICATION

- D. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of anti-graffiti coatings and to instruct Applicator on the product and application method to be used.
- B. General: Apply anti-graffiti coatings according to manufacturer's written instructions.
1. Use applicators and techniques best suited for the material being applied.
 2. Do not apply anti-graffiti coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
 3. Coating surface treatments and finishes are indicated in the coating system descriptions.
 4. Provide finish coats compatible with primers used.
 5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
- C. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.
1. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
- D. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
- M. The number of coats and film thickness required is the same regardless of application method.

- N. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. Allow sufficient time between successive coats to permit proper drying.
- G. Give special attention to edges, corners, crevices, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
- H. Application Procedures: Apply coatings according to manufacturer's written instructions.
- I. Spray Equipment: Use mechanical methods to apply coating as permitted by manufacturers written instructions and governing regulations.
 - 1. Use spray equipment with orifice size recommended by manufacturer for material and texture required.
- J. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate.
 - 1. Provide total dry film thickness of the entire system as recommended by manufacturer.
- K. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.
- L. Recoat primed and sealed substrates immediately if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.
- M. Completed Work: Match approved Samples for shade and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

3.48 CLEANING

- D. Immediately clean anti-graffiti coatings from adjoining surfaces and surfaces soiled or damaged by application as work progresses. Repair damage caused by application. Comply with manufacturer's written cleaning instructions.
- E. Clean up debris and unused material and remove from site.

3.49 PROTECTION

- H. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- I. Provide "Wet Paint" signs to protect newly coated finishes. After completing coating operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 09965

END OF LANDSCAPE ARCHITECTURAL PACKAGE