

## SECTION 31 00 00

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Preparing of subgrade for retaining walls, slabs, sidewalks, pavements, and foundations.
  - 2. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.
  - 3. Pavement base course.
  - 4. Placement and compaction of general backfill and site fill (sub-base).
  - 5. Placement of geogrid.
  - 6. Excavation and backfill required for all sewer systems.
  - 7. Structural excavation
  - 8. Incidental excavation.
- B. Excavating and Backfilling for Mechanical/Electrical Work: Refer to Divisions 22 and 26 for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.
- C. Final grading, together with placement and preparation of topsoil for lawns and planting, will be in another contract.

##### 1.2 DEFINITIONS

- A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect or Architect's consultants, shall be at Contractor's expense.
  - 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect.
  - 2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.
- C. Additional Excavation: When excavation has reached required subgrade elevations, notify

Architect, who will inspect conditions. If the Architect determines that bearing materials at required subgrade elevations are unsuitable, continue excavation, until suitable bearing materials are encountered and replace excavated material as directed by the Architect. The Contract Sum may be adjusted by an appropriate Contract Modification.

1. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

D. Sub-base: The compacted soil layer immediately below granular base.

E. Subgrade: The undisturbed earth or the compacted soil layer immediately below subsequent construction.

F. Structure: Foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

### 1.3 SUBMITTALS

A. Test Reports: Submit the following reports directly to Architect from the testing services, with copy to Contractor:

1. Test reports on all fill materials.
2. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
3. Field reports; in-place soil density tests.
4. One optimum moisture-maximum density curve for each type of soil encountered.
5. Report of actual unconfined compressive strength and/or results of bearing tests of each material tested.

### 1.4 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction, such as:

1. Louisiana Standard Specifications: Comply with applicable requirements of "Louisiana Standard Specifications for Roads and Bridges," 2000 Edition, of the Department of Transportation and Development, Office of Highways, for work performed on LaDOTD rights-of-way, unless requirements specified in this Section are more restrictive.
2. City of New Orleans Standards: Comply with applicable standards of the City of New Orleans 1999 General Specifications for Street Paving of the Department of Public Works, for work performed on public rights-of-way unless requirements specified in this Section are more restrictive, or as indicated elsewhere.
3. Sewerage & Water Board of New Orleans: Comply with applicable standards of the Sewerage & Water Board of New Orleans, for work performed on public rights-of-way or on S&WB servitudes, unless requirements specified in this Section are more restrictive.

B. Testing and Inspection Service: Owner will employ and pay for a qualified independent

geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.

- C. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

## 1.5 PROJECT CONDITIONS

- A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
  - 1. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
- B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
  - 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
  - 2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
  - 3. Provide minimum of 48-hour notice to Architect and utility owner, and receive written notice to proceed before interrupting any utility.
  - 4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- C. Use of Explosives: Use of explosives is not permitted.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
  - 1. Operate warning lights as recommended by authorities having jurisdiction.
  - 2. Protect structures, utilities, sidewalks, driveways, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
  - 3. Perform earthwork of contaminated excavated materials in compliance with the recommendations of an industrial hygienist, in compliance with other specifications in this Section.

E. Handling and Disposition of Excavated Material:

1. To be removed from the site.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. Shall be Backfill and Fill Materials: Sand free of wood roots, clay lumps and other deleterious materials. Sand fill should have no more than 10% material passing the No. 200 sieve; liquid limit less than 25; plasticity index less than 6.
- B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Base Course Material: Naturally or artificially graded mixture of natural or crushed stone (asphalt), pumped riversand (concrete), crushed concrete (paver).
- D. Backfill and Fill Materials (Sub-base): Pumped riversand or other satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
- E. Unacceptable Materials: Materials from on site excavations shall not be used.

### 2.2 OTHER MATERIALS

- A. Geotextile Fabric: Geotextile fabric shall be in accordance with Section 1019 of the Louisiana Standard Specifications for Roads and Bridges, 2006 edition and latest revisions, or as amended herein. The geotextile fabric shall be composed of at least 85 percent by weight (mass) of polyolefins, polyesters, or polyamides. The geotextile fabric shall be resistant to chemical attack, rot and mildew and shall have no tears or defects which adversely alter its physical properties. When required, the geotextile fabric shall contain stabilizers and/or inhibitors added to the base material to make filaments resistant to deterioration due to ultraviolet and heat exposure. Edges of geotextile fabrics shall be finished to prevent the outer yarn from pulling away from the fabric. Fibers of other composition may be woven into the geotextile fabric for reinforcing purposes. Durability of these fibers shall be equivalent to that of the geotextile fabric. Geotextile fabric rolls shall be furnished with an opaque, waterproof wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged with the manufacturer's name, date of manufacture, batch number, and name of product. Unless otherwise specified on the plans or in the project specifications, the geotextile fabric shall be an approved product in QPL 61.
- B. Single Layer, Type I Biaxial Structural Geogrid: The geogrid shall conform to the physical properties listed in the following table. The listed property values are certifiable minimum average roll values, and are equal to the mean values less one standard deviation which reflects a 95% confidence level. The minimum properties values are as follows:

<u>Physical Properties</u>	<u>Test Methods</u>	<u>Requirements (Type I)</u>
<b>Interlock:</b>		
Aperture size	I.D. Callipered	1.0 x 1.3 in.
Open Area	COE	70 %
Thickness	ASTM D-1777-64	0.03 in. (ribs) 0.11 in. (junctions)
Secant Aperture Modulus (@ 20 cm-kg)	Grid Aperture Test (Univ. of Alaska)	3.20
<b>Reinforcement:</b>		
Flexural Rigidity	ASTM D-1388-64	250,000 mg-cm
Tensile Modulus	GR1-GG1-87	14,000 lb/ft
Strength (junctions)	GR1-GG2-87	765 lb/ft
Efficiency (junctions)	GR1-GG2-87	90%
<b>Material:</b>		
Polypropylene	ASTM D-4101	98%
Carbon Black	ASTM 4218	0.5%
<b>Dimensions:</b>		
Roll Length	164 ft.	
Roll width	9.8 ft.	
Roll Weight	71	

1. Use single layer, Type I Tensar BX1100, or approved equal. Multi-layer, or twin-layer geogrid is not an acceptable substitute material. A typical 2 foot overlap in all directions is required for all installations.

### PART 3 - EXECUTION

#### 3.1 EXCAVATION

- A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

#### 3.2 STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of

agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open.
  - 1. Provide permanent steel sheet piling or pressure-cresoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops a minimum of 30 inches below final grade and leave permanently in place.

### 3.3 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
  - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
  - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

### 3.4 STORAGE OF EXCAVATED MATERIALS

- A. Stockpiling: Stockpile acceptable excavated materials and borrow materials for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
  - 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- B. Disposal: Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill, at a legal landfill.

### 3.5 EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.
  - 1. Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. For pile foundations, stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

### 3.6 EXCAVATION FOR PAVEMENTS

- A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

### 3.7 TRENCH EXCAVATION FOR PIPES AND CONDUIT

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 12 inches of clearance on both sides of pipe or conduit.
- B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
  1. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped, crushed limestone backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads and to ensure continuous bearing of pipe barrel on bearing surface.

### 3.8 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

### 3.9 BACKFILL AND FILL

- A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.
  1. On grassed areas, use topsoil and comply with planting requirements in Division 32.
  2. Under walkways, driveways, sidewalks, and handicap ramps, use pumped riversand.
  3. Under pavements, use base material.
  4. Under piping and conduit and equipment, use crushed stone where required over natural subgrade and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.
  5. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

6. Concrete is specified in Division 03.
7. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
8. Provide 8-inch-thick concrete base slab support for all drop inlets, manholes, and catch basins. After installation and testing of piping or conduit, provide minimum 4-inch-thick encasement (sides and top) of concrete for piping or conduit less than 30 inches below surface of roadway prior to backfilling or placement of pavement sub-base.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, water-proofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

### 3.10 PLACEMENT AND COMPACTION

- A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
  1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- B. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. Control soil and fill compaction, providing minimum percentage of density specified for each

area classification indicated below. Correct improperly compacted areas or lifts as directed by Engineer if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density:
  - a. Under slabs and footings, proof-roll subgrade and compact 9 inches of bedding material to 95 percent maximum density per ASTM D-698.
  - b. Under lawn, landscaped, or unpaved areas, proof-roll subgrade and compact each 12 inch layer of backfill or fill material to 90 percent maximum density per ASTM D-698.
  - c. Under walkways, handicap ramps, driveways, and sidewalks compact riversand base course to 95 percent maximum density per ASTM D-1557.
  - d. Under all pavements, proof-roll and scarify 8 inch thick layer of natural subgrade, or imported excavated material, and compact to minimum 95 percent maximum density per ASTM D-698.
  - e. Under concrete pavements, compact 6 inch thick riversand base course to minimum 95 percent maximum density per ASTM D-1557.
  
- F. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
  1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

### 3.11 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
  
- B. Grading Outside Retaining Walls: Grade areas adjacent to retaining walls to drain away from structure and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
  1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
  2. Ramps, Sidewalks and Walkways: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
  3. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2 inch above or below required subgrade elevation.
  4. Grading Surface of Fill under Footings and Retaining Walls: Grade smooth and even,

free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10-foot straightedge.

5. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

### 3.12 PAVEMENT SUB-BASE COURSE

- A. General: Sub-base course consists of placing sub-base material, in layers of specified thickness, over subgrade surface to support a pavement base course or slab.
  1. Refer to other Division 03 sections for paving specifications.
- B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub-base course.
- C. Shoulders: Place shoulders along edges of sub-base course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each sub-base course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of sub-base course.
- D. Placing: Place sub-base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-base material during placement operations.
  1. When a compacted sub-base course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

### 3.13 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow Owner's testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
  1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.
    - a. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.
    - b. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
- B. Footing Subgrade: For each strata of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each

footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Engineer.

- C. Paved Areas Subgrade: Perform at least one field density test of subgrade for every 1,000 sq. ft. of paved area. In each compacted fill layer, perform one field density test for every 1,000 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.
- D. If in opinion of Architect, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

### 3.14 EROSION CONTROL

- A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

### 3.15 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from Transfiguration of the Lord Property: Remove excess excavated material, trash, debris, and waste materials and dispose of it off property at a legal landfill.

END OF SECTION



## SECTION 31 31 16

### TERMITE CONTROL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Soil treatment with termiticide.

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

##### 1.3 SUBMITTALS

- A. Product Data: For termiticide.
  - 1. Include the EPA-Registered Label for termiticide products.
- B. Product Certificates: For termite control products, signed by product manufacturer.
- C. Qualification Data: For Installer of termite control products.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Brand name and manufacturer of termiticide.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes, and rates of application used.
  - 6. Areas of application.
  - 7. Water source for application.
- E. Warranty: Special warranty specified in this Section.

##### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

- B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.
- C. Source Limitations: Obtain termite control products through one source.

## 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

## 1.6 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

## 1.8 MAINTENANCE SERVICE

- A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Termiticides:

- a. Aventis Environmental Science USA LP; Termidor.
- b. Bayer Corporation; Premise 75.
- c. Dow AgroSciences LLC; Dursban TC Equity.
- d. FMC Corporation, Agricultural Products Group; Baseline, 800-321-1362.
- e. Syngenta; Demon TC.

## 2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.

1. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

### 3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

### 3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
  - 1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  - 2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
  - 3. Crawlspace: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
  - 4. Masonry: Treat voids.
  - 5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION

## SECTION 32 13 13

### PORTLAND CEMENT CONCRETE PAVING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Extent of Portland cement concrete paving is shown on Drawings, including curbs, gutters, walkways, sidewalks, driveways, and pavement.
- B. Prepared sub-base is specified in Division 31 Section "Earthwork".
- C. Concrete and related materials are specified in Division 32.
- D. Joint fillers and sealers are indicated in Division 32 and on Drawings.
- E. Pavement markings.

##### 1.2 SUBMITTALS

- A. Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

##### 1.4 JOB CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
  - 1. Coordinate with requirements for temporary facilities and controls specified in Division 01.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
  2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.
- B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.
1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Architect.
- C. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.
- D. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
- E. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required. Only Portland Cement is authorized for this project. Slag Cement is not authorized under any circumstances.
- F. Expansion Joint Materials: Redwood joints with self-leveling sealants. Comply with requirements of applicable Division 32 sections for preformed expansion joint fillers and sealers, per indications on Drawings.
- G. Anti-spalling Compound: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.
- H. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft. / gal.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
    - b. "Ecocure"; Euclid Chemical Co.
    - c. "Kure-N-Seal"; Sonneborn-Contech.
    - d. "L&M Cure"; L & M Construction Chemicals.
- I. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Everbond"; L & M Construction Chemicals.
    - b. "Hornweld"; A. C. Horn.
    - c. "Sonocrete"; Sonneborn-Contech.
- J. Epoxy Adhesive: ASTM C 881, 2-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Epoxitite"; A. C. Horn.
    - b. "Sikadur Hi-Mod"; Sika Chemical Corp.
    - c. "Euco Epoxy 463 or 615"; Euclid Chemical Co.

## 2.2 CONCRETE MIX, DESIGN, AND TESTING

- A. Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control and as herein specified.
- B. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticizer), air-entraining admixture, and water to produce the following properties:
  - 1. Compressive Strength: 4000 psi, minimum at 28 days, unless otherwise indicated.  
Slump Limits: 8 inches minimum for concrete containing high-range water-reducing admixture (superplasticizer); 3 inches for other concrete.
  - 2. Air Content: 5 to 8 percent.
  - 3. Flexured Strength: 650 psi, minimum at 28 days.

## 2.3 PAVEMENT MARKING MATERIALS

- A. Thermoplastic Pavement Markings: Alkyd resin or hydrocarbon based material in conformance with Section 1015.10 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, and shall meet the requirements of Tables 1015-7, 1015-8, 1015-9; and QPL 63. The bead content shall conform to Class B per AASHTO M247, Type I.
- B. Colors: Yellow. Unless otherwise noted on the Drawings, use colors as follows:
  - 1. Yellow—safety markings.

## 2.4 TRAFFIC PAINT

- A. Thermoplastic Pavement Markings: Alkyd resin or hydrocarbon based in conformance with Section 1015.12 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, and shall meet the requirements of Table 1015-11, and QPL 36. The bead content shall conform to Class B per AASHTO M247, Type I.
- B. Colors: Yellow, red and blue. Blue paint may be white paint, tinted. Unless otherwise noted on the Drawings, use colors as follows:
  - 1. Blue—handicapped markings.
  - 2. Red—fire lane markings.
  - 3. Yellow—all other striping and markings.

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION

- A. Remove loose material from compacted sub-base surface immediately before placing concrete.
- B. Compact prepared sub-base surface to check for unstable areas and need for additional compaction, per requirements of Division 31 Section “Earthwork”. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

### 3.2 FORM CONSTRUCTION

- A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Check completed formwork for grade and alignment to following tolerances:
  - 1. Top of forms not more than 1/8 inch in 10 feet.
  - 2. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.
- C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.
- D. Slope step treads at 1/4 inch per foot to drain.

### 3.3 REINFORCEMENT

- A. Locate, place and support reinforcement as specified in Division 03 Sections, unless otherwise indicated.

### 3.4 CONCRETE PLACEMENT

- A. General: Comply with requirements of Division 03 Sections for mixing and placing concrete, and as herein specified.
- B. Do not place concrete until sub-base and forms have been checked for line and grade. Moisten sub-base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
- D. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- E. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.
- F. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.
- G. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

### 3.5 JOINTS

- A. General: Construct butt, expansion, weakened-plane (contraction), longitudinal, longitudinal construction, and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
- B. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated. Saw-cut edges of existing pavement to align joints at right angles or perpendicular to surface of new concrete.
- C. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
  - 1. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
  - 2. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.
- D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.
  - 1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
  - 2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.
- E. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.
  - 1. Locate expansion joints at maximum 60 feet o.c. for each pavement lane, unless otherwise indicated.
- F. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. Joint sealer is required at all joints with joint fillers.
- G. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.
- H. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
- I. Fillers and Sealants: Comply with requirements of applicable Division 07 section for preparation of joints, materials, installation, and performance.

### 3.6 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.
- C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:
  - 1. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect.
    - a. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
- E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Engineer.

### 3.7 CURING

- A. Protect and cure finished concrete paving in compliance with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.
- B. Anti-spalling Treatment: Apply treatment to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt, and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 s.f. per gallon. Apply anti-spalling compound in 2 sprayed applications. First application at rate of 40 sq. yds. per gal.; second application, 60 sq. yds. per gallon. Allow complete drying between applications.

### 3.8 PAVEMENT MARKING

- A. Preparation: Thoroughly clean surfaces to be painted by rotary brooms, air blasting, scrapers, hand brooms or other method acceptable to the Architect. Painting must be accomplished as soon as practical after cleaning.
- B. Application: Apply stripes by spraying in a uniform pattern with a factory manufactured spray painting machine suited for this type of work. Lines are to be 4" wide, unless shown otherwise on the Drawings. Paint shall be applied at a rate of 150 sq. ft. per gallon.
- C. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Architect.

- D. Handicapped Symbol: Use standard handicapped symbol stencil for painting at handicapped parking spaces. Comply with current ADA-AG requirements.
- E. Curbs and Wheel Stops: Paint curbs after they are installed. Hand paint, or spray paint after protecting adjacent surfaces from overspray.

### 3.9 PAVEMENT MARKING TOLERANCES

- A. Line Widths:
  - 1. Plus or minus ¼" variance on straight segments.
  - 2. Plus or minus ½" variance on curved segments.

### 3.10 REPAIRS AND PROTECTIONS

- A. Repair or replace broken or defective concrete, as directed by Engineer.
- B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION

