DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 00 00 - MISCELLANEOUS REQUIREMENTS

1. Summary

These Miscellaneous Requirements are issued as supplements to the Uniform General Conditions for Construction Contracts (UGCs) and any Special Conditions that form a part of the Contract for Construction between the Owner and the General Contractor (or Construction Manager, or Design-Build Contractor). The term "Contractor", as used herein, is meant to refer to a General Contractor, or a Design-Build Contractor, or a Construction Manager. Should any provision of these Division 1 Specifications conflict with the Contract, the UGCs or the Special Conditions, the latter shall govern.

2. Removal of Debris (see Section 015240)

The Contractor shall remove and legally dispose of all demolition debris and all unused construction materials off-site. Unless specifically noted otherwise, all excess earth and rock excavation materials shall be removed and disposed of offsite. Such demolition debris, unused construction materials and excess excavated earth and rock shall be handled, transported and legally disposed of at the Contractor's expense.

3. Drawings and Specifications (also see UGC Article 6)

3.1 The Drawings and Specifications are intended to describe and provide for a finished and complete piece of Work that meets the requirements of all the applicable governing laws, ordinances, rules, and regulations of the locality. It is mandatory that all work must meet these requirements.

3.1.1 No extra compensation will be allowed for the Contractor's rework due to its failure to conform to any such requirements unless the original installation was directed by written order issued by the A/E or the Owner.

3.1.2 Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be like effect as if shown or mentioned in both. If the Contractor believes that some information is missing then that information should be requested of the Owner or A/E in writing. Should the Drawings disagree among themselves, or with the Specifications, the better quality and/or greater quantity of work

and/or materials shall be included with the Contractor's project proposed pricing. In the case where the Specifications do not fully agree with the material schedules, the material schedules shall govern.

3.1.3 The general character of the detail work is shown on Drawings, but minor modifications may be made by A/E in full size Drawings, shop drawings, or models. Contractor shall not attempt to execute any part of the Work requiring such drawings until he has received approved copies of same.

3.1.4 Where the word "similar or typical" occurs on Drawings, they shall be understood in their general sense and not as meaning identical. All details shall be worked out in relation to their location and their connection to other parts of the Work. If the Contractor finds this to be beyond its capability, interpretations and directions should be requested of the A/E.

3.1.5 Small scale and large scale drawings are intended to be mutually compatible and explanatory. In case of variances, the following order of preferences is established to define the intent of the work.

3.1.6 Explanatory notes on Drawings;

3.1.6.1 Recorded dimensions;

3.1.6.2 Large scales details;

3.1.6.3 Small scale details;

3.1.6.4 Scaled measurements

3.2 The "Scope of Work" description placed in the front portion of each section of the Specifications is intended to designate the scope and locations of all items of Work included in that section, either generally or specifically. It is not, however, intended to limit the scope of the work where plans, schedules, or notes indicate a larger scope.

4. Interpretations of Documents (see UGC 3.2.2)

Whether bidding or building the Project, if there is any doubt as to the meaning of any part of the Construction Documents, the Contractor shall submit a written request to the Owner seeking an interpretation. If the question has to do with technical requirements, the Contractor should provide the A/E with a copy of the request as the Owner will typically ask the A/E for the technical interpretation. If such a request is made during bidding, it should be made at least ten days before bid opening. Interpretations shall then be issued by written response only and during bidding only by issuing an "Addendum" to the bid documents. When in doubt

during construction, the Contractor should proceed only with a written interpretation by the Owner, or in its absence, proceed only after notifying the Owner in writing about the interpretation that is being used. Failure of the Contractor to request an interpretation shall not relieve the Contractor from responsibility to complete the Work to the Owner's satisfaction. If the Contractor does not agree that an interpretation received is satisfactory and without cost or time implications, the Owner should be notified immediately in writing of that fact.

5. Materials and Work (see UGC 8.1)

5.1 Unless otherwise specified, all materials shall be new and free of asbestos, noxious or toxic fumes, urea-formaldehyde and lead (lead in potable water system) and both workmanship and materials shall be of the best quality. If requested by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of his materials and workmanship. Any work installed that does not meet the requirements of the Construction Documents shall be removed and replaced with conforming Work. **(UGC 3.3.5)**

5.2 The Contractor and subcontractors shall be responsible for the proper care and protection of all materials and equipment furnished both during and after installation. Such materials and equipment may be staged inside the construction fence, or areas designated by the Owner, but only consistent with a Staging Plan acceptable to the Owner. All materials affected by the weather shall be covered and protected to keep them free from damage while being transported to the site. When stored on site, they shall be placed in watertight storage shed/compartments or otherwise protected from the weather. Any material damaged by water or other causes shall be removed from the site and replaced with new material.

5.3 When necessary to avoid delay or to protect work or equipment, provide suitable watertight coverings over windows, doors, skylights, hatchways, and such other openings admitting rain, including the Owner's materials within the building area when working on a combined effort.

5.4 The Contractor and subcontractors shall protect and be responsible for their Work and any damage to their Work from the date of delivery or installation until Substantial Completion when the Owner will take possession and assume responsibility. They shall make good, without cost to the Owner, any damage or loss that may occur to their Work during this period.

5.5 When any room in one of Owner's buildings has been provided for use as a shop,

storeroom, etc., the Contractor shall restore the room to equal, or better, condition by providing repairs, patching, cleaning, and painting at its sole expense.

5.6 During the execution of the Work the open ends of all piping, conduit and mechanical ducts and openings in equipment shall be sealed in such a way as to prevent the entrance of foreign matter. All heating, ventilating, plumbing and electrical equipment shall be covered and protected. All plumbing fixtures shall be protected and boarded over to prevent their usage by any person. All drains shall be covered until they are placed into service.

5.7 The Contractor shall provide all scaffolding and ladders necessary for performing the Work. All scaffolding shall be so constructed, anchored and braced to comply in all respects with OSHA guidelines to afford safety and protection to both workers and their Work, the inspectors and the Work of other contractors.

5.8 Except as otherwise specified, the Contractor shall furnish at its own cost and risk all tools, apparatus, hoists or cranes, derricks, etc. needed for the Work.

5.9 Temporary equipment shall be installed in such a manner that finished Work will not be damaged by smoke, falling mortar, concrete or other causes. The location and arrangement of temporary equipment shall be subject to the approval of the Owner.

5.10 All temporary shoring required for the installation of Work shall be provided by the Contractor who will take all responsibility.

5.11 The Contractor and its subcontractors shall provide on the premises, at locations approved by the Owner, suitable watertight storage sheds for the storage of tools and equipment. Such sheds shall be at least 6 inches off the ground on heavy joists. The Contractor shall maintain such sheds in good condition and remove them when directed by the Owner.

5.12 **Also see Sections 01 31 00, 01 35 23 and 01 50 00 for related requirements.**

6. Intent of the Documents (see UGC 11.1.2)

6.1 It is the intention of the Construction Documents to describe and require the complete installation of the various systems and the Contractor is to furnish all items necessary to make the various systems complete, although each and every item required may not be specifically mentioned in the Construction Documents.

6.2 It is not the intent of the Construction Documents to limit materials, equipment or fixtures to the product of any particular manufacturer. Where definite materials, equipment or fixtures have been specified by name, manufacturer or catalog number, it has been done to set a quality standard, applicability, physical conformity

and other characteristics. It is not the Owner's intent to discriminate against or prevent any dealer, jobber or manufacturer from furnishing materials, equipment or fixtures that meet or exceed the characteristics of the specified items. However, substitutions of materials shall not be made without a specific written request by the Contractor having been approved by the Owner in writing. **(See paragraph 17 of this Section).**

6.3 Any discrepancies in the Specifications must be reported to the Owner for clarification, correction and interpretation from the A/E before the work is executed.

7. Existing Underground Utilities

If existing underground lines occur in the site where the work is to be accomplished, such lines will be located and staked by the Contractor for the benefit of the Owner and the Contractor prior to start of the work. Contractor shall maintain these markings throughout the duration of the construction project. Prior to any excavation, the Contractor shall review with the Owner the locations of all underground utilities and receive the Owner's written permission to proceed.

8. Pumping, Shoring, Etc.

8.1. Pumping: When necessary to avoid delay or to protect the Work or the premises, provide suitable pumping equipment and keep excavations, pits and other areas involved free of water that may leak, seep, or rain in. Do not allow water to flow into excavations. Do not allow water to flow off site in quantities or at rates that exceed the quantities or rates that existed prior to the start of construction

8.2. Shoring: The Contractor shall provide and be responsible for all temporary shoring required for execution and protection of the work. After all construction is secure and stable, and when authorized by the Structural Engineer or Civil Engineer, the Contractor shall remove all shoring.

9. Hazardous Materials

9.1 If during the course of his work, the Contractor observes the existence of asbestos, or asbestos bearing materials, the Contractor shall immediately terminate further operations and notify Owner of the condition. The Owner will, after consultations, determine a further course of action.**(UGC 7.5)**

9.2 Contractor shall furnish Manufacturer's Safety Data Sheets (MSDS) on all materials and products installed by the Contractor and subcontractors on this project to

indicate no asbestos-containing materials have been installed.

10. Substantial Completion (see UGC 1.26 and 12.1.1)

"Substantial Completion" constitutes a stage of project completion that will allow Owner beneficial occupancy for the purpose of safely installing furnishings, maintaining normal security over them, and use of the facility for its intended purpose. Substantial Completion shall not be considered as Final Completion as there may be minor correction items outstanding and there are additional completion items required to achieve Final Completion. Upon acceptance that an entire Project, or a portion of a Project, as Substantially Complete the Owner will take possession from the Contractor and assume operations, maintenance and insurance liability responsibilities for that portion of the Project.

11. Coordination (see UGC 3.3.6.2)

The Contractor and subcontractors on the project shall coordinate their work with each other, advising on work schedules, equipment locations, etc. It shall be the responsibility of Contractor to assure this coordination and to schedule and supervise the work of all subcontractors performing work under this contract. Contactor shall be responsible for the proper fit of the various parts of the Work and for the coordination of operations of all trades, the subcontractors and the material suppliers engaged upon or in connection with the Work as well as those of his own employees. Contractor shall accommodate and coordinate with other independent contractors and Owner personnel on site during construction to allow them necessary access to perform their work.

12. Observation of Work (see UGC 8.5.1)

The Owner's representatives, as well as the A/E, shall have access to the work at all times wherever it is in preparation or progress. The Contractor shall provide proper and safe facilities for such access and for observation.

13. Cooperation with Building Officials

Contractor, Subcontractor and all related suppliers, vendors and employees will cooperate with applicable utility and government officials and inspectors at all times. If such official or inspector deems special inspections necessary, provide assistance and facilities that will expedite such inspection or observation.

14. Notification

The Contractor shall notify the Owner at least 48 hours in advance (Monday thru Friday) of concrete pours, roofing installation, start of each new section of classification of work, concealment of plumbing, heating, air conditioning, or electrical work.

15. Ongoing Operations/Construction Personnel

15.1 The facilities of the campus will only be available during the scheduled construction time-period as specified by the Owner, and if not specified, then from 8:00 a.m. until 6:00 p.m., Monday through Friday. Work during other times, including weekends, shall only be allowed with prior request and written authorization from the Owner. In addition, the Contractor shall accommodate and coordinate its construction work force and activities to allow the Owner's forces and Owner's separate contractors (i.e. telephone, data, IT, computer, and furniture installation) to enter the jobsite to perform their work.

15.2 This project is surrounded by continuously functioning campus facilities, including student housing, academic and research efforts. The Contractor shall make every effort to avoid disruptions to ongoing campus activities and to maintain a safe environment for students, faculty, and staff in the areas adjacent to the Project.

15.3 Adjacent facilities will continue to be used for their intended purpose while this Project is underway and the following requirements shall apply:

15.3.1 Contractor, Subcontractors, Owner and A/E shall meet regularly to coordinate and schedule any construction activities affecting ongoing operations including, but not limited to: testing days, student/staff holidays, special events, etc.

15.3.2 The Owner may have other contractors, or its own employees, performing work on the campus and in the vicinity of the Contractor's Work. The Contractor shall not commit any act, or allow any act, that will interfere with the performance of work by these other work forces. The Contractor shall cooperate with all performing parties so that the Owner can realize the best possible outcome of all projects involved and requiring coordination.

15.3.3 Student, faculty and general public safety is of utmost importance. Fire and life safety exiting from buildings must be maintained at all times and closely monitored. Review and receive approval for changes

in existing conditions with the local fire marshal for each phase of construction. Provide temporary signage as required by the fire marshal and/or the Owner.

15.3.4 Fire arms, drugs, intoxicating beverages, X-rated materials, etc. are banned from the Owner's property.

15.3.5 Smoking is not allowed inside any campus building or anywhere on the campus except in designated areas. Smoking will not be allowed in any enclosed area of the building(s) of this project. Enclosed, as used here, refers to erection of exterior walls and overhead structure for any portion of the project; it does not mean to limit the term to only "dried in" situations. Use of or possession of illegal drugs or alcohol on the project site or anywhere on campus is prohibited.

15.3.6 Construction personnel are not to communicate or interact with students and faculty on site. Only the Project Superintendent, Project Manager and/or their appointed representatives may communicate with the faculty and administrative staff on an as needed basis.

15.4 Campus utilities must not be interrupted except when scheduled and approved in advance through Owner-designated campus channels. The Contractor or his personnel shall NOT open or close any valves of the central campus utility systems. Valve operation is to be done by College utilities personnel only. The Contractor shall not activate or de-activate any campus utility system or component of any system, without express written direction from the Owner.

15.5 Chemical cleaning of new utility additions shall be done by circulating a good non-phosphate cleaner through as much of the new system as possible. Prior to dumping the cleaning agent, the Contractor shall notify the local City/County industrial water treatment department to sample the effluent. If the City/County officials approve of dumping to drain, then the Contractor will dump into the sanitary sewer. The Contractor shall refill the new system with water and again have the City/County water treatment officials sample the effluent prior to dumping. If at any stage the City/County water treatment officials refuse to accept the effluent, then the Contractor must make special arrangements for legal disposal at its expense and provide the Owner with copies of the resulting shipping and disposal manifests.

16. Field Measurements (see 014518 – Field Engineering)

16.1 The Contractor will employ an experienced, competent staff to establish or survey

the building lines, elevations, and field dimensions. Each subcontractor shall verify all existing grades, lines, levels and dimensions affected by their work.

16.2 Before ordering any materials or doing any work, each subcontractor shall verify all measurements and shall be responsible for their correctness. Any difference between the actual dimensions and conditions on the site and those indicated on the drawings shall be submitted to the Owner for instructions and consideration before proceeding with the work.

17. Substitutions (see UGC 8.3.5 and 8.3.6)

The Contractor may submit and Owner and A/E will consider substitutions that have not been submitted and approved prior to receipt of proposals. Contractor shall submit a written substitution request on an Owner approved form and the substitution shall be fully identified for product or method being replaced by substitution, including related specification section and drawing number(s) and fully documented to show compliance with the requirements of the Construction Documents. Include product data/drawings, description of methods, samples where applicable and Contractor's detailed comparison of significant qualities between the specified item and the proposed substitution. The Contractor shall include a statement of effect on construction time, coordination and other affected work, cost information or proposal and a written guarantee indicating the proposed substitution will result in overall work equal to or better than work originally indicated. Contractor shall allow sufficient time for review and approval of such proposed substitutions.

END OF SECTION 01 00 00

SECTION 01 20 00 - PROJECT MEETINGS

Pre-Construction Conferences (see UGC 3.1.1)

1.1 Prior to commencing construction, the Contractor shall schedule a meeting to review all aspects of the Construction Project. The time of the Pre-Construction Conference and the attendees shall be determined through discussions between the Owner and Contractor prior to scheduling.

1.2 The following is a tentative agenda for the Pre-Construction Conference:

- Critical work sequencing;
- Designation of responsible personnel;
- Procedures for processing submittals, substitutions, applications for payment, proposal requests, change letters and Contract Close-out procedures;
- Parking and access to the site;
- Office, storage areas and temporary facilities;
- Utility information;
- Testing procedures;
- Procedures for maintaining record documents.

1.3 Minutes of the Pre-Construction Conference will be kept and distributed to all attendees and to all team members not present at the meeting. All final decisions recorded in the minutes shall become binding on the parties.

2. Pre-Installation Conferences

Conduct a Pre-installation Conference at the site before each construction activity that requires extensive coordination and for those activities where a preinstallation meeting is specifically required by the specification section.

3. Progress Meetings

3.1 The Contractor shall schedule weekly progress meetings to discuss and monitor the construction project. The Contractor shall determine the meeting times and required attendees.

3.2 Minutes of the Progress Meeting shall be kept and distributed to all attendees and to all team members not present at the meeting.

4. Close-out Meetings

4.1 When the Contractor determines that a Project, including all punch list items, has been substantially completed and an acceptance date established, a formal project

close-out meeting will be scheduled and attended by the parties designated by the Owner and A/E.

4.2 At the close-out meeting, upon documentation of exceptions and assignment of completion responsibilities, the close-out documents required by the Construction Documents will be released to the Owner.

4.3 Minutes of the Project Close-out meeting will be kept by the A/E and any exceptions identified will be recorded. Specific completion dates for the exceptions will be established and tracked by the Owner to ensure expeditious completion. Copies of the minutes will be distributed to all attendees.

END OF SECTION 01 20 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

a. This Section includes administrative and procedural requirements governing the following:

1) Lump-sum allowances.
2) Contingency allowances.

b. See Division 01 Section "Unit Prices" for procedures for using unit prices.

c. See Division 01 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.2 SELECTION AND PURCHASE

a. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

b. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

c. Purchase products and systems selected by Architect from the designated supplier.

1.3 SUBMITTALS

a. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

b. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

c. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.4 COORDINATION

a. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.5 LUMP-SUM ALLOWANCES

a. Allowance shall include cost to Contractor of specific products and materials **selected by Architect** under allowance and shall include taxes, freight, and delivery to Project site.

b. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials **selected by Architect** under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.6 CONTINGENCY ALLOWANCES

a. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

b. Contractor's related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

c. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

d. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.7 UNUSED MATERIALS

a. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1) If requested by Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by

Architect, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

a. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

a. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

a. Allowance No. 01: Include Allowance for Exterior Signage - $75,000.00

1) Details for signage allowance, if used, will be provided for pricing by the Architect as needed.

b. Allowance No. 02: Include Allowance for Owner Contingency - $225,000.00

END OF SECTION 01 21 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

a. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

a. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

   1) The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

a. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

   1) Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

b. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

c. Execute accepted alternates under the same conditions as other work of the Contract.

d. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

a. Alternate No. 01: On drawing sheet SE300, detail 1, shows an empty 1" communication conduit for communication stubbing out from the light pole base. On sheet SE201, drawing note 3, states all locations where the empty 1" communication conduit is to be installed. As an alternate: Provide pricing to run the empty 1" communication conduit with pull strings from the noted pole locations to the electrical room located on the first floor of the Angela Morales Building. Location of electrical room is noted SE201 by a plan detail callout symbol on the Northeast corner of the Angela Morales Building. The conduit should stub up inside the electrical room through the building slab. This electrical room is the same room where the entire new site lighting wiring is terminated.

END OF SECTION 01 23 00

SECTION 01 27 00 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Sections include:

1. Division 01 Section "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.2 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

C. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1A – Concrete Pavers:

1. Description: Cost to add 1 square foot of concrete pavers according to paver drawing detail and according to Division 32 Section "Unit Paving." Include concrete base, sand bed, and all other shown design components.

2. Unit of Measurement: Per Square Foot.

B. Unit Price No. 1B – Concrete Pavers:

1. Description: Credit to deduct 1 square foot of concrete pavers according to paver drawing detail and according to Division 32 Section "Unit Paving." Include concrete base, sand bed, and all other shown design components.

2. Unit of Measurement: Per Square Foot.

C. Unit Price No. 2A – Concrete Pavement:

1. Description: Cost to add one square yard of concrete pavement at the thickness shown on the plans, including subgrade stabilization according to concrete pavement details and Division 31 Section "Subgrade Stabilization Lime," setting forms ; and installing reinforcing steel according to Division 03 Section "Concrete Reinforcement," and Division 32 Sections "Portland Cement Concrete Pavement and "Concrete Pavement Joints."

2. Unit of Measurement: Per Square Yard.

D. Unit Price No. 2B – Concrete Pavement:

1. Description: Credit to deduct one square yard of concrete pavement at the thickness shown on the plans, including subgrade stabilization according to concrete pavement details; and Division 31 Section "Subgrade Stabilization Lime," setting forms and installing reinforcing steel according to Division 03 Section "Concrete Reinforcement," and Division 32 Sections "Portland Cement Concrete Pavement and "Concrete Pavement Joints."

2. Unit of Measurement: Per Square Yard.

E. Unit Price No. 2C – Concrete Sidewalks:

1. Description: Cost to add one square foot of concrete sidewalk at the thickness shown on the plans, sand bedding according to sidewalk details and Division 32 Section "Concrete Walks and Ramps."

2. Unit of Measurement: Per Square Foot.

F. Unit Price No. 2D– Concrete Sidewalks:

1. Description: Credit to deduct one square foot of concrete sidewalk at the thickness shown on the plans, sand bedding according to sidewalk details and Division 32 Section "Concrete Walks and Ramps

2. Unit of Measurement: Per Square Foot.

G. Unit Price No. 3A – Benches:

1. Description: Cost to add and install 1 Unit (Bench) according to Division 12 Section "Site Furnishings."

2. Unit of Measurement: Per Unit.

H. Unit Price No. 3B – Seats with Table:

1. Description: Cost to add and install 1 Unit (4 Seats with Table) according to Division 12 Section "Site Furnishings."

2. Unit of Measurement: Per Unit.

I. Unit Price No. 3C – Waste Receptacles:

1. Description: Cost to add and install 1 Unit (Waste Receptacle) according to Division 12 Section "Site Furnishings."

2. Provide individual add prices for each type shown on drawings.

3. Unit of Measurement: Per Unit.

J. Unit Price No. 3D – Sphere Bollards:

1. Description: Cost to add and install 1 Unit (Sphere Bollard) according to Division 12 Section "Site Furnishings."

2. Unit of Measurement: Per Unit.

K. Unit Price No. 4A – Site Lighting (A type Fixture):

1. Description: Cost to add fixture, provide foundation, wire, and install 1 Unit (A Type Fixture) according to Division 26 Section "Site Lighting." and construction drawings. Include 100 feet of underground conduit and wiring.

2. Unit of Measurement: Per Unit.

L. Unit Price No. 4B – Site Lighting (C type Fixture):

1. Description: Cost to add fixture, provide foundation, wire, and install 1 Unit (C Type Fixture) according to Division 26 Section "Site Lighting." and construction drawings. Include 100 feet of underground conduit and wiring.

2. Unit of Measurement: Per Unit.

M. Unit Price No. 4C – Site Lighting (L type Fixture):

1. Description: Cost to add fixture, provide foundation, wire, and install 1 Unit (L Type Fixture) according to Division 26 Section "Site Lighting." and construction drawings. Include 100 feet of underground conduit and wiring.

2. Unit of Measurement: Per Unit.

N. Unit Price No. 5A – Decomposed Granite:

1. Description: Cost to provide, prep ground, and install 1 square foot of Decomposed Granite details in construction drawings.

2. Unit of Measurement: Per Square Foot.

O. Unit Price No. 5B – Decomposed Granite:

1. Description: Credit to deduct, not prep ground, and not install 1 square foot of Decomposed Granite details in construction drawings.

2. Unit of Measurement: Per Square Foot.

P. Unit Price No. 8A – Landscape Plants:

1. Description: Cost to add 1 plant or 1 plant container if standard container contains multiple plants, install, irrigate, and maintain for maintenance period per Division 32 Sections "Planting" and "Operation and Maintenance of

Planting" and construction drawing details.

2. Provide individual add prices for each plant listed in the Plant Schedule.

3. Unit of Measurement: Per Container.

Q. Unit Price No. 8B – Landscape Plants:

1. Description: Credit to deduct 1 plant or 1 plant container if standard container contains multiple plants, install, irrigate, and maintain for maintenance period per Division 32 Sections "Planting" and "Operation and Maintenance of Planting" and construction drawing details.

2. Provide individual deduct prices for each plant listed in the Plant Schedule.

3. Unit of Measurement: Per Container.

END OF SECTION 01 27 00

SECTION 01 31 00 - PROJECT ADMINISTRATION

1. Subcontracts (see UGC 3.3.6)

1.1 Contractor agrees to bind every subcontractor, and every subcontractor agrees to be bound by the terms and conditions of the Owner's contract.

1.2 The Contractor is required to submit a list of all first tier subcontractors to the Owner as subcontracts are executed.

2. Flow of Communications (see UGC 3.2, 3.3.1 and 3.3.6)

2.1 The Owner's Designated Representative (ODR) is the Owner's primary representative for the Project who will be designated to the Contractor in writing. The ODR is the only party authorized to issue written/or oral instructions directly to the Contractor that involve changes to the contract scope, cost or time of the Work. If any other party directs the Contractor to make changes to the Work that will involve scope, cost or time the Contractor should notify the ODR immediately in writing. (see UGC 1.17)

2.2 Normally, the Owner will also designate in writing an Owner's Designated Site Representative (ODSR). The ODSR will have the authority, delegated by the ODR, to make decisions on behalf of the Owner concerning coordination with the College of Work on the site including: traffic controls, site safety, scheduling of utility outages, and all matters within the contract that do not involve changes to the scope, cost and/or time for completion. The ODSR, or a designee, will coordinate and conduct quality inspections of the construction work as it is installed or performed, authorize payments (except first and final) and conduct final acceptance inspections. The ODSR will be the Contractor's primary point of contact on the site.

2.3 The Architect/Engineer (A/E) is responsible to the Owner for the technical aspects of the Design, including the review of Contractor Submittals and for interpretation of the technical requirements of the Construction Documents. The Owner's written instructions to the Contractor on these matters will generally be issued through the A/E.

2.3.1 The A/E may issue clarifications and other information not affecting the contract scope, cost or time by means of an A/E's Supplemental Instructions (ASI), or similar clarification form, that will be sequentially numbered. Both the A/E and Contractor will maintain separate ASI registers. (See UGC 3.2.2).

2.3.2 If Contractor believes such a clarification will create a change in the contract

scope, cost or time for performance, a written notification of such must be provided to the ODR before performing the Work involved. The Contractor should proceed with such Work only after being directed to do so in writing by the ODR.

2.4 Any oral direction to the Contractor by the ODR, ODSR or the A/E should be confirmed in writing prior to the Contractor proceeding with the direction.

2.5 All Project correspondence shall include the Project Number and Name in the title or reference.

2.6 All correspondence originated by the Contractor should include simultaneous copies to the ODSR and the A/E. Such correspondence that involves changes, or proposed changes, to the scope, cost or time for the Work, or any dispute or potential dispute, should also include copies to the ODR.

2.7 All subcontractor correspondence to either the Owner or the A/E shall be routed through the Contactor.

2.8 All subcontractor Requests for Information (RFIs) shall be submitted by and under cover of the Contractor, who is to carefully review and ensure the completeness and appropriateness of the question prior to submission. The Contractor should sequentially number each RFI and submit them directly to the A/E, with copies to the ODSR. The Contractor and A/E will maintain separate RFI logs.

2.9 The preparation and handling of Pay Applications, Request for Information, Change Proposals, Submittals, etc. are to be processed as discussed in the Pre-Construction Conference meeting.

3. Project Changes (see UGC 9.1, 9.3.3.3, 9.6.2.2 and Article 11)

3.1 All changes to the Contract involving scope, cost, or time will be issued on the standard Houston Community College (HCC) Change Order form. Such Change Orders are valid only if signed by either the Chancellor of HCC or by the Executive Director for Construction Administration. A single Change Order may include several different change issues and they will not be required to be related to each other.

3.2 Prior to issuing a Change Order, the Owner must have received from the Contractor a Change Order Proposal that is complete in its description of the changes in scope and its detailed presentation of cost and time implications of the proposed change. If the Owner and Contractor do not agree on the implications of a proposed change, they will meet and discuss and resolve their differences prior to proceeding with the changes to the Work.

3.2.1 The Contactor shall summarize all costs for each change at each level of subcontractor and supplier by preparing a "Cost Analysis", and shall provide each subcontractor's cost summary as backup. Additional support documentation from both the Contractor and its subcontractors is encouraged.

3.2.2 Where the Contractor believes it is entitled to a time extension, it shall so state as part of its response to the Change Proposal, including a justification for such request. Time extensions will be granted only if a Change Order Proposal affects the activities on the Critical Path of the Owner approved Project Schedule (i.e., when the work impacts the "Contract Substantial Completion Date").

3.2.3 If the Owner and Contractor cannot mutually agreed upon a fair and reasonable cost and time settlement, the Owner may: 1) Reject the quotation and void the Change Order Proposal, 2) Issue instruction to the Contractor to proceed on a time and material basis for a price to be determined later not to exceed a fixed maximum dollar and time, or 3) Issue a Unilateral Change Order.

3.2.4 The Owner may issue Field Orders directly to the Contractor for minor changes to the contract, which can be negotiated in the field. Pricing backup shall be the same as a Change Order Proposal and is to be outlined as noted above. Once the Owner and the Contractor have signed the Field Order, the work is authorized and the Field Order will be included in the next Change Order.

4. Liquidated Damages (see UGC 9.11, 12.1.4)

If assessed, liquidated damages will be withheld from progress payments beginning with the first payment after the Contract completion date and until all work of the contract is complete. The amount assessed shall be deducted from the contract price through a written Change Order.

5. Site Use Issues

5.1 The Contractor is responsible for the actions of its entire work force, including Subcontractor and Supplier employees, whenever they are on the campus. Harassment of any kind toward any person will not be tolerated. Offending workers will be removed from the project immediately and permanently. Harassment

includes any action such as jeering, whistling, calling-out, staring, snickering, making rude or questionable comments, or similar behavior. Any offending worker or employee will be removed.

5.2 The Contractor shall provide and submit a program plan for worker orientation, identification and control of access to the site and for managing personnel records, including payroll records. All workers on the project shall participate in this program before beginning work of the project. This plan shall include, as a minimum:

5.2.1 Employee identification badges with a photo of the employee, the employer and employees' name. Badges shall be provided for all employees and produced by a system on site. This identification shall be worn at all times while on the project site. Lack of an ID badge shall be grounds for removal from the project until the badge is produced.

5.2.2 Identification badges for workers, busing of workers from remote parking lots, frequent written and verbal reminders to the work force of appropriate behavior and avoidance of campus facilities and publication of acceptable access and egress routes from the work site are all minimum requirements of the plan.

6. Shop Drawings and Submittals (see UGC 8.3)

6.1 Refer to the UGC for requirements not identified in this section.

6.2 The Contractor shall assign an identifying number to each submittal following a format to be established at the Pre-Construction Conference. The same number with a numerical or alphabetical suffix will be used to identify re-submittals.

6.3 The burden of timeliness to complete the submittal process is on the Contractor. The Contractor shall allow sufficient time within the construction schedule for the A/E and Owner to review and approve all submittals, including time for all re-submittals on any unaccepted/rejected submittal.

6.4 Any deviation from the Construction Documents shall be conspicuously noted on the submittal and the transmittal cover sheet. Failure to so note deviations will void any action taken on the submittal.

6.5 All manufacturers' data contained within the submittal shall have all inapplicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.

6.6 Equipment of larger sizes than shown, even though of a specified manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper

installation, operations and maintenance.

6.7 The Owner will not be responsible for payment of any item that has not been submitted and approved through the established submittal process.

6.8 The exact number of submittal copies required for distribution will be determined at the Pre-Construction Conference. The Contractor shall anticipate providing a minimum of four (4) copies of each submittal in addition to those needed by the Contractor and its subcontractors. Two (2) of the approved copies will be returned to the Contractor and one (1) shall be set aside for subsequent turn over to Owner at Project Closeout.

7. Substitution of Materials, Labor and Equipment (see UGC 8.3.5 and 010000 paragraph 17)

7.1 Refer to the UGC for requirements not identified in this section.

7.2 The specified products referenced in the Construction Documents establish minimum qualities for which substitutions shall at least equal to be considered acceptable. The burden of proof of equality rests with the Contractor. The Owner retains sole authority for acceptance of substitutions.

7.3 All substitutions shall be submitted with ninety (90) days of the Notice to Proceed for Construction and be clearly marked as such on the transmittal cover sheet for the submittal.

7.4 The Contractor shall allow a minimum of four (4) weeks for review of each substitution by the A/E and/or Owner in addition to the requirements identified in Section 7.3 above.

7.5 When requested by the A/E, the Contractor shall provide a sample of the proposed substitution item. In some cases, samples of both the specified item and the proposed item shall be required for comparison purposes.

7.6 Acceptance of materials and equipment will be based on the supplier/manufacturer's published data and will be tentative subject to submission of complete shop drawings and/or specifications indicating compliance with the Construction Documents. Acceptance of materials and/or equipment under this provision shall not be construed as authorizing any deviation from the Construction Documents, unless specifically directed in writing from the A/E.

7.7 Any and all additional costs or time resulting from the acceptance or rejection of any substitution shall be the sole responsibility of the Contractor. These include costs that are not presented at the time of the substitution request and those costs that

become known after the approval of the substitution. This includes direct as well as indirect costs.

7.8 If a substitution is accepted, and the substitute proves defective, or otherwise unsatisfactory as determined by the Owner for the service intended within the warranty period, the substitute shall be replaced with the material or equipment specified in the Construction Documents, or as approved by the Owner, at no additional cost to the Owner.

8. Allowances

8.1 Allowances shall include:

- Cost of materials to Contractor.
- Delivery to project site; handling, storage and installation at project site.
- Protection, security, including insurance.
- Contractor's overhead, profit and other costs shall be included in the Contract Sum but not in the allowances

8.2 At contract closeout, monies remaining in any allowance line item will be credited to the Owner by Change Order.

9. Alternates

9.1 Alternates will be exercised and added to the proposed contract sum at the option of the Owner.

9.2 For any or all additive alternates selected or otherwise approved for addition to the contract sum by the Owner, the Contractor shall coordinate all related work and modify the surrounding work as required to complete the work, including changes under each alternate, only if acceptance is designated in the contract.

10. Unit Prices (see UGC 11.2)

The Contractor shall provide unit prices for specific portions of the work identified by the Owner during the pre-bid process. Unit pricing shall include all costs of materials, including, but not limited to shipping, and their related labor cost, including, but not limited to all appropriate burdens and markups.

11. Applications for Payment (see UGC Article 10 and 12.3)

11.1 Such requests shall be presented on (AIA) style G702 & G703 Pay Application forms. The G702 & G703 forms which may be supplemented with columnar

continuation sheets shall separately identify each update to the original contract or GMP amounts.

11.2 The Contractor's project accounting records shall be kept on the basis of generally accepted accounting principles in accordance with cost accounting standards issued by the Federal Office of Management and Budget Cost Accounting Standards Board and organized by each pay request period.

11.3 Prior to the submission of the initial Application for Payment the Contractor shall submit the following documents to the A/E and Owner for review:

11.3.1 Contract Price of GMP Schedule of Values: A single document itemizing the breakdown of the Contract Price/GMP, including general conditions, contingencies and allowances shall be submitted using HCC standard Schedule of Values format. The Contractor shall submit a draft breakdown and such submittal shall be a condition precedent to the processing of the first pay application. The Contractor shall submit subsequent draft copies of the Schedule of Values no later than five (5) working days prior to formal submission of each monthly pay request.

11.3.1.1 The breakdown shall follow the trade divisions of the specifications.

11.3.1.2 No adjustment to the original detailed breakdown of the contract line item shall be made once accepted by the Owner and A/E, unless such adjustment is directed by the Owner in writing.

11.3.1.3 Construction Manager or Design-Builders will be allowed to reallocate among General Conditions line items after consultation with, and agreement from, the Owner. In the event the contractual limits on General Condition's costs are exceeded, the overruns shall be subtracted from the Fee.

11.3.2 The Contractor shall not use subcontractor invoices/pay applications in lieu of a single Schedule of Values from the Contractor.

11.3.3 The breakdown shall anticipate future Change Orders and make provisions for incorporating all changes into the breakdown listing. If issued, Change Orders shall be identified separately and shall itemize the GMP Change Orders, Change Proposals and/or Field Orders, which are incorporated into each Change Order for payment on a line-item basis. Contracts with Guaranteed Maximum Price proposals shall repeat the process outlined in

this section every time a subcontract is added to the monthly Schedule of Values for payment.

11.3.4 Submission and approval of Construction Staging Plans, Parking Plans, Quality Control Plans and Trenching Plans are a prerequisite for starting Work at the site and for receiving the first monthly partial payment.

11.4 At a minimum, the Contractor shall provide attachments to each month's payment request as follows:

11.4.1 Four copies of the monthly Small Bossiness Progress Assessment reports.

11.4.2 Four copies of the updated Submittal Schedule.

11.4.3 Four copies of all invoices required by the contract.

11.4.4 Four copies of the certified wage rate notification form for each member of the workforce not previously submitted.

11.4.5 Four copies of the updated RFI and ASI logs.

11.4.6 Four copies of the updated Work Progress Schedule as specified herein.

11.5 All regular monthly applications for payment shall be submitted to the Owner and A/E for review and approval in draft form no less than five working days prior to the formal submission. The Contractor shall be prepared to review the draft copy at the project site, or at such other location as may be agreed to by the parties. Failure to comply with the requirements outlined in this section shall relieve the Owner from its obligation to make payments on any/all line items until the Contractor meets all requirements.

11.5.1 Payments cannot exceed the contract, work in-place, or subcontract amounts as noted on the Schedule of Values line items.

11.5.2 All as-built drawings shall be up to date and available for review by the A/E and Owner.

11.5.3 When requesting payment for materials stored off site, all such materials shall be specifically identified, including supporting documentation, photos and insurance. The Contractor should be available to escort the Owner to visit and personally verify the stored materials in a physically separated and secure area.

11.6 Request for payments in association with release of, or reduction in retainage, or completion of work have additional requirements outlined in the UGC.

12. Procurement of Subcontracts (Applies to Construction Manager at Risk and Design-Build Contracts Only)

12.1 The Construction Manager at Risk (CM) or Design/Build Contract (DB) shall provide a written Bid/Proposal Package Strategy (B/PPS) for procuring subcontracts including self-performance work (other than General Conditions), prior to the approval of the Guaranteed Maximum Price, but no later than twenty calendar days prior to the first advertisement for subcontractor proposals. The B/PPS shall be a written plan submitted to, and reviewed by the Owner.

12.1.1 The plan shall identify bid packages that are most advantageous to the Project and align with the CM/DB's HCC SB Good Faith Effort by providing at least three qualified respondents (including CM/DB). Each bid package shall include the UGC, Owner's Division 1 Specifications, Drawings and Specifications and any other HCC requirements included in the CM/DB Contract pertaining to the scope of work covered in the packages.

12.1.2 The B/PPS shall include the following for each bid package contemplated:

- Anticipated scope of work to be procured;
- A current Work Progress Schedule;
- Anticipated selection criteria and questions;
- Self-perform work proposals to be submitted by the CM/DB;
- Proposed advertising dates;
- Proposed pre-proposal meeting(s) dates;
- Proposed receipt, review and award dates;
- Anticipated notice to proceed dates.

12.2 The CM/DB shall update the B/PPS monthly at a minimum, as conditions change, or as proposed dates are revised.

12.3 Per the Texas Higher Education Code 51.782: "A Construction Manager at-Risk shall publicly advertise, in the manner prescribed by HCC, and receive bids or proposals from trade contractors or subcontractors for the performance of all major elements of the work other than the minor work that may be included in the general conditions".

12.4 The goal of the Project Team shall be to have all work procured through advertised competitive proposals, however, if a "minor procurement" condition arises during the process, the following procurement guidelines may be used by the CM/DB, with Owner approval, for procurement of work: Less than $5,000.00 No requirements

Between $5,000.01 to $25,000.00 Obtain three solicitations Greater than $25,000.00 Advertised competitive proposals If the CM does not receive at least three competitive proposals on procurements over $5,000.00, the CM shall re-package the scope and reissue the proposal without additional cost to the Owner, or delay to the project "Substantial Completion" date. This solicitation requirement does not pertain to Change Orders to existing subcontracts.

12.5 Work shall be divided into reasonable lots; however, material and labor acquired through purchase order/vendor type contracts are subject to the entire project (i.e. Concrete material shall be procured as a unit price time an estimated total project quantity provided by the CM/DB to equal a total construction cost). Work shall not be incrementally divided for the purpose of circumventing the procurement guidelines of 12.4 above.

12.6 The CM/DB may establish selection criteria for each phase of work for review and approval by the Project Team. Criteria shall be qualifications based and consistent with the information needed by the CM/DB to make a proper evaluation and selection. The CM/DB shall establish a selection matrix including cost, criteria, weighting and ranking procedures for evaluation and work with the Project Team to tailor the selection criteria to be project and scope specific to ensure the questions are proper and relevant to the goals of the project. SB participation/status cannot be used as criteria for determining "best value," only for determining if the respondent is responsive.

12.6.1 The CM/DB shall establish clear criteria and questions so that those reading the Request for Proposals will understand how they will be evaluated.

12.6.2 If criteria are not included in the advertisement for proposals, the proposal shall be considered a lump sum bid, and the CM/DB shall award the work to the lowest qualified, responsive bidder.

12.6.3 After selection criteria have been established, the CM/DB shall publicly advertise the work in general circulations and trade associations in accordance with TEC 51.782 for CM, Article 7 of the current Contract for DB and the Texas Administrative Code 111.14 -"HUB" for both CM and DB. This advertisement shall include, at a minimum, the following:

- HCC Project Number and Project Name;
- Institution/Campus name;
- CM/DB name and address;

- CM/DB contract name and phone number;
- Location for viewing of plans and specifications;
- Date, time and location of Pre-proposal meeting(s);
- Date, time deadlines(s), and location for receiving proposals;
- Instruction to respondents for submitting proposals;
- Selection criteria, questions and submittal requirements.

12.7 At the time and location identified in the advertisement, the CM/DB shall hold a Pre-proposal meeting(s) for all potential subcontractors with the Project Team and Owner present. The CM/DB shall review the following at a minimum:

- The general scope of the project and specific scope of work included in this package;
- Instructions to respondents for submitting proposals;
- Selection criteria and questions;
- HUB Good Faith Effort requirements;
- Project safety requirements;
- Project schedule requirements;
- Payment procedures and requirements, including retainage;
- Commissioning and Close-out requirements.

12.8 If the CM/DB identifies any self-performance in the B/PPS (work to be performed by its own employees), the CM/DB shall submit a proposal to the Owner at least 24 hours before the advertised time and location in a manner so as not to compromise the competitive process.

12.9 The CM/DB shall accept all proposals at the advertised location until the advertised deadline. Upon receipt, the Owner shall be allowed to review the proposal and confirm the time and date received. Any proposals received after the deadline shall not be considered by the CM/DB, and shall be returned to the respondent unopened. Fax proposals shall not be accepted unless the ODR, prior to the initial advertisement for proposals, approves a detailed plan by the CM/DB for proper care and custody.

12.10 After compiling, reviewing and verifying the costs and scope associated with all proposals, the CM/DB shall provide a "bid tabulation" matrix and a proposed Schedule of Values for review by the project team.

12.10.1 The bid tabulation matrix shall compare all equivalent scope proposals to the CM/DB's estimate.

12.10.2 Each matrix shall indicate the CM/DB estimate(s) for each scope of

work and identify the respective cost savings/over-runs.

12.10.3 The CM/DB may use values/quantities from its own estimate to provide full scope comparisons between each respondent, however, these "plug" numbers shall be clearly identified in the matrix to the Project Team and be used only to compare various proposals.

12.10.4 The proposed updated Schedule of Values shall summarize all executed and recommended "best value" subcontracts to provide a current status of the Guaranteed Maximum Price Proposal.

12.10.5 Once the proposals are compiled into a bid tabulation matrix and the proposed Schedule of Values has been updated, the CM/DB shall request a meeting with the Project Team to review the proposals.

12.11 The CM/DB shall lead the proposal review meeting and identify any exclusions or conditions, identify any non-qualifying respondents and any other problems that may have occurred during the process.

12.11.1 The CM/DB shall confirm that the respondents are qualified, meet the established selection criteria, and identify the amount of the proposals.

12.11.2 The CM/DB shall identify the "best values" and the current status of the buyout savings to the project team. If the "best value" causes the CM/DB to exceed the Cost of Work line item, including contingencies in the GMP the CM/DB shall acknowledge that the overage will be deducted from the CM/DB's Construction Phase Fee.

12.12 Once the "best value" respondent has been identified by the CM/DB, without exception by the Owner, the CM/DB shall finalize negotiations with the selected "best value" respondent. If the CM/DB is unsuccessful in its negotiations with the selected respondent, the CM/DB shall notify the ODR that it intends to begin negotiations with the second "best value" and report the cost implications to the Schedule of Values. Once negotiations are successfully completed the CM/DB shall notify the Owner in writing that it intends to write a subcontract to the selected "best value" respondent and identify the bid package number, value of the contract, along with any changes from the bid day value, changes in scope, report the current status of the GMP identifying the current savings/overages and provided a copy of the executed subcontract or purchase order prior to any request for payment by the CM/DB for applicable work.

12.13 The Owner reserves the right to object to the "best value" identified by the CM/DB

and may conduct an evaluation of the selection process. If after evaluation the Owner disagrees with the CM/DB "best value" recommendation, the Owner may instruct the CM/DB to re-bid the scope of work or use the Owner's "best value" selection. If the value of the Owner's selection causes an increase in the Total Contract Price, the increase will be the responsibility of the Owner.

12.14 The process identified in this section shall be repeated for each bid package until the project is entirely bought-out.

13. Contractor Daily Reports

The Contractor shall provide the Owner with a report detailing its daily activities on the Project in a format acceptable to the Owner. All tests performed by the Contractor are to be attached to these daily reports. All work reports required of subcontractors shall be attached to the Contractor's daily report. As a minimum, the report shall include the following information as it relates to the day's activities on site: subcontractors on site, equipment on site, areas of work, type of work performed, materials received, tests performed, any injuries or accidents, any oral instructions received from the Owner or A/E, any material damage, any change in supervisory personnel and anything that might impact the projects quality or schedule. These reports shall be submitted to the Owner on a daily basis. Not receiving these reports in a timely manner may be grounds for the Owner withholding payments until they are submitted.

14. As-Built Drawings and Record Drawings (see UGC 10.3 and 11.4)

14.1 One copy of all record documents shall be kept up to date and available at the Project Site. "As-Built" drawings, specifications, detail manuals, and submittals shall be continuously annotated by the Contractor to reflect actual record field conditions, addenda, issuance of all Change Orders and clarifications, and actual dimensional records for underground and all other services. One copy of all approved submittals and material selections shall also be kept available.

14.2 Maintenance of current documentation by the Contractor is required in order to process pay applications. The Owner and A/E will review the status of such documentation monthly, at a minimum. Also refer to the Commissioning Procedures and Project Close-out Procedures for detailed instructions on As-Built drawings and specifications.

15. Utility Outages

15.1 The Contractor shall notify the Owner, in writing, of any planned utility outages ten business days in advance of the anticipated outage date. The notice shall identify the utility(s) to be shutdown, the anticipated duration of the outage and the subcontractor responsible for initiating and terminating the outage. The Owner has final authority to approve or disapprove of the requested outage date and time.

15.2 A standard form for processing a request for utility shutdown or any other disruption shall be provided by the Owner at the Pre-Construction Conference. The Contractor shall utilize this form, with attachments as necessary, in requesting an outage.

16. Coordination of Space (see UGC section 3.3 and 3.3.6.2 in particular)

16.1 The Contractor and subcontractors should coordinate the use of Project space and sequence of installation of mechanical, electrical, plumbing, HVAC and Communications work which is indicated diagrammatically on the drawings. The Contractor and subcontractors should follow routing shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space. The Contractor and subcontractors should utilize space efficiently to maximize accessibility for other and future installations, maintenance and repairs. Making adjustments due to field conditions is considered a part of the work.

16.2 Within finished areas all pipes, ducts and wiring should be concealed, unless otherwise directed in the plans and specifications. The Contractor and subcontractors should coordinate locations of fixtures and outlets with finish elements.

16.3 The Contractor and subcontractors should verify that mechanical and electrical controls, valves, cut-offs, cleanouts, switches and other items are located in such as manner as to make them readily accessible to the user.

16.4 In no case shall locations of equipment be established by scaling the drawings. In the event exact dimensions are not provided with the drawings either supplemental instructions should be obtained from the A/E, or approval of placement from the Owner, should be obtained prior to final placement.

16.5 All work should be arranged in a neat and orderly manner while maximizing clearances.

16.6 All operating system components which will be approved through the submittal process should be reviewed prior to submittal to confirm there is physically

adequate space to accommodate the device.

17. Repair of Damage (see UGC 3.3.11.3)

The Contractor shall be responsible for any loss or damage caused by Contractor, his workers or his subcontractors, to the Work, materials stored on site, to tools and equipment, to adjacent property and to persons. The Contractor shall make good any loss, damage or injury at Contractor's own expense and take particular care to protect adjacent buildings, utilities, landscape and lawn sprinkler systems.

18. Deliveries

18.1 The Owner will not accept delivery of products and materials bound for the Contractor. The Owner will not be responsible for material losses, or make arrangements to have someone present for acceptance of deliveries.

18.2 The name and address of Owner shall not be used for delivery of materials and equipment.

18.3 The Contractor should make arrangements for deliveries in accordance with construction schedules and in ample time to facilitate inspection prior to installation without causing delay to the project.

19. Protection of Utilities, Etc. (see UGC 3.3.11.3)

The Contractor and all subcontractors and vendors should take precaution to protect and leave intact the streets, site and work previously accomplished, including buildings, streets, utility poles, fire hydrants, utility lines, catch basins and storm drainage systems.

20. Project Management Software

20.1 Attention is directed to the Contract and General Conditions and all Sections within Division 1 – General Requirements, which are hereby made a part of this Section.

20.2 Refer to specification Section 01 31 00, Paragraph 6 – Shop Drawings and Submittals.

20.3 Project Management Communications: The Contractor shall use the Internet web based project management communications tool, e-Builder® ASP software and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.

20.3.1 Project management communications is available through e-Builder® as

provided by "e-Builder®" in the form and manner required by HCC.

20.3.2 The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

20.4 Training: e-Builder® will provide a group training sessions scheduled by HCC, the cost of which is included in the initial users' fee. Users are required to attend the scheduled training sessions they are assigned to. Requests for specific scheduled classes will be on a first come first served basis for available spaces. Companies may also obtain group training from E-Builder at their own expense, please contact e-Builder® for availability and cost.

20.5 Support: e-Builder® will provide on-going support through on-line help files.

20.6 Project Archive: The archive shall be available to each team member at a nominal cost. The archive set will contain only documents that the firm has security access to during construction. All legal rights in any discovery process are retained. Archive material shall be ordered from e-Builder®.

20.7 Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.

20.8 Purpose: The intent of using e-Builder® is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files

20.9 Authorized Users: Access to the web site will be by individuals who are licensed users.

20.9.1 Individuals may use the User Application included in these specifications or may request the User Application.

20.9.2 Submit completed user application forms with check made payable to "e-Builder, Inc.".

20.9.3 Authorized users will be contacted directly by the web site provider, e-Builder®, who will assign the temporary user password.

20.9.4 Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

20.10 Administrative Users: Administrative users have access and control of user licenses and all posted items. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!** Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).

20.11 Communications: The use of fax, email and courier communication for this project is discouraged in favor of using e-Builder® to send messages. Communication functions are as follows:

20.11.1 Document Integrity and Revisions:

a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.

b. The system shall make it easy to identify revised or superseded documents and their predecessors.

c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.

20.11.2 Document Security:

a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!**

20.11.3 Document Integration:

a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.

20.11.4 Reporting:

a. The system shall be capable of generating reports for work in

progress, and logs for each document type. Summary reports generated by the system shall be available for team members.

20.11.5 Notifications and Distribution:

a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.

20.11.6 Required Document Types:

a. RFI, Request for Information.
b. Submittals, including record numbering by drawing and specification section.
c. Transmittals, including record of documents and materials delivered in hard copy.
d. Meeting Minutes.
e. Application for Payments (Draft or Pencil).
f. Review Comments.
g. Daily Field Reports.
h. Construction Photographs.
i. Drawings.
j. Supplemental Sketches.
k. Schedules.
l. Specifications.

20.12 Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the e-Builder® web site by licensed users.

20.12.1 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier shall respond to documents received in electronic form on the web site, and consider them as if received in paper document form.

20.12.2 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier reserves the right to and shall

reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.

20.12.3 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.

20.12.4 The following are some but not all of the paper documents which require original signature:

a. Contract
b. Change Orders
c. Application & Certificates for Payment
d. Construction Change Directives (CCD)
e. Forms and reports in Division 0

20.13 Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:

20.13.1 Providing suitable computer systems for each licensed user at the users normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.

20.13.2 Each of the above referenced computer systems shall have the following minimum system (The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area) and software requirements:

20.13.3 Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)

a. PC system 500 MHz Intel Pentium III or equivalent AMD processor
b. 128 MB Ram
c. Display capable of SVGA (1024 x 768 pixels) 256 colors display
d. 101 key Keyboard
e. Mouse or other pointing device

20.13.4 Operating system and software shall be properly licensed.

a. Internet Explorer or other browser (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
b. Adobe Acrobat Reader (current version is a free distribution for download).
c. Or, users intending to scan and upload to the documents area of e-Builder® should have Adobe Acrobat (current version must be purchased).
d. Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

20.14 Contact the following person at e-Builder® to purchase licenses & Project Archive:

Pam Whitmore
Executive Account Manager
1800 N.W. 69th Avenue, Suite 201
Plantation, FL 33313
(954) 513-3105
pwhitmore@e-builder.net

END OF SECTION 01 31 00

SECTION 01 32 00 - PROJECT PLANNING AND SCHEDULING
(See UGC Article 9)

1 Definitions:

1.1 Project Schedule (a.k.a. Work Progress Schedule) - the schedule developed, monitored Construction phases of the project.

1.2 Project Team - refers to the Owner, Architect/Engineer (A/E), Design Consultants, Users, Contractor and Subcontractors that are contracted and/or specifically assigned to the Project.

1.3 Work Day - refers to a day in which work is planned, excluding weekends and legally recognized state holidays.

1.4 Critical Path - is the sequence of activities that determines the longest duration for the project when the Total Float is equal to, or less than zero.

1.5 Total Float - the number of days an activity on the longest path can be delayed without delaying the Substantial Completion Date. Total float should not be shown as a single activity, but rather the relationship between the early and late finish dates or early and late start dates of each activity.

2 Purpose

2.1 Time is an essential part of this contract. Therefore, the timely and successful completion of the Work requires careful planning and scheduling of all activities inherent in the completion of the project.

2.2 The Contractor shall participate with the Owner and A/E in a project planning workshop promptly upon execution of the contract unless specified differently in the Construction Documents. The Schedule shall be coordinated with the Contract Price Breakdown, or Schedule of Values, and shall include all significant procurement actions (including long lead time delivery items and related approval activities), all work placement activities (including start and completion dates), identification of the timing of overhead inspections, system startup and commissioning activities, pre-final and final inspections, and punch list corrections as a minimum.

2.3 Acceptance of the Project Schedule; or any subsequent update thereof, by the Owner

is for format and extent of detail of the Project Schedule only. Such "acceptance" does not indicate approval of the Contractor's means or methods, or of any change to the contract terms including without limitation any required contract milestones.

2.4 The Project Schedule shall be developed with a certain amount of float time. This float, which shall be no less than ten percent of the total duration of the project, shall be presented in a format which facilitates reporting of progress and trends and can be used to identify risk and opportunities, project upcoming activities and forecast project milestones.

2.5 The Owner must be able to reasonably rely on the Contractor's Project Schedule in order to make accurate commitments to the Project Team, campus administration and other parties as necessary.

3 Contractor Responsibilities

3.1 The Contractor is responsible for planning, managing, coordinating and scheduling all activities from a Notice to Proceed to Final Completion of the project within the time allotted by the contract.

3.2 The Contractor is responsible for keeping the Owner and Project Team fully informed of schedule status and upcoming activities throughout the project.

3.3 The Contractor's Pre-Construction and Construction project management personnel shall actively participate in the planning and development of the Project Schedule and shall be prepared to review such development and progress with the Owner, A/E and any other members of the Project Team so the planned sequences and procedures are clearly understood by all parties.

3.4 The Contractor is to plan for appropriate activity durations to allow for thorough review, procurement, submittal, installation, inspection, testing and commissioning of all work in order to confirm compliance with the project plans and specifications.

4 Schedule Development Requirements

4.1 Appropriate logic relationships must be in place and complete, while the Project Schedule shall be free of any mandatory and/or late finish constraints, except for the Substantial Completion Date.

4.2 The estimated activity duration of an activity shall be expressed in work days only.

4.3 During Pre-Construction Services, the Project Team will establish the maximum duration for every activity included in the schedule.

4.4 The Project Schedule should be coordinated with the Contractor's Submittal Schedule and Schedule of Values.

5 Planning and Scheduling Workshop

5.1 Within fifteen calendar days after the Notice of Proceed is issued the Contractor will conduct a Planning and Scheduling Workshop with the Contractor's Project Manager, Superintendent, the Owner, A/E, User Representative and any available subcontractors prior to submitting the initial Project Schedule to the Owner.

5.2 Two separate Planning and Scheduling Workshops should be held with the aforementioned parties prior to the Contractor submitting the baseline Preconstruction Project Schedule.

5.3 The baseline schedule shall be submitted within 10 work days after the Planning and Scheduling Workshops are complete.

6 Construction Phase Baseline Schedule Submittal

6.1 The Baseline Project Schedule shall be submitted to the Owner with the required Total Float and a current data date (within five days of the date of submission). The Baseline Schedule will be updated within ten days of the date when each subcontractor is procured and brought on to the project.

6.2 Once the full scope of the Project has been approved (i.e. the last stage GMP Change Order has been executed), the Project Manager shall coordinate with the Owner to reset the Baseline Project Schedule.

6.3 The Owner reserves the right to withhold any and all payments related to the Project Schedule and/or General Conditions if a Baseline Project Schedule is not submitted, or is not acceptable to the Owner.

6.4 The Project Schedule shall be presented in a graphic time-scaled view including all activities, early start and finish dates, estimated durations and total float, sorted by early start.

7 Updating the Project Schedule

7.1 Once the Baseline Project Schedule has been accepted, the Project Manager shall update the Project Schedule on at least a monthly basis and submit the updated Project Schedule with the draft application for payment.

7.2 Project Schedule updates shall be based on actual work progress, current logic and remaining durations.

7.3 Total Float is intended to be used proportionally with the duration of the project; therefore, there should be no remaining Total Float at the actual Substantial Completion Date.

8 Excusable Delays and Time Extensions

8.1 Excusable delays shall be administered per the UGC.

8.2 If an excusable delay extends the Contract Substantial Completion Date, the ODR may extend the contract time by the number of excusable calendar days lost on the Project Schedule, or take other actions as appropriate under the terms of the contract.

8.2.1 Any Change Order Proposal that the Contractor claims, or will claim, justifies an extension of contract time must contain the information necessary to justify the time extension.

8.2.2 Change Order Proposals that do not affect the Critical Path for the Project and delay the Substantial Completion Date, or does not include a request for additional time prior to approval by the ODR, shall not be due a time extension.

8.3 Once the ODR accepts a time extension, and authorizes the Contractor to proceed with the contract change, the proposed revision shall be incorporated in the Project Schedule.

END OF SECTION 01 32 00

SECTION 01 32 20 - PHOTOGRAPHIC DOCUMENTATION

1 Photographic Media

1.1 Digital Images: Provide images in uncompressed TIFF format produced with a minimum 4.0 mega pixels and image resolution of not less than 1024 by 768 pixels.

1.2 Video Format: Provide DVD+R video discs.

2 Construction Photographs

2.1 Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photos with blurry or out-of-focus areas will not be accepted.

2.2 Maintain key plan with each set of construction photos that identifies each photo location.

2.3 Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

2.4 Date and Time: Include date and time filename for each image.

2.5 Preconstruction Photos: Before commencement of work on the project take digital photos of the project site and surrounding properties, including existing items to remain during construction, for different vantage points.

2.6 Take photos to show existing conditions adjacent to the project site.

3 Construction Videos

3.1 Preconstruction DVD's: Before starting construction on the project site prepare a video recording of the site and surrounding properties from different vantage points. Show existing conditions of the site and adjacent buildings. Show protection efforts by Contractor including, but not limited to, tree protection and storm water controls.

END OF SECTION 01 32 20

SECTION 01 35 20 - LEED REQUIREMENTS (IF LEED PROJECT)

1 Definitions

1.1 LEED - Leadership in Energy and Environmental Design.

2 Submittals

2.1 The Contractor shall provide preliminary submittals of its LEED Action Plan, indicating how the Owner's requirements will be met, within thirty days after the Start date established by the Notice to Proceed. Submit additional LEED submittals required by other specification sections.

3 Quality Assurance

3.1 LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

END OF SECTION

SECTION 01 35 23 – PROJECT SAFETY REQUIREMENTS
(see UGC Article 7)

1 Purpose

1.1 The Contractor shall bear overall responsibility for all aspects of safety at the project.

1.2 The Contractor shall, at all times, provide adequate resources, equipment, training and documentation to:

1.2.1 Assure compliance with all applicable regulatory and contract requirements.

1.2.2 Assure a safe work environment at the Project.

1.2.3 Instill a culture for safe behavior in all supervisors and workers.

1.2.4 Ensure a universal understanding that safety and health issues take precedence over all other considerations at the Project.

1.3 The Contractor and every subcontractor shall comply with the requirements of this section and all Federal, State, and local statures, standards, and regulations. In any circumstance where this Section differs from, or is in conflict with any statutory requirement, the more stringent shall apply.

1.4 The Owner reserves the right to have any manager, supervisor or worker removed from the project for disregarding the Project's safety requirements.

1.5 The Owner reserves the right to deduct from the contract any safety related expenses that the Owner incurs as a result of the Contractor's, or any subcontractor's, failure to comply with the requirements of this Section.

1.6 The Owner will deny requests for time extensions and/or monetary considerations whenever the Owner intercedes on behalf of safety compliance as a result of Contractor failure to act as required by the contract.

2 Contractor's Project Safety Coordinator (PSC)

2.1 The Contractor shall provide a Project Safety Coordinator, who shall be responsible for safety training, inspections, investigations, record keeping, reporting, incident response, and claims management, and shall serve as the technical advisor to the Contractor's Project staff for all safety issues.

2.2 If the contract value is less than $3,000,000 the Contractor's project superintendent

may perform these duties. If the contract value exceeds $3,000,000 the Contractor shall furnish a construction safety specialist.

3 Subcontractors' Project Safety Representative (PSR)

3.1 Every subcontractor shall identify one employee to be its Project Safety Representative who will be on-site during all the subcontractor's activities and will participate in all training activities, audits, etc. related to the safety program.

3.2 The PSR shall attend all safety meetings while the company is actively performing work at the project and shall be responsible for reporting all incidents to the PSC.

3.3 The PSR shall transport or accompany any injured co-worker that requires medical attention at facilities outside the project.

3.4 The PSR shall be responsible for either conducting or making arrangements for all training, equipment and materials that workers need to perform their duties in the safest possible manner.

4 Project Safety Program

4.1 The Contractor shall develop a written, site specific, safety program. It shall be printed in English and an initial draft shall be submitted to the Owner for review and comment as a prerequisite to issuance of the Notice to Proceed with construction services'

4.2 The Contractor shall incorporate Owner comments into a final draft which shall be resubmitted to the Owner for concurrence.

5 Personal Protective Equipment (PPE)

5.1 PPE shall be required for all workers in construction areas. The followings items shall be furnished, inspected, and maintained by the employer. The Contractor shall maintain an adequate inventory to furnish these items for five Owner representatives who may visit the project from time to time:

5.1.1 Hard Hats (safety helmets): shall be ANSI stamped (Z89.1-1997, Type I, Class E, G and C and be worn at all times while in the construction areas.

5.1.2 Eye protection (safety glasses): shall be ANSI stamped Z87. If a worker wears prescription glasses (plastic lenses only) that are marked Z87, the employer shall furnish goggles or safety glasses that are designed to fit

over another pair of glasses and be worn at all times while in the construction areas.

5.1.3 Vests shall be at a minimum a Class II reflective traffic vests and be worn at all times while in the construction areas.

5.1.4 Hand protection, Hearing Protection, Respiratory Protection, Fall Arrest Equipment, Other PPE: shall all be furnished as required to comply with OSHA Standards.

6 Medical Equipment

6.1 The Contractor shall maintain at least one first aid kit on the project site at all times per ANSI Z308.1.

7 Certifications

7.1 Supervisors, Competent Persons, Equipment and Crane Operators, and Emergency Responders shall all be identified in lists submitted by employers to the PSC prior to commencement of work. In addition to lists, the employers shall include copies of all available training certificates or formal documentation to support the declared positions. For all operations that require a "competent person" (per OSHA definition), the PSC shall maintain a project file containing the transmittals from each employer naming each person declared to be competent for each operation. For operations requiring independent certification, a copy of the certificates shall be attached.

8 Project Safety Signs and Posters

8.1 The Contractor shall post safety regulation signs at every point of entry to the project in English and Spanish. The content of the sign should at a minimum indicate that visitors are required to check in at the project office, persons entering the construction area must be appropriately attired, no weapons, tobacco, alcohol, controlled substances and related paraphernalia may be brought onto the premises, a posted speed limit will be identified and copies of the MSDS sheets are available at the project office.

8.2 The Contractor shall post emergency contacts and notification, including phone numbers, notification of insurance carrier for Worker's Compensation Coverage and any and all other required State and Federal postings.

9 Project Safety Training and Meetings

9.1 Within fifteen days of the issuance of the Notice to Proceed the Contractor shall hold the initial safety meeting and all Project Team members are strongly encouraged to participate.

9.2 The PSC shall present orientation training to every person who is to be allowed into the construction area without an escort. A translator shall be present when there are workers in attendance who do not speak English.

9.3 The PSC shall maintain a site safety orientation log signed by all persons receiving safety training.

9.4 Project safety meetings will be held on a weekly basis and will be chaired by the PSC and attended by all companies' PSRs who are currently on site. The topics of discussion should focus on safety and loss control issues.

9.5 "Tool Box Talks" shall be conducted on a weekly basis by each PSR and will cover safety issues related to upcoming work, current site conditions and review of any recent incidents.

9.6 Special task training should occur when new equipment or non-routine activities are scheduled.

10 Safety Inspections

10.1 Daily – The PSC shall observe work operations in all areas of the project and note any violations in the daily progress reports.

10.2 Weekly – A comprehensive safety inspection shall be conducted by the PSC and each PSR for their respective work areas. A written record of the observations and recommended corrections should be made and placed in the project files.

10.3 Quarterly – The PSC shall facilitate an inspection which shall include, but not be limited to the following: fall arrest equipment, fire extinguishers, rigging, ladders, hand tools, power tools, cords, welding leads, hoses, alarms, respirators, ground fault circuit interrupters, first aid stations, eye wash stations, and emergency rescue equipment.

10.4 Semi-Annually – The PSC shall facilitate an inspection of all hoists, cranes, mobile equipment, motorized lift platforms, stages, generators and compressors to

assure proper operational condition.

10.5 The PSC shall notify the Owner within one hour of the arrival at the project site by any representative of a regulatory agency and provide the Owner with a copy of any published findings or citations issued to any employer and shall ensure that statutory posting requirements are met.

11 Records and Reports

11.1 The PSC shall prepare a written report for each incident that involves any injury that may not be resolved by first aid response and/or each incident that involves damage to property or equipment. The report should contain a list of factual details that created the incident, the responsive actions that occurred during and immediately following the incident and recommendations for modifications to prevent repetition of the incident. A copy of the report should be submitted to the Owner within 24 hours of the incident.

12 Construction Operations

12.1 Cranes:

12.1.1 Tower cranes and related power supply equipment shall be surrounded by at least an eight foot high, 5/8" plywood enclosure with lock controlled entrance.

12.1.2 Operators of cranes, derricks and/or hoisting equipment shall possess certification from a nationally accredited training organization.

12.2 Demolition:

12.2.1 Safe egress paths and barrier isolation of impacted areas shall be monitored and maintained to prevent entry by other trades and members of the public. This includes removal of materials and trash from elevated locations.

12.3 Electrical Power:

12.3.1 Ground fault circuit interruption (GFCI) shall be the primary protection from exposure to electrical current for all workers on the project. Only exit lighting and medium-high (greater than 240) voltage service will not be GFCI protected.

12.3.2 All strings of temporary lights shall be fully lamped and guarded regardless of height, and shall be continuously maintained. Adequate levels of

illumination for the work operations must be maintained at all times.

12.3.3 All receptacles and switches shall have trim plates installed before they are energized.

12.3.4 All power distribution panels shall have full covers installed before primary power is brought into the panel.

12.4 Excavations:

12.4.1 Prior to starting, each excavation shall be reviewed with the Owner to obtain any historical knowledge about existing utilities in the area. Where applicable, "utility locates" will be called for seventy two hours in advance of commencement of the excavation. Potholing and/or hand excavation shall be required within two horizontal feet of located centerlines and in areas where knowledge is lacking.

12.4.2 When a trench excavations cannot be backfilled in the same day as it is created, a highly visible barricade shall be erected no less than six feet from all approachable edges. All portable means of access shall be removed at the end of each workday.

12.4.3 Earth ramps that are to be used for walking access shall not exceed twenty percent in grade slope. Steeper slopes shall be gated and used for equipment only.

12.5 Fall Protection and Prevention:

12.5.1 Any walking/working surface shall be defined to have a fall exposure that has one or more sides, ends or edges without a guardrail system attached or a solid continuous wall of at least forty-two inches in height above the walking/working surface, and within twelve horizontal inches from the edge. The Contractor shall require engineered or conventional fall protection measures for each and every fall exposure that involves vertical distances equal to or greater than six feet. The recognized exemptions/exceptions are as follows:

- Portable step ladders.
- Extension and straight ladders.
- Erection and dismantling of scaffolding.
- Limited exposure for engaging and disengaging a hook.

- Vertical fall exposure protected by a warning line and six foot setback.

12.5.2 Provide covers over holes which are secured and clearly marked as covers.

12.5.3 Job built ramps and bridges must be covered with non-skid materials.

12.5.4 Materials, scraps, waste and tools shall never be allowed to free-fall from a height greater than twenty feet, unless it is contained within a chute or controlled by a hoist.

12.6 Fire Protection

12.6.1 The Contractor shall review fire prevention needs and procedures with the Owner and shall post appropriate information and warnings.

12.6.2 The Contractor shall maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways and other access routes.

12.6.3 The Contractor shall provide supervision of welding operations, combustion type temporary heating units and similar sources of ignition.

12.6.4 All floors that have combustible materials present shall be accessible from ground level by a usable stair system. For structures greater than three stories in height shall have a fire sprinkler stand pipe installed and it shall be charged to within two stories (or thirty vertical feet) of all floors containing combustible materials. A Siamese connection shall be installed at every second level to provide access for fire hoses.

12.6.5 All fire extinguishers that are not task-specific shall be adequate in number and description to comply with OSHA declared limits for egress points, floor area and travel distances. They shall be situated in highly visible locations.

12.6.6 All fire extinguisher that are task specific shall be inspected and furnished in advance by the employer that will be conducting the work that requires such fire fighting provisions. Such extinguishers shall be located with twenty-five feet from the perimeter of the task operation.

12.7 Housekeeping - The Contractor shall ensure that all subcontractors effectively clean the project site continuously throughout each workday. Effective cleanup shall address all of the following housekeeping issues:

12.7.1 All construction waste, trash, and debris shall be placed in designated receptacles. No glass bottles will be permitted on the project site.

12.7.2 Stack all whole and scrap materials in locations that do not obstruct a clear

pathway nor create a risk of toppling causing injury or damage to the work.

12.7.3 Place all hoses, cords, cables and wires in locations that prevent them from being damaged by tires, sharp edges, or pinch points and from creating trip or hook hazards.

12.7.4 Secure and effectively cover all materials on roofs and elevated levels to prevent displacement by wind.

12.7.5 All materials and equipment shall be protected from the elements while staged on the project site.

12.7.6 All signs, barricades, fire extinguishers, guardrails, gates, etc. are to be restored to their proper locations in sound condition after they have been moved for work purposes.

12.7.7 Properly store and secure all flammable and combustible liquids and gases.

12.7.8 Collect and place all cut-off or waste pieces of rolling stock into waste and scrape containers as they are created.

12.7.9 Live rounds ejected from powder-actuated tools shall be immediately placed in designated containers and periodically returned to the tool dealer or law enforcement agency for proper disposal.

12.7.10 All puncture and impalement exposures shall be covered or eliminated as soon as they are created.

12.8 Ladders:

12.8.1 Portable aluminum ladders are prohibited.

12.8.2 Extension, straight and job built ladders shall be secured from movement at the top and bottom.

12.8.3 Manufactured portable ladders shall display ANSI heavy duty rating (Class 1-A) and be inspected daily.

12.9 Medical Assistance and Screening:

12.9.1 The PSC shall maintain a First Aid Log for all treatment administered on the project.

12.9.2 Drug and alcohol screening shall be mandatory for every supervisor and/or worker who sustains or contributes to the cause of any injury (beyond first aid) or property damage incident.

12.9.3 Minimum requirements for chemical screening shall at least match the threshold limits for a NIDA 5-panel protocol and for alcohol screening shall at least match the Texas DOT vehicle operator's limit for blood alcohol content.

12.9.4 Any supervisor or worker who tests positive shall be ejected and excluded from return to work at the project. Successful completion of an acceptable rehabilitation program may be considered by the Owner for restoring a person's ability to return to the project. The final decision rest solely with the Owner.

12.10 Petroleum Fuel Operated Equipment:

12.10.1 Where possible, equipment operator cabs shall be locked during non-working hours. Only equipment operators and direct supervisors shall have access to keys.

12.10.2 Any combustion engine equipment with less than ninety-eight percent clean air exhaust shall not be operated in enclosed spaces unless the exhaust is piped to outside air, and fresh air is brought into the space to replace the amount being consumed. This includes generators/welders and compressors as well as mobile equipment.

12.10.3 For hose and termination fittings on air compressors, whip checks shall be used at all connection points. Emergency shut off valves shall be installed on every discharge fitting of all air compressors.

12.11 Public Protection - The public boundary perimeter shall be secured from public intrusion. Attractive nuisance items such as tower cranes, tall ladders, fire escapes, large excavations, etc. shall require additional and separate security measures.

12.12 Project Service Water:

12.12.1 Potable water: Comply with city health requirements.

12.12.2 Non-potable water: Water storage containers, hose bibs and faucet shall be posted in English and Spanish "Danger – Do Not Drink"

12.13 Welding and Burning:

12.13.1 Oxygen and fuel gas cylinders shall not be stored together, including on bottle carts. At the end of any workday bottles must be moved to OSHA

prescribed storage arrangements.

12.13.2 Anti-flashback arrestors shall be installed at the pressure regulator gauges of all Oxy-Acetylene cutting rigs.

12.13.3 Welding operations shall not be allowed to present an opportunity for flash burn exposures to the eyes of any workers in the vicinity. All welding operations shall provide appropriate screening measures, erected in advance to contain the high energy light.

END OF SECTION 01 35 23

SECTION 01 41 00 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

a. Provisions established within the General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

1.2 SECTION INCLUDES:

a. Owner provided testing laboratory services.
b. Selection and payment.
c. Laboratory responsibilities.
d. Laboratory reports.
e. Limits on testing laboratory authority.
f. Contractor responsibilities.
g. Schedule of inspections and tests.

1.3 REFERENCES:

a. ASTM C29 - Unit Weight and Voids in Aggregate.
b. ASTM C31 - Making and Curing Concrete Test Specimens in the Field.
c. ASTM C39 - Compressive Strength of Cylindrical Concrete Specimens.
d. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars.
e. ASTM C127 - Specific Gravity and Absorption of Course Aggregate.
f. ASTM C128 - Specific Gravity and Absorption of Fine Aggregate.
g. ASTM C136 - Sieve Analysis of Fine and Course Aggregate.
h. ASTM C138 - Unit Weight, Yield, and Air Content of Concrete.
i. ASTM C231 - Air Content of Freshly Mixed Concrete by the Pressure Method.
j. ASTM C143 - Slump of Portland Cement Concrete.
k. ASTM C172 - Sampling Freshly Mixed Concrete
l. ASTM C496 - Splitting Tensile Strength of Cylindrical Concrete Specimens.

m. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
n. ASTM C1019 - Sampling and Testing Grout.
o. ASTM D698 - Moisture Density Relations of Soils and Soil Aggregate Mixture Using 5.5 lb. Rammer and 12" Drop.
p. ASTM D2167 - Density and Unit Weight of Soil in Place by Rubber Balloon Method.
q. ASTM D2922 - Density of Soil and Soil Aggregate in Place by Nuclear Methods.
r. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
s. ANSI/ASTM E329 - Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
t. AWS - American Welding Society, Document D1.1 and D1.3, Structural Welding Codes.
u. ACI - American Concrete Institute, Document 315 (Details and Detailing of Concrete Reinforcement) and 347 (Recommended Practice for Concrete Formwork).

1.4 SELECTION AND PAYMENT

a. Owner will employ services of an independent testing laboratory to perform specified inspection and testing.

b. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents. Contractor will pay all testing required by local authorities having jurisdiction.

1.5 QUALITY ASSURANCE

a. Laboratory shall comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740.
b. Laboratory shall maintain a full-time registered Engineer on staff to review services.
c. Laboratory authorized to operate in State in which Project is located.

d. Testing equipment shall be calibrated once each year with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

1.6 LABORATORY RESPONSIBILITIES

a. Test samples of mixes submitted by Contractor.
b. Provide qualified personnel at site. Cooperate with Contractor and Architect in performance of services.
c. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
d. Ascertain compliance of materials and mixes with requirements of Contract Documents.
e. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
f. Perform additional inspections and tests required by Architect.
g. Attend preconstruction conference.

1.7 LABORATORY REPORTS

a. After each inspection and test, promptly submit two copies of laboratory report to Architect and one to the applicable consultant and to Contractor. Include: Date issued, Project title and number, name of inspector, date and time of sampling or inspection, identification of product and Specifications section, location in the Project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents.

b. When requested by Architect/Engineer, provide interpretation of test results.

1.8 LIMITS ON TESTING LABORATORY AUTHORITY

a. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

b. Laboratory may not approve or accept any portion of the Work.

c. Laboratory may not assume any duties of Contractor.

d. Laboratory has no authority to stop Work.

1.9 CONTRACTOR RESPONSIBILITIES

a. Deliver to laboratory at designated location adequate samples of materials proposed to be used which require testing, together with proposed mix designs.

b. Cooperate with laboratory personnel, and provide access to Work and to manufacturer's facilities.

c. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.

d. Notify laboratory of material sources and furnish necessary quantities of representative samples of materials proposed for use which are required to be tested.

e. Notify Architect and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

f. Advise laboratory in a timely fashion to complete required inspection and testing prior to subsequent work being performed.

g. Pay for all subsequent re-testing of products or systems found to be defective or otherwise not in accordance with specification requirements. Remove rejected products and replace with products of specified quality.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EARTHWORK

a. Make necessary soil tests (Atterberg Limit Series and ASTM D698 Standard Proctor) to determine moisture content and density of existing subgrade.

b. Perform necessary soil tests (Atterberg Limit Series and ASTM D698 Standard Proctor for each type of fill specified) to determine the moisture content of existing subgrade and to inspect and test the placement of additional fill lifts to verify that all fill materials used are in accordance with the specifications for that use.

c. Perform one field density test (ASTM D2922) per 1,000 S.F. of site area in the area affected on each lift prior to placement of additional fill material.

3.2 BUILDING SUBGRADE STABILIZATION

a. Make necessary soil tests (Atterberg Limit Series and ASTM D698 Standard Proctor for each type of fill specified) to determine the moisture content and density of existing subgrade and inspect and test the placement of additional fill lifts to verify that all fill materials used are in accordance with the specifications for that use. Perform one field density test (ASTM D2922) for each 5,000 S.F. of area within the construction footprint on each lift prior to placement of additional fill material.

3.3 FORMWORK, REINFORCING STEEL AND INSERTS

a. Prior to each concrete placement, inspect formwork for tightness of joints, proper shoring and bracing, and location of rustications, in accordance with ACI 347.

b. Prior to each concrete placement, inspect fabrication and bending of bars, bar sizes, spacing, placement and tying in accordance with ACI 315.

c. Prior to each concrete placement, inspect positioning of steel inserts and assemblies, sizes, and spacing.

3.4 CAST-IN-PLACE CONCRETE

a. Design Mixes:

1) All concrete mixtures to be reviewed by the testing laboratory.
2) At the beginning of the work, Contractor shall submit proposed concrete mixes for review by the Architect and testing laboratory, including the sieve analysis of fine and coarse aggregate ASTM C-136, dry rodded weight of coarse aggregate - ASTM C-29, and the specific gravity (bulk saturated surface dry), of fine and coarse aggregates ASTM C127 and C128. Laboratory will review and make mix modification recommendations.
3) Do not mix concrete for placing in the work until after laboratory reports reflect that each proposed mix will develop the strength required.

b. Test Cylinders: Make at least one (1) test of each day's pouring or each fifty (50) cu. yards, whichever comes first, on each different portion or section of the work. Mold and cure specimens in accordance with ASTM C31, and test in accordance with ASTM C39. Test cylinders shall be made and tested by the laboratory in accordance with ASTM C 172. Footings, walls, and floor systems constitute different sections. Each test shall consist of five (5) specimens, two (2) of which

shall be broken at seven (7) days, two (2) at twenty-eight (28) days and one held in reserve. Determine temperature and air content for each set of test cylinders in accordance with ASTM C231.

3.5 Field Quality Control:

1) Determine slump for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C143.
2) Monitor addition of water to concrete and length of time concrete is allowed to remain in truck.
3) Certify delivery tickets indicating class of concrete, amount of water added during initial batching, and time initial batching occurred.
4) Monitor work being performed in accordance with ACI (American Concrete Institute) recommendations as a standard of quality.

b. Source Quality Control: Periodically inspect and control concrete mixing and loading of transit mix trucks at batch plant at intervals as agreed to by Architect and laboratory personnel.

3.6 STRUCTURAL STEEL

a. Fabrication of, erection of, and connections between, structural steel members, including welding and tension in high strength bolts, will be accomplished under and subject to the inspection and approval of an independent testing agency. The structural steel fabricator and erector shall afford full cooperation to the laboratory.

b. Perform the following testing and inspection:

1) Check temporary bracing of steel frame.
2) Check location of condition of anchor bolts.
3) Check plumbness and tolerance of steel frame.
4) Visually inspect common bolts.
5) Inspection of high-strength bolting
   a) Visually inspect connections.
   b) Check tightness of at least 33% of connections.
   c) Check at least two bolts of each girder to column connection.
6) Visually inspect field and shop welds.
7) Ultrasonic or X-ray testing of full penetration welds.
8) Re-inspect corrective measures required at expense of Contractor.
9) Verify that no members are damaged.
10) Certify that materials and installation are according to Contract Documents and industry standards.

c. Gas Cutting: Do not use gas cutting torches for correcting fabrication errors in the structural framing. Cutting will be permitted only on secondary members as acceptable to the Structural Engineer. Finish gas-cut sections equal to a sheared appearance when gas finish cutting is permitted. Do not flame cut holes or enlarge holes by burning.

d. Correction: The fabricator or erector shall correct deficiencies in structural steel work which inspection and test reports have indicated to be not in compliance with the specified requirements. Perform all additional tests required to reconfirm non-compliance of the original work and to show compliance of corrected work.

e. All welders employed during erection of structural steel must be certified for type of base materials and positions encountered. Certification testing to be performed at Contractor's expense.

3.7 MORTAR AND GROUT

a. Submit materials proposed for use and intended proportioning to testing laboratory for test batching of mortar and grout.

b. Test cubes will be made to verify compliance with specification requirements. During first day's masonry work, test mortar cubes (3 total) will be made by testing laboratory, with one each broken at 7 and 28 days, and the 4th held in reserve. Testing laboratory will perform mortar cube testing as masonry work continues on the project, with a minimum of two sets of test cubes each week, or corresponding to each 2000 S.F. of wall surface laid, whichever occurs first.

c. Perform mortar sampling and testing in accordance with ASTM C109 and ASTM C780 and grout sampling and testing per ASTM C1019.

END OF SECTION 01 41 00

SECTION 01 42 00 - REFERENCE STANDARDS

1 Governing Regulations/Authorities

1.1 The Architect/Engineer (A/E) has contacted the appropriate authorities having jurisdiction for the listed regulations and codes to obtain information for preparation of the Construction Documents. The Contractor may contact the authorities having jurisdiction directly for information and decisions having bearing on the work. **Refer to the coversheet of the plans issued for construction to identify the appropriate authorities having jurisdiction.**

2 Standards

2.1 Reference to standards, codes, Specifications, recommendations and regulations refer to the latest edition or printing prior to the date of issue of the Construction Documents.

2.2 Applicable portions of standards listed that are not in conflict with the Construction Documents are hereby made a part of the Specifications

2.3 Modifications or exceptions to Standards shall be considered as amendments and unmodified portions shall remain in full effect. In cases of discrepancies between standards, the more stringent requirements shall govern.

2.4 Copies of Standards: Each entity engaged in construction of the Project is required to be familiar with industry standards applicable to its respective construction activity. Copies of applicable standards are not bound with the Construction Documents. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

3 Schedule of Standards

AA Aluminum Association
1525 Wilson Blvd. Suite 600
Arlington, VA 22209
703.358.2960
Fax 703.358.2961
www.aluminum.org

AABC Associated Air Balance Council
1518 K St. NW
Washington, DC 20005
202.737.0202
www.aabchq.com

AAMA American Architectural Manufacturers Assoc.
1827 Walden Office Square, Suite 550
Schaumburg, IL 60173-4268
847.303.5664
Fax 847.303.5774
www.aamanet.org

AAN American Association of Nurserymen
1250 Eye St., NW, Suite 500
Washington, DC 20005
202.789.2900

ANLA American Nursery and Landscape Association
1000 Vermont Ave., NW, Suite 300
Washington, DC 20005-4914
202.789.2900
www.anla.org

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol St., Suite 225
Washington, DC 20001
202.624.5800
www.transporation.org

ACI American Concrete Institute
38800 Country Club Dr.
Farmington Hills, MI 48331
248.848.3700

Fax 248.848.3701
www.aci-int.org

ACIL American Council on Independent Laboratories
1629 K St. NW
Washington, DC 20006
202.887.5872
www.acil.org

ACPA American Concrete Pipe Association
1303 West Walnut Hill Lane, Suite 305
Irving, TX 75038-3008
972.506.7216
Fax 972.506.7682
www.concrete-pipe.org

ADC Air Diffusion Council
1901 N. Roselle Rd., Suite 800
Schaumburg, IL 60195
847.706.6750
Fax 847.706.6751
www.flexibleduct.org

AF&PA American Forest & Paper Products
(Formerly National Forest Products Assoc. (NFPA))
1111 Nineteenth St., NW, Suite 800
Washington, DC 20036
800.878.8878
Fax 202.463.2700
www.afandpa.org

AI Asphalt Institute
2696 Research Park Dr.
Lexington, KY 40512-4052
606.288.4960

http://wwwashpaltinstitute.org

AIA American Institute of Architects
1735 New York Ave. NW
Washington, DC 20006
202.626.7300
www.aia.org

AIHA American Industrial Hygiene Assoc.
P 2700 Prosperity Ave., Suite 250
Fairfax, VA 22031
703.849-888
www.aiha.org

AISC American Institute of Steel Construction
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001
312.670.2400
www.aisc.org

AISI American Iron and Steel Institute
1140 Connecticut Ave., NW, Suite 705
Washington, DC 20036
202.452.7100
www.steel.org

AITC American Institute of Timber Construction
7012 S. Revere Parkway, Suite 140
Centennial, CO 80112
303.792.9559
303.792.0669
www.aitc-glulam.org

ALI Associated Laboratories, Inc.
500 S. Vermont St.

Palatine, IL 60067
800.685.0026
www.associatedlabs.org

ALSC American Lumber Standards Committee
P.O. Box 210
Germantown, MD 20875
301.972.1700
www.alsc.org

AMCA Air Movement and Control Assoc.
30 W. University Dr.
Arlington Heights, IL 60004-1893
847.394.0150
www.amca.org

ANSI American National Standards Institute
1819 L St., NW, 6th Fl.
Washington, DC 20036
202.293.8020
Fax 202.293.9287
www.ansi.org

APA American Plywood Assoc.
7011 S. 19th
Tacoma, WA 98466
253.565.6600
Fax 253.565.7265
www.apawood.org

ARI Air Conditioning and Refrigeration Institute
4100 North Fairfax Dr., Suite 200
Arlington, VA 22203
703.524.8800
Fax 703.528.3816

www.ari.org

ARMA Asphalt Roofing Manufacturers Assoc.
Public Information Dept.
1156 15th St., NW, Suite 900
Washington, DC 20005
202.207.0917
Fax 202.223.9741
www.asphaltroofing.org

ASA Acoustical Society of America
2 Huntington Quadrangle, Suite 1N01
Melville, NY 11747-44502
516.576.2360
Fax 516.576.2377
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Date 3/02/09
www.asaa.aip.org

ASC Adhesive and Sealant Council
7979 Old Georgetown Rd. Suite 500
Bethesda, MA 20814
301.986.9700
Fax 301.986.9795
www.ascouncil.org

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, GA 30329
404.636.8400
Fax 404.321.5478
www.ashrae.org

ASME American Society of Mechanical Engineers
Three Park Ave.

New York, NY 10016-5990
800.843.2763
www.asme.org

ASPE American Society of Plumbing Engineers
8614 Catalpa Ave., Suite 1007
Chicago, IL 60656-1116
773.693.2773
Fax 773.695.9007
www.aspe.org

ASSE American Society of Sanitary Engineers
901 Canterbury, Suite A
Westlake, OH 44145
440.835.3040
Fax 440.835.3488
www.asse-plumbing.org

ASTM American Society for Testing and Materials
100 Barr Harbor Dr.
West Conshohocken, PA 19428-2959
610.832.9500
Fax 610.832.9555

AWCMA American Window Covering Manufacturers Assoc.
355 Lexington, AVE, 17th Fl.
New York, NY 10017
212.297.2122
Fax 212.370.9047
www.wcmanet.org

AWI Architectural Woodwork Institute
46179 Westlake Dr., Suite 120
Potomac Falls, VA 20165
571.323.3636

Fax 571.323.3630
www.awinet.org

AWPA American Wood-Preservers' Assoc.
P.O. Box 361784
Birmingham, AL 35236-1784
205.733.4077
www.awpa.com

AWPB American Wood Preservers Bureau
4 D. Washington, St
Newnan, GA 30263
404.254.9877

AWS American Welding Society
50 N.W. LeJeune Rd.
Miami, FL 33126
800.443.9353
Fax 305.443.9353
www.aws.org

BHMA Builder's Hardware Manufacturers Assoc.
355 Lexington Ave., 15th Fl.
New York, NY 10017
212.297.2122
Fax 212.370.9047
www.buildershardware.com

BIA The Brick Industry Association
1850 Centennial Park Dr., Suite 301
Reston, VA 20191
703.620.0010
Fax 703.620.3928
www.bia.org

BIFMA Business and Institutional Furniture Manufacturers Assoc.
2680 Horizon, Dr., SE, Suite A-1
Grand Rapids, MI 49546-7500
616.285.3963
Fax 616.285.3765
www.bifma.org

CFFA Chemical Fabrics & Film Assoc., Inc.
c/o Thomas Assoc., Inc
1300 Sumner Ave.
Cleveland, OH 44115-2851
216.241.7333
www.chmicalfabricsandfilm.com

CISCA Ceiling and Interior Systems Construction Assoc.
5700 Old Orchard Rd., 1st Fl.
Skokie, IL 60077
708.965.2776
www.cisca.org

CISPI Cast Iron Soil Pipe Institute
5959 Shallowford Rd., Suite 419
Chattanooga, TN 37421
615.892.0137
Fax 615.892.0817
www.cispi.org

CRI Carpet and Rug Institute
P.O. Box 2048
Dalton, GA 30722
706.278.8835
Fax 706.278.8835 www.carpet-rug.org

CRSI Concrete Reinforcing Steel Institute
933 North Plum Grove Rd.

Schaumburg, IL 60173-4758
847.517.1200
Fax 847.517.1206
www.crsi.org

CTIOA Ceramic Tile Institute of America
12064 Jefferson, Blvd.
Culver City, CA 90230-6219
310.574.7800
Fax 310.821.4655
www.ctioa.org

DHI Door and Hardware Institute
14150 Newbrook Dr., Suite 200
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Date 3/02/09
Chantilly, VA 20151
703.222.2010
Fax 703.222.2410
www.dhi.org

ETL ETL Testing Laboratories, Inc.
P.O. Box 2040
Route 11, Industrial Park
Cortland, NY 13045
607.753.6711
www.etl.com

ECDS Energy Conservation Design Standards for New State Buildings
State Energy Conservation Office
Texas Facilities Commission
P.O. Box 13047
Austin, TX 78711-3047

FGMA Flat Glass Marketing Assoc.

(The Flat Glass Marketing Assoc. included Glass Tempering Association, and members of the Laminators Safety Glass Association consolidated to form the Glass Assoc. of North America)
2495 SW Wanamaker Dr., Suite A
Topeka, KS 66614
785.271.0208
Fax 785.271.0166
www.glasswebsite.com

FM Factory Mutual Research Organization
500 River Ridge
P.O. Box 9102
Norwood, MA 02062
617.762.4300

GA Gypsum Association
810 First St., NE #510
Washington, DC 20002
202.289.5440
Fax 202.289.3707
www.gypsum.org

HMA Hardwood Manufacturers Assoc.
400 Penn Center Blvd., Suite 350
Pittsburg, PA 15235
412.829.0770
Fax 412.829.0844
www.hmamembers.org

HPMA Hardwood Plywood Manufacturers Assoc.
1825 Michael Farraday Dr.
Reston, VA 20190
703.435.2900
Fax 703.435.2537
www.hpva.org

IBC International Building Code
International Code Council
500 New Jersey Ave., NW 6th Fl.
Washington, DC 20001-2070

IBD Institute of Business Designers
341 Merchandise Mart
Chicago, IL 60654
312.647.1950

ICC International Code Council
500 New Jersey Ave., NW, 6th Floor
Washington, DC 20001
888.422.7233
Fax 202.783.2348
www.iccsafe.org

IECC International Energy Conservation Coder
www.iccsafe.com

IEEE Institute of Electrical and Electronic Engineers
3 Park Ave., 17th Fl.
New York, NY 10016-5997
212.419.7900
Fax 212.752.4929
www.ieee.org

IESNA Illuminating Engineering Society of North American
120 Wall Street, Fl. 17
New York, NY 10005
212.248.5000
Fax 212.248.5017
www.iesna.org

IFC International File Code
www.iccsafe.org

IGCC Insulating Glass Certification Council
c/o ETL Testing Laboratories, Inc.
P.O. Box 9
Henderson Harbor, NY 13651
315.646.2234
Fax 315.646.2297
www.igcc.org

ILI Indiana Limestone Institute of American
400 Stone City Bank Bldg.
Bedford, IN 47421
812.275.4426
Fax 812.279.8682
www.iliai.com

IPC International Plumbing Code
www.iccsafe.org

ISA Instrument Society of America
67 Alexander Dr.
Research Triangle Park, NC 27709
919.549.8411
Fax 919.549.8288
www.isa.org

LIA Lead Industries Assoc., Inc.
Sparta, New Jersey
www.leadinfo.com

LPI Lightning Protection Institute
25475 Magnolia Dr.
P.O. Box 99

Maryville MO 64468
800.488.6864
www.lightning.org

MBMA Metal Building Manufacturers Assoc.
1300 Sumner Ave.
Cleveland OH 44115-2851
216.241.7333
Fax 216.241.0105
www.mbma.com

MCAA Mechanical Contractors Assoc. of America
1385 Piccard Dr.
Rockville, MD 20850
301.869.5800
Fax 301.990.9690
www.mcaa.org

MFMA Maple Flooring Manufacturers Assoc.
60 Revere Dr., Suite 500
Northbrook, IL 60062
888.480.9138
Fax 847.480.9282
www.maplefloor.org

MIA Marble Institute of America
28901 Clemens Rd., Suite 100
Cleveland, OH 44145
440.250.9222
Fax 440.250.9223
www.marble-institute.com

ML/SFA Metal Lath/Steel Framing Assoc.
(A Division of the National Association of Architectural Metal Manufacturers)
800 Roosevelt Rd., Bldg. C, Suite 312

Glen Ellyn, IL 60137
630.942.6591
Fax 630.7903095
www.naamm.org

NAAMM National Association of Architectural Metal Manufacturers
800 Roosevelt Rd., Bldg. C, Suite 312
Glen Ellyn, IL 60137
630.942.6591
Fax 630.7903095
www.naamm.org

NAIMA North American Insulation Manufacturers Assoc,
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
703.684.0084
Fax 703.684.0427
www.naima.org

NAPA National Asphalt Pavement Association
NAPA Building
5100 Forbes Blvd.
Lanham, MD 20706
888.468.6499
www.hotmix.org

NCMA National Concrete Masonry Assoc.
13750 Sunrise Valley Dr.
Herndon, VA 20171-4662
703.713.1900
Fax 703.713.1910
www.ncma.org

NEC National Electrical Code (NFPA)

NECA National Electrical Contractors Assoc.
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814
301.657.3110
Fax 301.215.4500
www.necanet.org

NEII National Elevator Industry, Inc.
1677 County Route 64
P.O. Box 838
Salem, NY 127865-0838
518.854.3100
Fax 518.854.3257
www.neii.org

NEMA National Electrical Manufacturers Assoc.
1300 North 17th St., Suite 1752
Rosslyn, VA 22209
703.841.3200
Fax 703.841.5900
www.nema.org

NFPA National Fire Protection Assoc.
1 Batterymarch Park
Quincy, MA 02169-7471
617.770.3000
Fax 617.770.0700
www.nfpa.org

NHLA National Hardwood Lumber Assoc.
6830 Raleigh-LaGrange Rd.
Memphis, TN 38184-0518
901.377.1818
www.natlhardwood.org

NLGA National Lumber Grades Authority
#302 960 Quayside Dr.
New Westminister, BC V3M 6G2 Canada
604.524.2393
Fax 604.524.2893
www.nlga.org

NPA National Particleboard Assoc.
18928 Premiere Court
Gaithersburg, MD 20879-1569
301.670.0604
Fax 301.840.1252
www.pbmdf.org

NPCA National Paint and Coatings Assoc.
1500 Rhode Island Ave., NW
Washington, DC 20005
202.462.6272
Fax 202.462.8549
www.paint.org

NRCA National Roofing Contractors Assoc.
10255 W. Higgins Rd., Suite 600
Rosemont, IL 60018-5607
708.299.9070
Fax 847.299.1183

NTMA National Terrazzo and Mosaic Assoc.
201 North Maple, Suite 208
Purcellville, VA 20132
540.751.0930
Fax 540.751.0935
www.ntma.com

NWWDA National Wood Window and Door Assoc.

1400 E. Touhy Ave.
Des Plains, IL 60018
800.223.2301
Fax 708.299.1286

PCA Portland Cement Assoc.
5420 Old Orchard Rd.
Skokie, IL 60077
847.966.6200
Fax 847.966.8389
www.cement.org

PCI Precast/Prestressed Concrete Institute
209 W. Jackson Blvd. #500
Chicago, IL 60606
312.786.0300
Fax 312.786.0353
www.pci.org

RFCI Resilient Floor Covering Institute
401 E. Jefferson St., Suite 102
Rockville, MC 20850
301.340.8580
Fax 301.340.7283
www.rfci.com

RMA Rubber Manufacturers Assoc.
1400 K St., NW, Suite 900
Washington DC 20005
202.682.4800
www.rma.org

SDI Steel Deck Institute
P.O. Box 25
Fox River Grove, IL 60021

847.458.4647
Fax 847.458.4648

SECO State Energy Conservation Office
LBJ State Office Bldg.
111 E. 17th St., Rm 1114
Austin, TX 78701
512.463.1931
Fax 512.475.2569
www.seco.cpa.stat.tx.us

SGCC Safety Glazing Certification Council
P.O. Box 730
Sackets Harbor, NY 13685
315.646.2234
Fax 315.646.2297
www.sgcc.org

SIGMA Sealed Insulating Glass Manufacturers Assoc.
401 N. Michigan
Chicago, IL 60611
312.644.8610
www.sigmaonline.org

SJI Steel Joist Institute
3127 Mr. Joe White Ave.
Myrtle Beach, SC 29577-6760
843.626.1995
Fax 843.626.5565
www.steeljoist.org

SMACNA Sheet Metal and Air Conditioning Contractors National Assoc.
4201 Lafayette Center Dr.
Chantilly, VA 20151-1209
703.803.2980

703.803.3732
www.smacna.org

SPIB Southern Pine Inspection Bureau
P.O. Box 10915
Pensacola, FL 32524-0915
850.434.2611
Fax 850.433.5594
www.spib.org

SPRI Single Ply Roofing Institute
77 Rumford Ave., Suite 3B
Waltham, MA 02453
781.647.7026
Fax 781.647.7222
www.spri.org

TCA Tile Council of America
100 Clemson Research Blvd.
Anderson, SC 29625
864.646.8453
Fax 864.646.2821
www.tileusa.com

TIMA Thermal Insulation Manufacturers Assoc.
29 Bank St.
Stanford, CT 06901
203.324.7533
(Standards now issued by NAIMA, www.naima.org)

UFAC Upholstered Furniture Action Council
Box 2436
High Point, NC 27261
919.885.5065
www.ufac.org

UL Underwriters Laboratories, Inc.
333 Pfingsten Rd.
Northbrook, IL 60062-2096
847.272.8800
Fax 847.272.8129
www.ul.com

WSFI Wood and Synthetic Flooring Institute
4415 W. Harrison St., Suite 242-C
Hillside, IL 60162
708.449.2933

WWPA Western Wood Products Assoc.
522 SW Fifth Ave., Suite 500
Portland, OR 97204-2122
503.224.3930
Fax 503.224.3934
www.wwpa.org

W.W.P.A. Woven Wire Products Assoc.
2515 N. Nordica Ave.
Chicago, IL 60635
312.637.1359
www.wovenwire.org

Government Agencies:

CPSC Consumer Products Safety Commission
4330 E. West Highway
Bethesda, MD 20814
301.504.7923
Fax 301.504.0124
www.cpsc.gov

CS Commercial Standard
(U.S. Department of Commerce)
1401 Constitution Ave., NW
Washington, DC 20230
202.482.2000
www.commerce.gov

DOC U.S. Department of Commerce
1401 Constitution Ave., NW
Washington, DC 20230
202.482.2000
www.commerce.gov

EPA Environmental Protection Agency
1445 Ross Ave., Suite 1200
Dallas, TX 75202
214.665.6444
www.epa.gov

FS Federal Specifications (from GSA Specifications Unit WFSIS)
7th and D St., SW
Washington DC 20407
202.708.9205
www.apps.fss.gsa.gov/pub/fedspecs

GSA General Services Administration
1800 F. St., SW
Washington DC, 20405
202.708.9205
www.gsa.gov

GSC Texas Building and Procurement Commission
1711 San Jacinto
Austin, TX 78701
512.463.6363

www.tbpc.state.tx.us

NIST National Institute of Standards and Technology
100 Bureau Dr., Stop 1070
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Washington, DC 20230
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END OF SECTION

SECTION 01 43 00 - QUALITY ASSURANCE

1 General Requirements

1.1 The Contractor is responsible for controlling the quality of the Work of its forces and its subcontractors and all of the Work of the Project in general and as set forth in the Construction Documents. The Contractor shall provide qualified personnel, approved by the Owner, to perform daily supervision, reviews and inspections of subcontractor work to insure quality, accuracy, completeness and compliance.

1.2 The Owner will employ a testing laboratory and/or geotechnical engineering service to perform quality assurance test and to transmit copies of test reports to the Contractor. Sampling and testing that the Owner may require is specified in this section and in the various technical sections requiring quality assurance testing. The Contractor shall cooperate with the Owner's testing personnel, provide access to the work, to manufacturer's and fabricator's operations, furnish incidental labor and facilities and samples for test and inspection as specified.

1.2.1 Employment of the testing laboratory to perform quality assurance tests is for the benefit of Owner in confirming that performance and quality of the work is in conformance with the Construction Documents.

1.2.2 Employment of the testing laboratory by Owner in no way relieves Contractor's obligation to perform the work in accordance with the Construction Documents and Owner's testing laboratory shall not be the same as Contractor's testing laboratory.

1.2.3 The testing firm shall make all inspections and perform all tests in accordance with the rules and regulations of the building code, local authorities, the specifications of the ASTM and these Construction Documents.

1.2.4 Any costs incurred by the Owner due to re-testing of materials or re-inspection of work due to non-compliance with the Construction Documents by the contractor shall be at the expense of the Contractor and shall be deducted from the next pay request accordingly.

1.3 Limits of testing laboratory authority: Laboratory is not authorized to:

1.3.1 Approve or reject any portion of the work.

1.3.2 Perform any duties of the Contractor and subcontractors.

1.3.3 Revoke, alter, relax, expand, or release any requirement of the Construction Documents or to approve or accept any portion of the Work, except where such approval is specifically called for in the specifications.

1.3.4 Work will be checked as it progresses, but failure to detect any defective work or materials shall not, in any way, prevent later rejection when such defect(s) are discovered.

1.4 When requested by the Owner, the Contractor will demonstrate a material's compliance with the specifications in one of the following ways:

- Manufacturer's Certificate of Compliance
- Mill Certificate
- Testing Laboratory Certifications
- Report of actual test results from Owner's designated laboratory, or a laboratory satisfactory to the Owner. Materials so tested shall be provided by the Contractor and selected by the Owner, or in the presence of the Owner, and the method of testing shall comply with the professional societies' standard specifications.

1.5 The Owner may require Special Inspections, Testing or Approval of certain materials or Work in addition to those clearly specified in the Construction Documents. Upon notification by the Owner of such requirements, the Contractor shall promptly arrange for such Special Inspections, Testing and Approval procedures. The costs associated with these efforts shall be borne by the Owner, except that if such materials or Work fail the initial Owner-paid inspections, tests and approvals, then subsequent tests required to prove the materials or Work suitable for inclusion in the Project Work shall be borne by the Contractor.

1.6 If the Contractor covers any of the Work that is required to be inspected, tested or approved by the Construction Documents, then that Work shall be uncovered, inspected, tested or approved and then recovered at the Contractor's sole expense.

1.7 The Contractor shall have the right to have tests performed on any material at any time for its own information and job control so long as the Owner is not charged for these tests or forced to rely on these tests when appraising quality of the materials. The tests specified in the Construction Documents for a specific material shall take precedence over any testing initiated by and paid for by the Contractor.

2 Below Grade Inspections

2.1 Before covering or backfilling of any improvement below grade, cover up inspections will be conducted to see that all items meet the plans and specifications. Only after all the deficiencies have been corrected will the Contractor be allowed to install any backfill.

3 Concrete Inspections

3.1 Before the placing of any cast-in-place concrete structure, an inspection will be conducted to see that all items meet the intent of the Construction Documents. Only after all deficiencies have been corrected will the Contractor be allowed to proceed.

4 Wall Closure/Above-Ceiling Inspections

4.1 Before the installation of any ceiling or the closing of walls chases, an inspection will be conducted to see that all items fully meet the contract document requirements before being covered. Only after all the deficiencies have been corrected will the Contractor be allowed to install the ceiling or close-up the wall. As a minimum, the following should be in place before an above-ceiling inspection is scheduled:

- All light fixtures installed and working;
- All plumbing installed and insulation complete;
- All rigid and flexible ducts installed;
- All required valve identification tags installed;
- All air devices installed and connected;
- All control wiring and devices installed and connected;
- The ceiling support structure installed.

5 Substantial Completion Inspection (see UGC 12.1.1)

5.1 When the Contractor feels that the work is complete and ready for the Owner's intended use, it will notify the A/E and Owner at least seven days prior to the date the Contractor is ready for a Substantial Completion Inspection. The A/E and appropriate members of the design team along with the Owner will perform a detailed inspection of the all work and furnish the Contractor with a list of incomplete or unsatisfactory items. When the Contractor has completed all the work related to these items the Pre-Final Inspection will be complete.

6 Final Inspection & Acceptance (see UGC 12.1.2 & 12.3)

6.1 Upon verification by the A/E and Owner that the deficiencies found during the Pre-Final Inspection have been corrected, and the work is ready for Final Inspection and Acceptance, the A/E and Owner will schedule a Final Inspection. When the work is found to be acceptable under the Construction Documents without exception and the contract is fully performed, then a Final Acceptance Notice will be issued by the A/E.

7 One-year Warranty Inspection

7.1 Within thirty-days prior to the expiration of the one year anniversary of the Substantial Completion date the Owner shall prepare a list of deficiencies related solely to the workmanship and material warranties provided by the Contractor through the Construction Documents. The Contractor shall make the necessary repairs and replacements and notify the Owner that all work is complete and Owner shall review and approve the work and provide written acceptance.

8 Execution

8.1 Pier Drilling Operations:

8.1.1 A representative of the soils testing laboratory shall make continuous inspections to determine that proper bearing stratum is obtained and utilized for bearing and that shafts are properly clean and dry before pouring concrete.

8.1.2 Soils testing laboratory shall furnish complete pier log showing the diameter, top and bottom elevations of each pier, casing required or not required, bell size, actual penetration into bearing stratum, elevation of top of bearing stratum, and volume of concrete used.

8.2 Reinforcing Steel Mechanical Splices:

8.2.1 Visually inspect and report on the completed condition of each mechanical splice of reinforcing steel.

8.2.2 Each mechanical splice shall be visually inspected to ensure compliance with building code and the manufacturer's published criteria for acceptable completed splices.

8.2.3 Special emphasis shall be placed on inspection of the end preparation of

each bar to be spliced.

8.2.4 Submit copies of manufacturer's published criteria for acceptable completed splices prior to observing mechanical splices.

8.2.5 Reports on each splice shall indicate location, size of bars and acceptability or rejection of splice. Reasoning for rejection shall be provided in the report.

8.3 Reinforcing Steel and Embedded Metal Assemblies - Inspect all concrete reinforcing steel for compliance with Construction Documents and approved shop drawings prior to placing concrete. All instances of noncompliance shall be immediately brought to the attention of the Contractor for correction and then, if not corrected, reported to the A/E.

8.3.1 Observe and report on the following:

- Number and size of bars;
- Bending and lengths of bars;
- Splicing;
- Clearance to forms including chair heights;
- Clearance between bars or spacing;
- Rust, form oil and other contaminants;
- Grade of steel;
- Securing, tying and chairing of bars;
- Excessive congestion of reinforcing steel;
- Installation of anchor bolts and placement of concrete around such bolts;
- Fabrication of embedded metal assemblies, including visual inspection of all welds;
- Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with the Construction Documents.

8.4 Concrete Inspection & Testing:

8.4.1 Receive, evaluate and certify all proposed concrete mix designs submitted by the Contractor which comply with the Construction Documents. Mix designs not complying shall be returned by the laboratory as unacceptable.

8.4.2 Secure composite samples of concrete at the jobsite and perform the appropriate tests as specified in the Construction Documents. Test results will be provided to the appropriate design team members, the Contractor and the Owner.

8.4.3 Inspect the application of curing compounds and monitor all curing conditions to assure compliance with the Construction Documents.

8.5 Post-tensioning of Concrete:

8.5.1 Verify certification of calibration of jacking equipment used in the post-tensioning operations.

8.5.2 Observe and report on placement and anchorage of tendons immediately prior to placement of concrete.

8.5.3 Provide a registered professional engineer experienced in posttension operations to observe and report on the placement, posttensioning and elongation measurement of each tendon.

8.5.4 Observe and report on grouting of tendons noted to be bonded.

8.6 Masonry:

8.6.1 Provide a qualified inspector to inspect all structural masonry work on a periodic basis.

8.6.2 Inspect the following:

- Preparation of masonry prisms for testing;
- Placement of reinforcing;
- Grout spaces;
- Mortar mix operations;
- Bedding of mortar for each type of unit and placing of units;
- Grouting operations;
- Condition of units before laying for excessive absorption.

8.6.3 Provide a report of each inspection.

8.7 Structural Steel:

8.7.1 Inspect all structural steel during and after erection for conformance with the Construction Documents and shop drawings. Any cases of insufficient bracing or guying, or other unsafe conditions shall be immediately called to

the attention of the Contractor and reported to the A/E and Owner.

8.7.2 Inspect the following:

- Proper erection of all pieces;
- Proper installation of all bolts;
- Plumbness of structure and proper bracing;
- Proper field painting;
- Visual examination of all field welding;
- Inspect all shop fabricated members, upon arrival at the jobsite, for
- Inspection of shop and field welding shall be in accordance with the AWS Structural Welding Code – Steel, latest edition;
- Inspection of bolted construction shall be in accordance with AISC specifications for structural steel buildings;
- Inspection of stud field welding shall be in accordance with AWS structural welding code latest edition.

8.8 Expansion Bolt Installations:

8.8.1 Inspect the drilling of holes and installation of expansion bolts for compliance with the Construction Documents and shop drawings.

8.8.2 Verify the installation torque of the expansion bolts for compliance with the manufacturer's installation instructions.

8.9 Metal Floor Deck – Field inspection shall consist of the following:

- Check types, gauges and finishes for conformance with Construction Documents and shop drawings;
- Exam for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting and other coatings.

8.10 Metal Roof Deck – Field inspection shall consist of the following:

- Check types, gauges and finishes for conformance with Construction Documents and shop drawings;
- Exam for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting and other coatings.

END OF SECTION 01 43 00

SECTION 01 43 39 - SITE MOCK-UPS
(see UGC 8.4)

1 General

1.1 The Contractor shall direct all the appropriate subcontractors in the construction of all site mock-ups for review by the Owner and Architect/Engineer (A/E) as required by the Construction Documents.

1.2 The mock-up(s) when approved by the A/E and Owner shall become the site reference for quality of the incorporated features of materials and workmanship.

1.3 The mock-up shall not be part of the work and shall remain in place until Substantial Completion, or otherwise directed by the Owner.

END OF SECTION 01 43 39

SECTION 01 45 00 - QUALITY CONTROL
(see 01 40 00)

1 General Requirements

1.1 Quality control shall be the sole responsibility of the Contractor, unless specifically noted otherwise. The Contractor shall be responsible for all testing, coordination, start-up, operational checkout and commissioning of all items of work included in the project. All costs for these services shall be included in the Contractor's cost of work and general conditions.

1.2 Specific quality control requirements for individual construction activities are specified in sections that govern those activities.

1.3 The Contractor employed testing agency shall comply with the requirements of ASTM C - 1021, 1077, 1093, E - 329, 543 and 548.

1.4 The Contractor shall develop design mixes for products to be used and have the appropriate test performed by the Contractor's employed testing agency at its own expense.

END OF SECTION 01 45 00

SECTION 01 45 18 - FIELD ENGINEERING

1 Quality Assurance

1.1 Surveyor Qualifications: Engage a land surveyor, registered in the State of Texas, to perform required land surveying services.

2 Examination

2.1 Verify layout information shown on the construction documents, in relation to the property survey and existing benchmarks and building locations and finish floor elevations before proceeding to lay out the work. Protect existing benchmarks and control points. Preserve permanent reference points during construction.

2.1.1 Do not change or relocate benchmarks or control points without prior written approval from the Owner.

2.1.2 Establish and maintain a minimum of two permanent benchmarks on the site.

3 Performance

3.1 Work from lines and levels established by the Construction Documents. Calculate and measure required dimensions with indicated and recognized tolerances. Do not scale drawings to determine dimensions.

3.2 Record deviations from required lines and levels and advise A/E immediately when deviations exceed indicated or recognized tolerances.

3.3 Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines services, or other appurtenances located in or affect by construction.

3.4 The as-built documents shall include a final Title I property survey.

END OF SECTION 01 45 18

SECTION 01 50 00 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1 General Requirements

1.1 Contractor shall provide all construction facilities and temporary controls specified in this section and as necessary for the proper and expeditious prosecution of the work. The Contractor will be provided with a description of the Project Site and the Limits of Construction either by the Construction Documents, or by the Owner. At any time such a description has not been provided, the Contractor should request it of the Owner in writing.

1.2 The Contractor shall erect a wire mesh fence around the Project Site. The Contractor and all its personnel, assigns, material suppliers and subcontractors shall confine and limit their work to the Project Site and shall confine their construction activities to within the Limits of Construction. All areas beyond these defined areas are patrolled either by the Campus Police or by the Police Department of the City. All public and University laws, ordinances, rules and regulations shall be obeyed. No tools, construction vehicles or construction materials shall be permitted to be outside the Project Site. Loitering of construction-related personnel in areas outside the Project Site is strongly discouraged and it will be discontinued if it becomes persistent, or otherwise a nuisance to the ordinary and normal functioning of the campus. **(UGC 3.3.11)**

1.3 All campus roads, drives, fire lanes and sidewalks/pedestrian routes (other than those specifically given over to the Contractor for its use) must be kept open and clean at all times. The Contractor shall make advanced preparations for, and obtain security clearance for, all significant materials and equipment movements that will disrupt traffic and pedestrian flows. The Contractor shall provide all traffic controls, warning signs, barricades and flag persons needed to minimize disruptions during such approved movements. When such movements cause damage or leave debris, the Contractor shall immediately repair and clean up afterwards. **(UGC 3.3.11.3)**

1.4 Contractor shall pay all charges for all connections to and distribution from existing services and sources of supply.

1.5 Requirements of service and utility companies relating to the work shall be ascertained by Contractor, and the Contractor shall comply with all requirements, including those relating to continued protection and maintenance until completion

of the work.

1.6 Materials and construction for construction facilities and temporary controls may be new or used, must be in adequate capacity, must not create unsafe conditions and shall not be unsightly.

1.7 Contractor shall relocate temporary services and facilities at it own expense, as required by progress of construction.

1.8 Contractor shall remove all temporary services and facilities when their use is no longer required or at completion of the project.

1.9 Contractor shall clean and repair damage caused by temporary services and facilities to new condition for new work and to a condition as good as or better than existing prior to start of work for existing construction projects.

2 Yard Repairs

2.1 Where compaction of the soil has occurred in turf or other plant material areas within the limits of construction, the areas shall be rejuvenated by deep cultivation of the compacted soil. After completion of construction, the Contractor shall scarify the construction site within the limits of construction to a minimum depth of eight inches, except within thirty feet of trees where it shall be a six inch depth. The Contractor will either place sod or hydro mulch on the rejuvenated areas, as may be mutually agreed to between the Owner and the Contractor, depending on the season and availability of irrigation.

3 Temporary Utilities and Services

3.1 The Contractor shall provide for all necessary and appropriate temporary utilities and services for execution and protection of the work.

3.2 Schedule of Costs and Fees for Utility Services are different on different campuses. The Contractor must review the Construction Documents carefully and communicate with the Owner to determine the status on each Project.

3.2.1 **Temporary Water** – The Contractor shall provide and install temporary lines for all water required for the Work and will arrange with the Owner's Utility Department for connection to the campus system and for services.

3.2.2 **Temporary Electrical** – The Contractor shall arrange with the local Utility

Company for temporary power and for metering. When using this temporary power, the Contractor shall be responsible for all related costs, including energy costs and fuel costs. If such power if available from the campus power systems, then the Contractor will make the same arrangements, but the Owner will pay for the power used unless the Contractor wastes energy and is not consuming it in a reasonable and prudent manner. The Contractor shall not energize the permanent power on the Project it is constructing until the Owner specifically approves.

3.2.3 **Temporary Heating, Cooling and Ventilation** – If temporary heating/cooling/ventilation is required for the protection of the Work or the work forces, the Contractor shall provide, at its cost, Owner-approved apparatus.

3.2.4 **Temporary Lighting** – The Contractor shall provide adequate temporary lighting to facilitate quality workmanship and appropriate inspection of the Work. Temporary lighting provided by the Contractor also must be adequate for site security, inspections of excavations, night work if pursued and for personal and general safety of operations. Provide the following minimum standards:

3.2.4.1 Provide and maintain lighting for construction operations to achieve a minimum lighting level of two watts per square foot.

3.2.4.2 Provide and maintain one watt per square foot lighting for exterior staging and storage areas after dark for security purposes.

3.2.4.3 Provide and maintain one-quarter watt per square foot lighting to interior work areas after dark for security purposes.

3.2.4.4 Permanent building lighting may be utilized during construction.

3.2.5 **Temporary Services Provided by Owner** – When approved by the Owner, the Contractor may request that Project mechanical and electrical systems be put into service prior to Substantial Completion, even if only to facilitate Contractor operations. However, the Contractor shall NOT open or close any valve connecting to the campus systems without specific Owner approval. During operation of the equipment prior to Substantial Completion the Contractor shall keep the equipment in good operating condition, properly and legally flushed with chemical treatment systems,

properly started and stopped, properly maintained, including regular replacement and/or cleaning of filters. Without exception the filters will be newly replaced just prior to turning the equipment over to the Owner for operation. The actual warranty periods will not start until the equipment is officially turned over to the Owner at Substantial Completion.

3.2.6 **Temporary Facilities/Equipment Removal** – Prior to turning the Project over to the Owner for operation and maintenance, the Contractor shall completely remove all temporary facilities and equipment from the Project Site and shall repair or replace any material, equipment, finished surfaces or landscaping that has been damaged by its activities on the site.

4 Construction Aids

4.1 Material and Personnel Hoists: The Contractor shall provide material and personnel hoist as required for normal use by all trades without charge. All necessary guards, signals and safety devices required for safe operation of these hoists shall be provided and properly maintained at all times.

4.2 Stairs: Provide temporary protective treads, handrails and wall coverings at stairways.

5 Barriers and Enclosures

5.1 Contractor shall construct temporary barricades, warning signs, hazard and warning lights, walks, passage-ways and similar temporary barriers and enclosures that are necessary to protect persons and property from hazards or damage due to construction operations, and required by the Owner, city, state or federal laws, ordinances or codes.

5.2 Contractor shall furnish and install construction fences and gates within the limits of construction, prior to beginning any other work on the project.

5.3 Contractor shall furnish and install movable fences as may be necessary and appropriate to facilitate execution of the work.

5.4 The Contractor shall be responsible for the protection of existing building surfaces (both interior and exterior), utilities, exterior structures, pavements, sidewalks, landscape, vegetation and irrigation systems. Any damage to existing areas will be repaired by the Contractor at its expense and to the satisfaction of the Owner. Such

needed repairs that are not timely undertaken or completed by the Contractor may, at the Owner's sole discretion, be repaired by the Owner and the related expenses deducted from the Contract Amount by change order.

5.5 All existing trees, shrubs or endangered plants within the Project Site or near access ways to the Project Site, shall be protected by the Contractor as indicated on the Drawings and maintained in sound condition unless ordered by the Owner to remove them. Contractor shall furnish and install barricades, fences and guards as necessary to prevent damage to existing trees, shrubs or endangered plants indicated to remain after construction is completed. Contractor shall not remove, cut or trim any tree, shrub or endangered plant before first notifying the Owner and receiving prior approval for the action. The Contractor will be responsible for repair or replacement in kind of damaged vegetation including watering and maintenance until fully restored.

5.6 All fencing, gates, barricades and guards shall be maintained to be straight, level and having a neat and uniform appearance while in place. Upon removal all holes and damage caused by the placement and use of the fences shall be repaired to its original condition.

5.7 Contractor shall provide temporary roofing and weather tight insulated closures for openings in exterior surfaces as required to maintain specified working conditions and moisture content of all project materials.

6 Security

6.1 The Contractor shall provide security and facilities to protect the Work, materials and equipment from unauthorized entry, vandalism, or theft until Substantial Completion has been achieved. If deemed necessary the Contractor may, at its own expense, employ unarmed security personnel. The Contractor must first must notify the Owner and provide particulars about the security firm and its personnel prior to its employment.

6.2 The Campus Police will not provide security for the Project Site or the areas that are given over to the Contractor's control.

7 Temporary Controls

7.1 Cleaning during construction: Contractor at all time shall keep the premises free

from accumulation of waste materials and rubbish caused by operations for the work. Provide a collection can at each area used for eating. Pick up garbage daily. Keep project site free of garbage, trash, vermin and rodent infestation. Require each subcontractor to collect and deposit waste and rubbish caused by subcontractor operations at designated locations. Clean interior areas prior to start of finish work and maintain areas free of dust and other contaminates during finishing operations. Protect installed equipment and seal installed ductwork and piping to prevent intrusion of dust. When the Work is within or adjacent to existing spaces that continue to be occupied, protect finishes, seal off occupied spaces and open ductwork and piping. The Contractor shall provide personnel for janitorial work to clean up (both on the Project Site and in adjacent spaces) any dust or debris that results from its operations.

7.2 Noise control: In and around occupied areas, minimize use of noise producing equipment and sequence the Work to minimize its effect of occupants. Work with noise producing equipment adjacent to occupied spaces will be coordinated with the Owner. Curtail such use to accommodate specific meetings or activities when requested by the Owner.

7.3 Water control: Provide methods to control surface water to prevent damage to the project and adjoining properties. Control fill, grade and ditch to direct surface drainage away from excavations, pits, tunnels and other construction areas. Direct runoff to proper runoff paths.

7.4 Storm Water Pollution Prevention Plan (SWPPP): Contractor shall be responsible for securing the appropriate SWPPP permit and paying all related fees, penalties, fines, etc., related thereto, from Texas Commission on Environmental Quality (TCEQ). The Contractor shall implement the SWPPP plan and insure that all devices and structures are properly maintained through the course of the project. Upon completion of the project the Contractor shall provide TCEQ with a Notice of Termination within thirty days of final stabilization achievement. Refer to SWPPP for additional requirements and to ensure compliance with its requirements.

7.5 Pollution controls: Provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by discharge of noxious or hazardous substances from construction operations. The Contractor shall notify the Owner immediately of all pollutant spills. The Contractor shall be solely responsible for

cleaning up and properly disposing of, in accordance with applicable laws and regulations, all spilled pollutants brought to the Site as a part of the Work including oil, paint, fuels, antifreeze, solvents, etc. The Contractor must keep accurate records of these clean up and disposal actions.

7.6 Protection of installed work:

7.6.1 Protect installed work and provide special protection where specified in individual specification sections.

7.6.2 Provide temporary and removable protection of installed products and control activity in the immediate area to prevent damage.

7.6.3 Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

7.6.4 Protect finished floors, stairs and other surfaces from dirt traffic, wear, damage, or movement of heavy objects.

7.6.5 Prohibit traffic or storage upon waterproofed or roofed surfaces, or in the alternative obtain the manufacturer's recommendations for protection.

7.6.6 Prohibit traffic from landscaped areas.

8 Parking:

8.1 Parking for workmen employed on the site shall be provided within the Limits of Construction or on such remote site as may be designated by the Owner from time to time. Any costs involved in Contractor parking shall be borne by the Contractor. The Contractor's forces shall not park on campus in areas outside the Project Site.

8.2 In some, but not all circumstances, Owner may provide remote parking spaces near the campus. In these cases the parking may be available for Contractor use at no cost, but permits issued by the campus police will be necessary to use this parking. In providing remote parking the Owner will not take on any responsibility for the vehicles, or contents of the vehicles, when they are parked in the remote locations provided.

8.3 The contractor shall provide adequate reserved parking for the Owner's and the A/E's Project Team members who regularly visit the Project Site.

8.4 The Contractor shall be responsible for restoration of all pavement, curbs, signage, sidewalks, etc., damaged by the construction operations and/or the workmen.

9 Field Offices and Sheds

9.1 The office shall be weather tight, with lighting, electrical outlets, high speed internet connection, telephone, heating, cooling and ventilation and equipped with sturdy furniture, a drawing table and plan racks.

9.2 Provide adequate space for projects meetings.

10 Temporary Toilets

10.1 Provide, maintain and pay for required temporary sanitary facilities and enclosures. Provide at time of project mobilization and do not remove until Substantial Completion. Locate these facilities away from public view as much as practical.

10.2 Clean and empty these facilities at least weekly unless it is needed more often to keep them sanitary. Post notices, remove deposited debris and take all steps necessary to keep the facilities clean and sanitary.

10.3 Do not use the Owner's toilet facilities, unless specifically approved by the Owner.

END OF SECTION 01 50 00

SECTION 01 50 10 - PROJECT SIGNAGE

1 Installation of Temporary Project Signage

1.1 When permitted by the Owner, an exterior construction project sign shall be installed immediately after contract award. The sign will make specific reference to the Houston Community College Campus Location.

1.2 Prior to any construction or installation of the sign, submit to the Owner for approval a quarter scale drawing, complete with all graphics and lettering.

1.3 The Contractor shall ensure the exterior construction project signage is properly set-back from all street intersections and pedestrian walkways such that it does not conflict with or impede fields of view necessary to vehicular and pedestrian traffic circulation.

1.4 The Contractor may install one sign bearing the company name, logo, project address and point of contact.

1.5 The sign shall remain the property of the Contractor and shall be removed from the Project Site and legally disposed of at the completion of the Work.

2 Signage Dimensions and Materials

2.1 The exterior construction project sign shall be constructed of a single four foot by eight foot sheet of three-quarter inch thick marine plywood placed on two four inch by four inch treated posts. The Architect/Engineer (A/E) shall provide the Contractor with the lettering, font background and rendering of the project, which will be installed by a professional sign company. All related costs shall be included in the General Conditions costs of Construction Manager and Design-Build contracts.

END OF SECTION 01 50 10

SECTION 01 52 40 - CONSTRUCTION WASTE MANAGEMENT

1 Definitions

1.1 Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

1.2 Disposal: Removal off-site of demolition and construction waste and deposited in landfill or incinerator acceptable to authorities having jurisdiction.

1.3 Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.4 Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.5 Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the work.

2 Performance Goals

2.1 The Contractor shall develop a waste management plan that will result in end of project rates for salvage/recycling as directed by the Owner during the Pre-construction conference.

3 Quality Assurance

3.1 The Contractor shall continuously monitor the disposal, recycling, salvage and reuse of materials generated by the Project to confirm compliance with the waste management plan and provide a report to the project team at each progress meeting.

4 Waste Management Plan

4.1 The Contractor shall develop a plan consisting of waste identification, waste reduction work plan and cost/revenue analysis. The plan should include separate sections for demolition and construction waste.

5 Salvaging Demolition Waste

5.1 Salvage of items for sale or donation by the Contractor or subcontractors is not permitted.

5.2 Salvaged items for Owner's use:

5.2.1 Clean salvaged items;

5.2.2 Pack or crate items and properly identify contents on the container;

5.2.3 Store items in a secure area until delivery to Owner;

5.2.4 Transport items to Owner's designated storage area.

6 Recycling Demolition and Construction Waste, General

6.1 Separate recyclable waste by type at project site to maximum extent practical.

6.2 Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from the project site.

6.3 Remove recyclable waste off Owner's property and transport to recycling receiver or processor within a reasonable time after an appropriate amount has been accumulated.

END OF SECTION 01 52 40

SECTION 01 70 00 - CONTRACT CLOSE-OUT

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General (see UGC Article 12)

1.1 Project closeout is hereby defined to include requirements near the end of the contract time, in preparation for Substantial Completion acceptance, occupancy by Owner, release of retainage, final acceptance, final payment and similar actions evidencing completion of the work.

1.2 Time of closeout is directly related to completion and acceptance and may either be a single time period for the entire project, or a series of times for individual portions or phases of the project that have been certified as substantially complete at different times.

1.3 If the project is to be accepted in phases, whether by originally specified project scope or by subsequent agreement between the parties, then the project closeout requirements shall pertain to each separately accepted portion or phase of the project. All required documentation for the portion of the project to be occupied early shall be furnished by the Contractor to the Owner on, or before, the date of early occupancy by the Owner. Such early occupancy of any portion of the Work will not waive the Contractor's obligations to complete the remaining Work within the Contract Time specified in the contract.

2. Record Documents (see UGC 6.2)

2.1 Record documents for project closeout shall include, but not necessarily limited to the following, which are required for substantial completion:

- As-built record drawings;
- As-built record specifications;
- Operating & maintenance manuals;
- Record approved submittals and samples;
- Certificate of no asbestos products incorporated in project;
- Completed punch lists.

3. Required Documents

3.1 Required documents (2 copies each) for final payment to be released included final versions of all of the above and the following:

- Final release of claims and liens;
- Affidavit of payment of debts and claims;

- Consent(s) of surety;
- Certificate of Substantial Completion;
- City of Houston Certificate of Compliance (Occupancy) for Project;
- Final Change Order, if applicable;
- Final Application for Payment;
- Contractor's Letter for Confirmation of General Guarantee;
- Subcontractors & Material Suppliers Release & Guarantee, notarized;
- Transmittal Listing Keys turn over to HCC Director of Operation & Maintenance;
- Completed SWPPP documents and Notice of Termination;
- Completed commissioning and closeout manuals.

4. Requirements for Substantial Completion (see UGC 12.1.1)

4.1 Prior to requesting Architect/Engineer (A/E) and Owner to schedule a Substantial Completion, or Pre-Final inspection, the Contractor shall complete the following and list known exceptions in the request:

4.1.1 Contractor's payment request should reflect a minimum of 95% completion for all applicable work.

4.1.2 Provide A/E and Owner with a complete copy of the Contractor's most current punch list.

4.1.3 Submit to the A/E for review a full set of as-built record drawings and specifications.

4.1.4 Submit to the A/E for review preliminary copies of the operating and maintenance manuals.

4.1.5 Submit release enabling Owner's full and unrestricted use of the work and access to service and utilities, including operating certificates and similar releases.

4.1.6 Contractor shall make provisions for final changeover of locks with the Owner's personnel.

4.1.7 Complete initial clean up requirements as described in the specifications.

4.2 The Contractor shall ensure that the work is ready for inspection and/or re-inspection. If the work is found not to be as stated in the Contractor's punch list or the items have not been substantially corrected/completed; the inspection will be terminated.

5. Requirements for Final Acceptance (see UGC 12.1.2)

Prior to requesting A/E and Owner to schedule final inspection for the project, the Contractor shall complete the following:

5.1 Prepare draft payment request showing 100% completion for each line item on the schedule of values, including all appropriate releases and supporting documentation.

5.2 Submit a copy of the pre-final punch list which includes evidence that each item has been completed or otherwise resolved.

5.3 Submit final meter readings for utilities as of the time when the Owner took possession.

5.4 Transmit completed commissioning and close-out manuals to the Owner.

5.5 Complete final cleaning and touch-up.

5.6 Submit final payment request.

5.7 Submit evidence of final and continuing insurance coverage complying with applicable insurance requirements.

6. Operating and Maintenance Manuals (see UGC 6.2.3 & 6.2.4)

6.1 Contractor shall organize operating and maintenance manual information into suitable sets of manageable size, and bind into individual binders properly tabbed and indexed. Two complete copies of each bound operating and maintenance manual shall be provided to the Owner and one complete copy for the A/E.

6.2 The requirements of this section are separate, distinct and in addition to product submittal requirements that may be established by this and other sections of the specifications.

6.3. Material and equipment data required by this section is intended to include all data necessary for the proper installation, removal, normal operation, emergency operation, startup, shutdown, maintenance, cleaning, adjustment, calibration, lubrication, assembly, disassembly, repair, inspection, trouble shooting and service of the equipment or materials.

7. Record Product Submittals

During progress of the work, maintain approved copies of each product data submittal and shop drawings, and mark-up significant variations in the actual work in comparison with submitted information. A separate binder with one copy of all MSDS sheets for any and all products incorporated into the project shall be

maintained during the course of the project, this binder shall be included in the record submittal documents.

8. Record Sample Submittals

Immediately prior to the date(s) of Substantial Completion, arrange for A/E and Owner to meet with Contractor at the project site to determine which (if any) of the submitted samples or mock-ups maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes.

9. Commissioning and Close-out Manual

The Contractor shall incorporate all commissioning and closeout documentation and/or verification not included in the operating and maintenance manuals, into a manual for transmittal to the Owner

END OF SECTION 01 70 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. See Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.2 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.

3. Products: List products to be used and firms or entities that will perform the Work.

4. Dates: Indicate when cutting and patching will be performed.

5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.

7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written

recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 91 00 - GENERAL COMMISSIONING REQUIREMENTS

1. Scope of Work Included

1.1 It is of primary concern that all operable systems installed in the project perform in accordance with the Construction Documents and the specified Owner's operational needs. This is particularly critical for systems affecting life safety, building controls, plumbing, HVAC, lighting and power delivery systems. The process of assuring such performance is achieved is commonly referred to as "Commissioning".

1.2 This section establishes minimum general and administrative requirements pertaining to start-up and commissioning of equipment, devices, and building systems. Additional technical and operational requirements for particular systems and components are established in the various technical sections of the specifications. The Contractor is solely responsible for the Commissioning process.

2. Commissioning Plan

2.1 The Contractor shall prepare a detailed commissioning plan to identify the following:

2.1.1 Project commissioning team members;

2.1.2 Commissioning activities;

- Pre-functional tests;
- Start-up tests;
- Functional tests;
- System integration testing.

2.1.3 The Contractor shall properly document the results of each phase of the commissioning plan and notify Architect/Engineer (A/E) and Owner of any failures to achieve the specified performance levels.

2.2 The Contractor shall incorporate the commissioning plan into the project baseline schedule to reflect dates and durations of all commissioning activities.

3. Equipment Documentation Requirements

The Contractor shall develop a complete equipment matrix/list of all equipment, devices and systems which will be presented to the project commissioning team at the Pre-commissioning conference. The following information should be included on the matrix/list:

- Brief equipment identification text;
- Equipment or device i.d. number;
- Start-up inspection required;

- Associated building system;
- Governing specification section;
- Appropriate submittal reference number(s);
- Installation location (room number or column coordinates).

4. Test Equipment

4.1 The Contractor and subcontractors shall provide all specialized tools, test equipment and instruments required to execute start-up, checkout and functional performance testing of equipment under their contracts.

4.2 Test equipment shall be of sufficient quality and accuracy to test and/or measure system performance within tolerances specified. A testing laboratory shall have calibrated the test equipment within the previous twelve months. Calibration shall be NIST traceable and in accordance with the manufacturer's recommendations.

5. Pre-commissioning Meeting

5.1 The Contractor shall conduct the Pre-commissioning meeting and review all aspects of the commissioning plan. All documentation will be discussed and test procedures will be reviewed for approval by the Owner.

5.2 The Contractor shall establish target dates for each of the commissioning activities and these will be discussed at all future project progress meetings.

6. Pre-installation Meeting - The Contractor shall schedule a pre-installation meeting for the work of each major building system. This meeting shall be scheduled following approval of system submittals and prior to commencement of system installation work.

7. Contractor's Verification of Installation

The Contractor shall perform a review of all tests to confirm completion and compliance with the specified performance specifications. The Contractor shall verify:

- Each component device has been properly installed;
- All shop drawings and product data submittals have been approved;
- All valve charts, wiring diagrams, control schematics, electrical panel directories, etc. have been submitted, approved and properly installed;
- All tabulated data has been submitted for each system and/or device as required by the specifications;
- All test reports and/or certifications required have been submitted and accepted;
- Any and all deficiencies have been corrected and re-tested to conformance

with the specifications.

8. Contractor's Operational Testing

8.1 The Contractor shall operate, or cause to be operated each system, device or equipment item, both intermittently and continuously, for the appropriate duration as set forth in the specifications and/or in accordance with the manufacturer's recommendations. These operations will be documented as a functional test.

8.2 Each component device and each building system shall be exercised to the full extent of its capability, from minimum to maximum, and under automatic control, where it is applicable, as well as checking manual operation.

9. Integrated System Demonstration

9.1 After successful completion and subsequent documentation of all system operations, the Contractor shall schedule a meeting with the project commissioning team to review the demonstration of all integrated systems within the facility.

9.2 The demonstration(s) shall included not only normal operating conditions over the entire operating range, but also failure modes such as major component failure and loss of power.

10. Owner Training

10.1 Training shall consist of classroom type sessions followed by on-site demonstrations of system operations.

10.2 The Contractor shall provide a minimum of eight hours of DVD recording of the training, with audio. The Owner will designate which portions of the training will be recorded. The DVD shall be produced in a professional manner.

END OF SECTION 01 91 00

SECTION 01 73 30 - TRENCH SAFETY SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work specified in this section consists of furnishing, installation, maintenance and removal of all necessary shoring, bracing, sheeting, shields, piling, deterring equipment and incidentals for all trench excavation, five feet or more in depth. The systems shall be in accordance with Occupational Safety and Health Administration (OSHA) Standards, 29CFR Part 1926 (Amended) October 31, 1989, Subpart P, Excavations.

B. This section applies to all required trenching, including but not limited to, excavation for storm sewers, water lines, sanitary sewer lines, and other underground improvements.

1.2 SUBMITTALS

A. The Contractor shall be responsible for selecting the excavation safety system as approved by OSHA 29CFR Part 1926 (amended October 31, 1989) and shall provide written notification of the protective system selected for project reference. The written notification shall include any tables, charts, diagrams, drawings or tabulated data applicable to the manufacturer's equipment.

1.3 PAYMENT

A. A line item shall be added for this section in the schedule of values. The Contract Total Bid Price shall include this item.

PART 2 - PRODUCTS

2.1 SHORING MATERIALS

A. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to be effective

to the bottom of the excavation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Trench Safety System shall be installed in accordance with the OSHA requirements.

B. In trenches four (4) feet deep or deeper, the Contractor shall provide adequate means of trench egress using ladders or steps. Ladders must extend three (3) feet above original ground level. Ladders shall be positioned in accordance with the following:

TRENCH LENGTH	POSITION OF LADDER
Less than 25 Feet	At third points
Less than 50 Feet	Each end and center
Greater than 50 Feet	At 25 feet intervals

3.2 REMOVAL

A. Temporary trench shoring shall be removed concurrently with backfill operations.

END OF SECTION 01 73 30

DIVISION 2 - EXISTING CONDITIONS

SECTION 02 41 13 - REMOVING EXISTING PAVEMENTS AND STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Removing concrete paving, asphaltic concrete pavement, and base courses.

B. Removing concrete curbs, concrete curbs and gutters, sidewalks and driveways.

C. Removing pipe culverts and sewers.

D. Removing existing inlets and manholes.

E. Removing miscellaneous structures of concrete or masonry.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable codes for disposal of debris.

B. Coordinate removal work with utility companies.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Obtain advance approval from Architect/Engineer for dimensions and limits of removal work.

B. Identify known utilities below grade. Stake and flag locations.

DIVISION 31 - EARTHWORK

SECTION 31 20 00 - EARTHWORK (STRUCTURAL RELATED)

PART 1 - GENERAL

1. RELATED DOCUMENTS

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

2. SUMMARY

   a. This Section includes the following:
      1) Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
      2) Excavating and backfilling for construction of foundations.

3. DEFINITIONS

   a. Backfill: Soil materials used to fill an excavation.
      1) Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
      2) Final Backfill: Backfill placed over initial backfill to fill a trench.

   b. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

   c. Excavation: Removal of material encountered above subgrade elevations.
      1) Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
      2) Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.
      3) Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

d. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

e. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

f. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

4. SUBMITTALS

a. Samples: For the following:
   1) 30-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources.

b. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1) Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
   2) Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.

5. PROJECT CONDITIONS

a. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
   1) Notify Architect not less than two days in advance of proposed utility interruptions.
   2) Do not proceed with utility interruptions without Architect's written permission.
   3) Contact utility-locator service for area where Project is located before excavating.

b. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

1. SOIL MATERIALS

a. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

b. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Provide soil having a Liquid Limit of 37 or less and a Placticity Index of less than 18.

c. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
   1) Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

d. Backfill and Fill: Satisfactory soil materials.

PART 3 - EXECUTION

1. PREPARATION

a. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

b. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

2. DEWATERING

a. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

b. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1) Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

2) Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3. EXPLOSIVES

a. Explosives: Do not use explosives.

4. EXCAVATION, GENERAL

a. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
1) If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

5. EXCAVATION FOR STRUCTURES

a. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

6. EXCAVATION FOR WALKS AND PAVEMENTS

a. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

7. APPROVAL OF SUBGRADE

a. Notify Independent Testing Laboratory when excavations have reached required subgrade.

b. If Independent Testing Laboratory determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
1) Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

c. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

d. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

8. UNAUTHORIZED EXCAVATION

a. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
   1) Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

9. STORAGE OF SOIL MATERIALS

a. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1) Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

10. BACKFILL

a. Place and compact backfill in excavations promptly, but not before completing the following:
   1) Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
   2) Surveying locations of underground utilities for record documents.
   3) Inspecting and testing underground utilities.
   4) Removing concrete formwork.
   5) Removing trash and debris.
   6) Removing temporary shoring and bracing, and sheeting.

11. FILL

a. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

b. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

c. Place and compact fill material in layers to required elevations as follows:
   1) Under grass and planted areas, use satisfactory soil material.

2) Under walks and pavements, use satisfactory soil material.
3) Under steps and ramps, use satisfactory soil material.
4) Under building slabs, use satisfactory soil material.

12. MOISTURE CONTROL

a. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
   1) Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   2) Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

13. COMPACTION OF BACKFILLS AND FILLS

a. 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.

b. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

c. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1) Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
   2) Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 92 percent.
   3) Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

14. GRADING

a. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1) Provide a smooth transition between adjacent existing grades and new grades.

2) Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

b. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
1) Lawn or Unpaved Areas: Plus or minus 1 inch.
2) Walks: Plus or minus 1 inch.
3) Pavements: Plus or minus 1/2 inch.

c. Grading inside Construction Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

15. FIELD QUALITY CONTROL

a. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

b. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

c. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1) Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
2) Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
3) Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.

d. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

16. PROTECTION

a. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

b. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1) Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

c. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1) Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

17. DISPOSAL OF SURPLUS AND WASTE MATERIALS

a. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 20 00

SECTION 31 23 00 - EXCAVATION GRADING AND FILL (CIVIL RELATED)

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Protection of trees.

B. Field engineering for site layout.

C. Testing laboratory services.

D. Fill material for pavement sub base.

E. Concrete reinforcing.

F. Cast-In-Place concrete.

G. Informational reference to site survey and to subsurface conditions.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. ASTM D 698, Test for Moisture-Density Relations of Soils (Standard Proctor).
2. ASTM D 2922, Test for Density of Soil in Place by Nuclear Method.
3. ASTM D 2487, Classification of Soils for Engineering Purposes.

1.3 SUBMITTALS

A. Samples:

1. Submit 10 pound sample quantity of fill materials.
2. Submit 20 pound sample quantity of topsoil material.
3. Pack tightly in containers to prevent contamination.

1.4 GRADES

A. Carefully compare new grade requirements with existing conditions.

B. Provide necessary earth, grading and shaping work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sub base Material: Unwashed pit run or crushed gravel, crushed stone, or crushed slag, naturally or artificially graded with maximum aggregate size of 1-1/2 inches, as acceptable to testing laboratory.

B. Backfill and Fill Material: Soil materials free of debris, waste, frozen matter, vegetable and other deleterious matter, as acceptable to testing laboratory.

C. Select Fill: Imported lean clay with a narrow Plasticity Index (PI) range of 10 to 15.

D. Lime Treated Structural Fill: On-site clay mixture, free of silt, loam, friable or soluble materials and organic matter; treated in 6 inch lifts with 36 pounds per square yard of hydrated lime.

E. Backfill:

1. Free from rocks larger than 3 inches in size, alkali, salt, petroleum products, debris, waste, roots, vegetable and other deleterious matter.

2. Excess non-vegetated excavated soils available from site may be used if conforming to specified requirements.

F. Lime: Material conforming to TxDOT Item 264, "Hydrated Lime and Lime Slurry".

G. Soil Filter Fabric: Mirafi "1405" is specified; DuPont "Typar" is acceptable, or approved equal.

PART 3 - EXECUTION

3.1 OBSTRUCTIONS

A. Remove obstructions within lines of improvements.

B. Refer obstructions of questionable nature to Engineer.

C. Remove abandoned foundations down to 12 inches below finished grade, or the finished elevation of pavements and walks unless indicated otherwise on the drawings.

D. Remove foundations of light standards completely.

3.2 STRIPPING

A. Strip entire area to receive pavement and slabs on grade to a minimum depth of six inches to remove soil containing vegetated material.

B. Remove vegetated material from site as waste.

C. Remove topsoil; spread on areas already graded and prepared for topsoil, or deposit in storage piles convenient to areas subsequently to receive topsoil.

D. Scarify existing asphalt surfacing and flexible base course material and remove from site.

E. Remove existing site improvements in areas scheduled to receive lawns, buildings, and pavements.

F. Stripped material becomes property of Contractor; remove from Project site immediately and dispose of properly.

G. Maintain site surface drainage during construction.

3.3 EXCAVATION FOR UTILITY TRENCHES

A. Excavate using ladder-type trenching machine or backhoe unless indicated otherwise.

B. Cut trench sides vertical from trench bottom to one foot above top of pipe; slope back on stable slope above that point.

C. Extend trench width minimum 6 inches and maximum 18 inches each side of pipe.

D. Excavate trench to a minimum depth of 6 inches below bottom elevation of proposed pipelines.

E. Leave no more than 500 feet of trench open at one time.

F. Where augured hole is indicated, provide opening no larger than one inch greater than outside diameter of pipe bell.

3.4 DEWATERING

A. Keep excavations dry; maintain dewatered condition for depth of one foot below excavation bottom.

B. Operate suitable pumps necessary to keep excavations continuously free of water.

C. Discharge drainage waterlines into approved sewers only with appropriate approvals; use of sanitary sewer is prohibited.

D. Direct surface drainage away from excavated areas.

E. Control grading adjacent to excavations to prevent water running into excavated areas.

3.5 PERIMETER BACKFILL

A. Backfill exterior side of perimeter of structure with lime-treated on-site clay materials, carrying such fill up to indicated sub grades.

B. Backfill systematically and as early as possible to allow maximum time for natural settlement and compaction.

C. Commence backfilling after underground work has been inspected, tested, forms removed, and excavation cleaned of trash and debris.

D. Place and compact backfill to minimize settlement and avoid damage to work in place.

E. Place backfill simultaneously on both sides of freestanding structures; prevent wedging action against structure.

F. Place materials in successive horizontal layers of not more than 8 inches (4 inches for handheld tamping equipment) and uniformly compacted to 92% of maximum density as confirmed by testing laboratory.

3.6 UTILITY TRENCH BACKFILL

A. Pipe bedding and backfill requirements for sanitary sewers shall be as specified in Section 333100, Sanitary Sewage Systems, of these specifications.

B. Pipe bedding and backfill requirements for storm sewers shall be as specified in

Section 334100, Storm Sewage Systems, of these specifications.

C. Pipe bedding and backfill for water distribution system piping shall be in accordance with Section 331116, Water Distribution Systems, of these specifications.

D. Backfill trench as soon as possible after pipe has been laid, jointed, and inspected; complete backfilling at end of each day.

E. Within Pipe Zone: Place backfill material and hand tamp in 6 inch layers to one foot above top of pipe.

F. Use of bulldozer or similar tracked equipment is unacceptable for compaction.

3.7 PREPARATION OF SUBGRADE FOR PAVING, WALKS AND EXTERIOR SLABS

A. Cut and fill areas as required.

B. Proof roll sub grade with heavy roller. Cut out any soft area that cannot be compacted by surface rolling and replace with compacted select fill.

C. Provide select fill at areas where required to elevate sub grade. Lime Stabilization: Stabilize to depth of 8 inches with lime slurry in accordance with TxDOT Item 260. Subgrade beneath sidewalks shall not be lime stabilized.

D. Compaction should be as specified in Section 313213.19 Soil Stabilization Lime of these specifications.

E. Maintain site surface drainage during construction.

3.8 ROUGH GRADING

A. Shape sub grade to allow for maximum amount of natural settlement and compaction.

B. Remove debris, roots, branches, stones, in excess of 2 inches in size.

C. Remove subsoil which has been contaminated with petroleum products.

D. Excavate areas, to sub grade elevation, which are to receive paving and sidewalks.

E. Bring sub grade to required levels, profiles and contours, making gradual changes in grade; blend slopes into level areas.

F. Slope grade away from building minimum 2 inches in 10 feet unless indicated otherwise.

G. Cultivate sub grade to a depth of 3 inches where topsoil is to be placed; repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted sub grade.

H. Maintain site surface drainage during construction.

3.9 SURPLUS MATERIALS

A. Remove surplus subsoil from site.

B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

3.10 CLEAN-UP

A. Remove temporary structures, rubbish, and waste materials from work site daily.

END OF SECTION 31 23 00

SECTION 31 32 13 .16 - CEMENT STABILIZED SAND

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Submittal procedures.

B. Storm and sanitary sewerage systems.

C. Water distribution system.

1.2 QUALITY ASSURANCE

A. Reference Standards:

B. ASTM - American Society for Testing and Materials.

1. ASTM - American Society for Testing and Materials.

PART 2 - PRODUCTS

2.1 SAND

A. Unwashed and free of all foreign matter, meeting the following requirement for gradation:

TYPE SQUARE SIEVE	PERCENT RETAINED
1-1/4-inch	0-10
1/2-inch	10-20
3/8-inch	15-30
No. 4	30-65
No. 40	50-75

1. Material passing the No. 40 sieve:
   a. Plasticity Index less than 10.
   b. Liquid Limit less than 35.

2.2 CEMENT

A. C150 ASTM, Type 1.

2.3 WATER:

A. Potable.

PART 3 - EXECUTION

3.1 MIXING:

A. Use minimum 2 sacks of cement per cubic yard of mixture.

B. Use amount of water necessary to obtain optimum moisture content for mechanical tamping.

C. Mix cement, sand, and water in mechanical type mixer.

D. Performance requirement of mixture shall achieve an unconfined compressive strength of 100 P.S.I. in 48 hours at 95% compaction.

3.2 DELIVERY:

A. Deliver mixed material to job site in trucks of uniform capacity.

B. Stamp time of loading on tickets. Material placed more than 6 hours after loading, or material which has obtained an initial set, will be unacceptable as cement stabilized sand.

END OF SECTION 31 32 13.16

SECTION 31 32 13 .19 - SOIL STABILIZATION: LIME

PART 4 - GENERAL

4.1 DESCRIPTION

A. This Section specifies the requirements for providing lime stabilization of subgrade using the slurry placement method. Dry placement method is not allowed on this project.

B. Where lime stabilization is required within close proximity of the trees to be saved the Landscape Architect shall be consulted prior to the beginning of the lime stabilization in that area.

4.2 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. AASHTO: American Association of State Highway and Transportation Officials
2. T 219: Methods of Testing Lime for Chemical Constituents and Particle Sizes.
3. ASTM: American Society for Testing and Materials
4. D 698: Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb. Rammer and 12-in. Drop.
5. D 4318: Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
6. TxDOT: Texas Department of Transportation
7. Standard Specifications for Construction of Highways, Streets and Bridges -- latest edition.
8. Item 264 - LIME AND LIME SLURRY

4.3 SUBMITTALS

A. The following shall be submitted:

1. Certificates stating that the lime complies with the requirements of the TxDOT Standard Specifications, Item 264 - Lime and Lime Slurry.

2. Certified weight tickets with each delivery of bulk lime to the Site.

3. A complete list of the equipment proposed for prosecution of the Work for approval. Listing shall include the manufacturer's description and characteristics of each piece of equipment.

4.4 PRODUCT DELIVERY AND HANDLING

A. Lime shall be Type B, Commercial Lime Slurry.

4.5 ENVIRONMENTAL REQUIREMENTS

A. Lime shall neither be mixed nor placed when the ambient temperature is below 40 F and is falling.

B. Lime may be mixed and placed when the ambient temperature is above 35 F and rising.

C. Mixing and placing hydrated lime in windy conditions is prohibited.

PART 5 - PRODUCTS

5.1 MATERIALS

A. Commercial Lime Slurry

1. Shall be Type B, in accordance with TxDOT Standard Specifications Item 264 - LIME AND LIME SLURRY having a minimum "Dry Solids Content" of 35 percent by weight of slurry.

B. Water

1. Water shall be potable, from municipal supplies approved by the State or City Health Department.

PART 6 - EXECUTION

6.1 PREPARATION

A. The material indicated for lime stabilization shall be scarified to the proposed

bottom of the lime treatment and removed or wind-rowed to expose the secondary grade.

B. Any wet or unstable material in the exposed secondary grade, as determined in accordance with ASTM D 4318, shall be scarified, lime shall be added, and the area of the unstable material shall be compacted to a uniform stability with the balance of the secondary grade.

C. After the secondary grade has been uniformly compacted, the excavated material shall be returned to the area indicated for lime treatment. The material shall remain in a pulverized condition until lime slurry has been placed and mixed.

6.2 CONSTRUCTION

A. General

1. Lime shall be applied only to that area where the first mixing operations can be completed during the working day.

B. Slurry Placing

1. The lime shall be mixed with water in trucks with approved distributors and applied as a thin water suspension or slurry.

2. Lime slurry distribution shall be attained by making successive passes over a measured section of the area until the proper lime and optimum moisture content has been secured.

3. The distributor truck shall be provided with an agitator to keep lime and water uniformly mixed.

C. Mixing

1. First Mixing

a. After being thoroughly mixed and brought to the proper moisture content, soil and lime shall be left to cure 1 to 4 days as directed by the Engineer. During the curing period, the material shall be kept moist as directed by the Engineer.

2. Final Mixing

a. After the required curing time, the material shall be uniformly mixed

by approved methods.

3. All clods and lumps shall be reduced by pulverization methods so that when all nonslaking aggregates retained on the No. 4 sieve are removed, the remainder of the material shall meet the following requirements when tested dry by laboratory sieves:

   a. Minimum Passing 1-3/4 in. sieve 100 percent

   b. Minimum Passing 3/4 in. sieve 85 percent

4. Material shall be aerated or sprinkled as necessary to provide the optimum moisture before compacting.

D. Compaction

1. Compaction shall begin immediately after final mixing.

2. Compaction shall start at the bottom and continue until the entire depth of the mixture is uniformly compacted to the specified density.

3. Where the total compacted thickness is to be greater than 8 in., material shall be spread and compacted in two or more approximately equal layers. The first layer of the treated material shall be compacted so that the material will not be mixed with the underlying material.

4. Compaction shall be accomplished by using approved tamping rollers, except that final passes shall be done only with heavy pneumatic rollers.

5. All irregularities, depressions and weak spots disclosed by passes of heavy pneumatic rollers shall be corrected by replacing with satisfactory material and re-compacting as specified.

6. The lime-stabilized area shall be sprinkled and compacted to 98 percent of the maximum dry density in accordance with ASTM D 698 (Standard Proctor), Method A.

7. Tests shall be made by the independent testing laboratory to verify that compaction requirements have been met. A minimum of one (1) test per 300 square yards shall be made.

E. Finishing and Curing

1. After the final layer of the lime-stabilized subgrade has been compacted, the

subgrade shall be brought to the required lines and grades in accordance with the Drawings. The completed section shall then be finished with a pneumatic-tired roller which is sufficiently light to prevent hair cracking of the surface.

2. The completed section shall be moist cured for a minimum of 7 calendar days before further courses are added or any traffic is permitted on the stabilized surface.

END OF SECTION 31 32 13.19

SECTION 31 63 29 - DRILLED CONCRETE PIERS AND SHAFTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes dry-installed drilled piers.

1.2 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture.

C. Placement Drawings: For concrete reinforcement.

D. Welding certificates.

1.3 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Drilled-Pier Standard: Comply with ACI 336.1 unless modified in this Section.

C. Preinstallation Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for drilled piers.

2. The geotechnical report is included elsewhere in the Project Manual.

B. Survey Work: Engage a qualified land surveyor or professional engineer to perform surveys, layouts, and measurements for drilled piers. Before excavating, lay out each drilled pier to lines and levels required. Record actual measurements of each drilled pier's location, shaft diameter, bottom and top elevations, deviations from specified tolerances, and other specified data.

1. Record and maintain information pertinent to each drilled pier and cooperate with Owner's testing and inspecting agency to provide data for required reports.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Wire: ASTM A 82, as drawn.

2.2 CONCRETE MATERIALS

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

1. Portland Cement: ASTM C 150, Type I/II Supplement with not more than 25 percent of the following:

a. Fly Ash: ASTM C 618, Class C or Class F.

B. Normal-Weight Aggregate: ASTM C 33, graded, 1 ½ inch nominal maximum coarse-aggregate size.

C. Water: ASTM C 94/C 94M and potable.

D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2.3 CONCRETE MIXTURES AND MIXING

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 limits as if concrete were exposed to deicing chemicals.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

D. Proportion normal-weight concrete mixture as follows:

1. Compressive Strength (28 Days): 3000 psi.

2. Air Content: Do not air entrain concrete.

E. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Unclassified Excavation: Excavate to bearing elevations regardless of character of surface and subsurface conditions encountered.

B. Excavate shafts for drilled piers to indicated elevations. Remove loose material from bottom of excavation.

C. Notify and allow testing and inspecting agency to test and inspect bottom of excavation. If unsuitable bearing stratum is encountered, make adjustments to drilled piers as determined by Architect.

1. Do not excavate shafts deeper than elevations indicated unless approved by Architect.

2. Payment for additional authorized excavation will be according to Contract

provisions for changes in the Work.

D. Temporary Casings: Install watertight steel casings of sufficient length and thickness to prevent water seepage into shaft; to withstand compressive, displacement, and withdrawal stresses; and to maintain stability of shaft walls.

1. Remove temporary casings, maintained in plumb position, during concrete placement and before initial set of concrete.

E. Bells: Excavate bells for drilled piers to shape, base thickness, and slope angle indicated. Excavate bottom of bells to level plane and remove loose material before placing concrete.

F. Tolerances: Construct drilled piers to remain within ACI 336.1 tolerances.

3.2 INSTALLATION

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

B. Place concrete in continuous operation and without segregation immediately after inspection and approval of shaft by Owner's independent testing and inspecting agency.

C. Place concrete to fall vertically down the center of drilled pier without striking sides of shaft or steel reinforcement. Vibrate top 60 inches of concrete.

D. Coordinate withdrawal of temporary casings with concrete placement to maintain at least a 60 inch head of concrete above bottom of casing. Vibrate top 60 inches of concrete after withdrawal of temporary casing.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Drilled-Pier Tests and Inspections: For each drilled pier, before concrete placement.

1. Soil Testing: Bottom elevations, bearing capacities, and lengths of drilled piers indicated have been estimated from available soil data. Actual elevations and drilled-pier lengths and bearing capacities will be determined

by testing and inspecting agency. Final evaluations and approval of data will be determined by Architect.

C. Concrete Tests and Inspections: ACI 301.

END OF SECTION 31 63 29

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 01 90 - OPERATION AND MAINTENANCE OF PLANTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the minimum requirements for caring for and achieving an established landscape FOR THE ENTIRE CAMPUS including:

1. Maintenance of lawn areas and sod areas (existing and contractor provided).
2. Maintenance of trees and planting bed areas (existing and contractor provided).
3. Removal of weeds from tree saucers, lawn areas, planting beds, walkways, and paved areas.
4. Application of organic fertilizers, insecticides and herbicides and soil amendments.
5. Maintenance of entire existing irrigation system and watering requirements of campus vegetation.
6. General site cleanup, removal of trash and by-products of maintenance in landscape areas, sidewalks, parking lots and interior campus roadways.

1.2 INTENT OF ESTABLISHING LANDSCAPE /360 DAY SCHEDULED MAINTENANCE

A. The intent of this section shall begin when the Contractor begins work on the site for maintenance of existing trees, lawn and planting bed areas and shall continue when Contractor provided plant materials are installed, however, the 360 day scheduled maintenance period shall only begin when a date is established based upon written acceptance of the plant materials provided by the Landscape Architect.

B. At the completion of the 360 day maintenance period, the Contractor shall provide the Owner with an established landscape. During the construction period and the one year establishment period the Contractor shall care for and provide a project site that is attractive in appearance and shall keep the existing irrigation system

operational and water all plant materials and lawns to maintain a healthy and vigorous condition using accepted horticultural standards.

C. Contractor shall be responsible for establishing the landscape for a period of 360 calendar days beginning on the written date of acceptance for the plant materials provided by the Landscape Architect.

1.3 CONTRACTORS PERFORMANCE

A. The Contractor shall perform all work required to fulfill the intent of this section. The workmen shall be neat in appearance, perform their work in a professional manner, keep noise to a minimum, and stage their work from a location on the site out of the way of the mainstream of the users. The Contractor shall provide all employees with the same uniform clearly identifying the company. In general, the Contractor's presence on the site shall be as inconspicuous as possible.

1.4 NEGLECT AND VANDALISM

A. Turf or plants that are damaged or killed due to Contractor's operations, negligence, or chemicals shall be replaced by the Contractor at no cost to the Owner.

B. Structures that are damaged due to the Contractor's operations shall be replaced by the Contractor at no cost to the Owner.

C. Damage to or thefts of landscaping installations not caused by the Contractor shall be corrected at the Owner’s expense upon receipt of the Owner’s written authorization to proceed. Contractor shall be responsible for bringing such areas to the attention of the Owner’s Representative in a timely manner. Upon notifying Owner of damaged or impacted areas due to theft, Contractor shall be responsible for providing a cost proposal to restore the impacted areas. Contractor shall only proceed with repairs upon written approval of the Owner.

1.5 SUBMITTALS

A. In accordance with Section 01 33 00 -Submittal Procedures and 01 78 39 Project Record Documents of these specifications, the following shall be submitted:

1. Manufacturer's data including product specifications, application instructions and precautions if any are necessary.

PART 2 - PRODUCTS

2.1 SOIL PRODUCTS

A. Mulch: As specified in Section 32 90 00 – Planting of these specifications.

B. Compost: As specified in Section 32 90 00 – Planting of these specifications.

C. Weed Control: Post-emergent weed control as specified in Section 32 90 00 – Planting of these specifications. Pre-emergent weed control shall be Corn Glutten Crumbs at a rate of 20lbs per 1,000sf.

2.2 COMMERCIAL ORGANIC FERTILIZER PRODUCTS

A. Super Seaweed at manufacturer recommended rates mixed with ½ oz. garlic oil, ½ oz. soybean oil per gallon of water.

B. MicroLife 6-2-4 Biological Fertilizer, MicroLife Humates Plus and MicroGro Granular Inoculant.

C. Organic Fertilizers are available from but not limited to: San Jacinto Environmental Supplies, 2221 West 34th St., Tel.no. 713-957-0909.

2.3 ORGANIC INSECT AND DISEASE CONTROL PRODUCTS

A. Fire Ant Control: As per Section 32 90 00 for Trees, Shrubs and Groundcover. Refer to 32 92 13 for these materials for hydro-mulch areas.

B. MicroLife (5-1-3) Brown Patch with "Anti-Disease", Neem Oil Organic Fungicide, MicroGro AF W.P., and MicroGro Granular.

C. Fungicide (Not for Lawn or hydromulched areas):

1. Systemic Fungicide with Benomyl by Greenlight Products, San Antonio, Texas 78217.

2. General Purpose Fungicide with manganese and zinc by Greenlight Products.

D. Organic Insect and Disease control products are available from but not limited to: San Jacinto Environmental Supplies, 2221 West 34th St., Tel.no. 713-957-0909.

2.4 MACHINERY

A. Machinery requirements listed under this Section are not intended to be restrictions of specific manufacturers or models unless so stated. Specific mention of manufacturers is intended as a guide to illustrate the final product of maintenance operations desired.

B. Lawn Mowers: Rotary or reel in good working order, finely tuned to protect the turf from excessive exhaust fumes. Blades shall be sharp.

C. Turf Edger: Rigid or flexible blade producing a fine clean edge where turf meets walkways, pavements, curbs, headers or buildings.

D. Fertilizer Spreaders: Cyclone. No visible overlapping of applications will be permitted.

E. Pruning Tools: Maintain in good working order and with sharp cutting edges. Disinfect pruning tools after using them to remove diseased limbs.

PART 3 - EXECUTION

3.1 TREES

A. Remove any existing above ground stakes and guys from all existing trees at start of Work.

B. Remove any excess mulch from existing tree saucers. Mulch shall only be 2 inches in depth within the tree saucer. Remove any mulch from within a 12 inch distance from the base of tree trunks to expose root flare of trees. Relocate excess mulch if present to areas that may be lacking a mulch cover.

C. Hand-turn all existing tree saucer soil areas to aerate the soils around the base of the existing trees only (not required for Contractor provided and installed trees). Do not injure any tree roots. Perform work when the trees are scheduled for their first fertilization.

D. Check installations of Contractor provided tree staples and adjust as necessary to ensure that trees are properly positioned and secured throughout the maintenance period. (Tree staples are only for Contractor provided trees and transplanted trees and are not to be installed on existing trees)

E. Remove suckers from trees in accordance with the Schedule of Article 3.10.

F. Edge, weed, fertilize, mulch, and aerate tree saucers in accordance with the Schedule of Article 3.10.

G. Prune and shape trees in accordance with the Schedule of Article 3.10. Do NOT prune trees for purposes not listed below without Owner approval. See paragraph F for Crape Myrtle Tree Pruning. Prune trees in order to:

1. Remove diseased or storm-damaged branches
2. To thin out the crown to permit new growth and better air circulation.
3. To reduce remove obstructing lower branches where the branches overhang walkways. A clear height of 7 ft. shall be maintained.

H. CRAPE MYRTLE TREE PRUNING: Prune only those stems that are no more round than a human's index finger and only prune to approximately 6 inches above the intersection of the stem that meets a branch. Prune suckers that have grown at the base of the trunk and any twiggy growth that has emerged up and along the main trunk(s). DO NOT PRUNE CRAPE MYRTLE TREES WHEN OTHER TREES ON SITE ARE BEING PRUNED. Contractor shall be responsible for replacing any damaged crape myrtle trees due to poor pruning practices. Only prune one time during the year, the first week of March in accordance with the Schedule of Article 3.10.

I. Control trees insects.

J. Control disease in accordance with the Schedule of Article 3.10 by spraying, either pruning or removing or both, disease damaged plant material.

K. Fertilize trees as indicated below in paragraph 3.3C, in accordance with the Schedule of Article 3.10.

3.2 TREE SAUCERS

A. Maintain tree saucers at existing size of circumference in a neat circle. Mulch depth shall be two inches. Mulch will not be accepted if mounded around tree. Mulch 3 – 6 inches away from base of trunk. Do NOT mulch against the tree trunk. Apply mulch in accordance with the Schedule of Article 3.10.

3.3 OVERALL PLANTING MAINTENANCE

A. Mowing:

1. Mowing for Existing Sod: Existing sod areas shall have mowing height set to 3 inches. Never cut more than 1/3 of the total length of the blade at any one mowing. Do not bag clippings during June through September.

2. Mowing for sod areas shall have the mowers set to accommodate a 1.5" mowing height. The first mowing shall not be attempted until the hydro-mulched areas are firmly rooted and securely in place. Not more than 30 percent of the grass leaf shall be removed by the initial or subsequent mowing. Care shall be taken to assure cutting blades are maintained in a sharp condition. Do not scalp the lawn or cut more than one half the existing top-growth in one mowing. Remove or catch these clippings. Do not allow clippings to remain on lawn surface more than four hours.

B. Watering: The Contractor shall monitor the existing irrigation system and hand watering operations to ensure adequate water is being applied to the site. Watering should begin immediately after installation. The general contractor shall designate the party responsible to ensure adequate water supply and application. The existing irrigation system and hand watering shall be viewed as a supplement to Houston's natural rainfall and not vise-a-versa. The Owner's objective is to condition the plant material to survive on limited water. Watering shall be provided according to the guidelines provided on the Drawings with an effort to provide a one -hour deep in accordance with the Schedule of Article 3.10. Once established, Contractor shall reduce watering of turf thus allowing the turf to acclimatize to Houston's natural rainfall following the schedule for deep watering.

C. Hand-turn all existing planting bed soil areas to aerate the soils around the base of existing plant materials within planting beds only (not required for Contractor provided and installed planting bed areas). Do not injure any existing tree and/or shrub roots. Perform work when the planting bed areas are scheduled for their first fertilization.

D. Fertilizing for Trees and Planting bed areas: Fertilize in accordance with the Schedule of Article 3.10, at manufacturer's recommended rate with products noted above and as follows:

1. Spring through Fall (March through November): Apply foliar spray Super Seaweed at recommended rates. Add ½ oz. garlic oil, ½ oz. Soybean Oil per gallon of water to the mix and spray to the point of dripping off leaves.

E. Fertilizing for Lawn areas: Fertilize in accordance with the Schedule of Article 3.10, at manufacturer's recommended rate with products noted above and as follows:

1. Spring (March, April, May): Apply MicroLife 6-2-4 Biological Fertilizer and MicroLife Humates Plus at rates specified by the manufacturer.

2. Summer (June, July, August, September): Apply MicroLife Humates Plus at rates specified by the manufacturer.

3. Fall (October, November): Apply MicroLife 6-2-4 Biological Fertilizer and MicroGro Granular Inoculant on the same day at rates specified by the manufacturer.

4. Spray with SuperSeawead 3 times per year just prior to start of spring, summer and fall.

5. One month prior to end of first year of maintenance contractor shall have soil pH tested and make recommendations for any adjustments to fertilization materials.

F. Insects: Control insects with applications of organic insecticides at the manufacturer's recommended rates. Contractor shall ensure that the insects are detrimental to the plant habitat prior to treating for insect removal. Contractor shall be responsible for notifying Owner's Representative of problem areas and presenting a cost proposal for applying the appropriate organic pesticides in a timely manner. Allowing the insects to continue without taking advance steps resulting in the death of the plant materials will become the Contractor's responsibility to cover all costs to repair and replace damaged areas and materials.

G. Diseases: Where they first appear, spray for diseases with a commercial organic fungicides including but not limited to (depending upon the disease): MicroLife (5-1-3) Brown Patch with "Anti-Disease", Neem Oil Organic Fungicide, MicroGro AF W.P., and MicroGro Granular. Provide in accordance with the manufacturer's recommendations. Contractor shall be responsible for notifying Owner's Representative of problem areas and presenting a cost proposal for applying the appropriate organic fungicide in a timely manner. Allowing the disease to continue

without taking advance steps resulting in the death of the plant materials will become the Contractor's responsibility to cover all costs to repair and replace damaged areas and materials.

3.4 WEED CONTROL

A. Weeds shall be removed from lawn areas, tree saucers, planting beds, vegetation growing through pavements, expansion joints, TemPark fabric, beach pebble and black star gravel areas using organic products noted above. Weed removal shall be in accordance with the Schedule of Article 3.10.

B. Apply organic pre-emergent weed killer in accordance with manufacturer's recommendation and in accordance with the Schedule of Article 3.10.

3.5 EXISTING IRRIGATION SYSTEM AND HAND WATERING MAINTENANCE

A. Contractor shall monitor the irrigation to insure that the system operates efficiently reducing water waste. Contractor shall repair all leaks at time of discovery and within 24 hours of notification by the Owner's Representative if discovered by the Owner or Owner's Representative. Contractor shall maintain the irrigation system as indicated in Specification Section 32 80 00.

B. Contractor shall maintain and store Contractor provided Tree Gator bags that are to be used for Contractor provided trees. Contractor shall not store Tree Gator bags on campus unless written authorization is obtained from the Owner's Representative. At end of Maintenance and Operations time period, Contractor shall turn over Tree Gator bags to Owner for Owner's use. If Tree Gator bags are in poor condition at end of maintenance period, i.e. tears or evidence of eminent tears, new bags are to be provided to the Owner at no additional cost to the Owner. Contractor is responsible for removing the Tree Gator bags from the site when not in use. Owner will not be responsible for vandalism of the Tree Gator bags if the Contractor neglects to properly store the bags when not in use.

C. If discovered by Owner or Owner's Representative, Owner reserves the right to shut down existing irrigation system until repairs are made and Contractor will be held accountable for damage to plant materials. Contractor shall adjust pressure to eliminate water fragmentation, "fogging," at heads. Contractor shall monitor operation time to reduce water runoff.

D. Contractor will coordinate ANY CHANGES IN watering times due to local climate conditions with Owner Representative in order to avoid any conflicts and to monitor the setting of the Irrigation Controller.

3.6 GENERAL CLEAN UP

A. Contractor shall dispose of any waste materials or refuse from contractor operations off-site except where separate agreement is reached with Owner.

B. Plant growth shall be prevented in cracks in decomposed granite walks and paved areas, expansion joints, curb joints, and black star gravel areas.

C. Leaves, papers, grass clippings (not during summer months), or other debris shall be removed in accordance with the Schedule of Article 3.10 as noted under Litter Pickup.

D. Litter pickup shall include all debris and litter occurring within the limits of right-of-way. Litter pickup and trash can content removal shall be in accordance with Schedule of Article 3.10, under Litter Pickup.

E. Mulch beds shall be cleaned of all debris and litter. Mulch that has been scattered outside of mulch bed or has been washed outside of mulch bed by rain shall be removed so that the areas around mulch beds are always clean and neat.

F. Cleanup shall include removal of all trash from on-site containers. Contractor shall supply trash can liners.

3.7 SCHEDULE

A. The Contractor shall provide the Owner with a written schedule on the first day of each month detailing all work to be performed for that month based upon the provided schedule of this section.

B. All work under this Section shall be performed in accordance with the attached Schedule of Article 3.10.

3.8 GUARANTY AND REPLACEMENT

A. Guaranty: Plants shall be guaranteed for a period of one year from the date of written acceptance and shall be alive and in satisfactory growth at the end of the guaranty period. Plants damaged or killed as a result of hail, wind, lightning, fire,

freeze, theft, vandalism, construction operation or occupancy of building are not covered by the guaranty. Where Contractor sees any such damage, he shall list item and location and report to the Owner.

B. Replacement:At any time during the establishment period, any dead plant that is under guarantee period shall be replaced within 2 weeks of Owner's Representative request at no additional cost to Owner. At the end of the one year establishment period, any plant that is dead; or 50% or more of the main branch structure dead; or not in satisfactory growth as determined by the Owner's Representative shall be removed from the site and shall be replaced as soon as normal conditions for planting permit. Plants which die or are dead at time of start of Work, at no fault to the Contractor shall be replaced at a price and size agreed on by the Owner and Contractor prior to the replacement

3.9 SCHEDULE

OPERATION	FREQUENCY												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Prune Trees (NOT CRAPE MYRTLES)											1		1
Prune Crape Myrtle Trees		1											1
Weed all Site Areas (Pre-Emergent application)		1											1
Lawn Fertilization			1	1	1	1	1	1	1	1	1		9
Lawn SuperSeaweed Application			1			1			1				3
Lawn Mowing (St. Augustine)	1		1	1	4	4	4	4	1		1		22
Tree and Planting Bed Fertilization			1	1	1	1	1	1	1	1	1		9
Weed all Site Areas (Post-emergent application and by hand if needed)	1		1	1	4	4	4	4	1		1		22
Mulch/Aerate all Site Areas	1			1	1				1				3
Tree Sucker Removal				1	1	1	1	1					5
Insect Control (Inspect)			1		1		1		1		1		5
Litter Pickup (General Clean up)	2	2	4	4	4	4	4	4	4	4	2	2	40
Disease Control (Inspect)			1		1		1		1		1		5
Edging saucers, planting beds, walks	1		1	1	4	4	4	4	1		1	1	22
1 hr. Deep Watering	1	1	1	1	1	4	4	4	4	1	1	1	128hrs
Irrigation System Maintenance	1	1	1	1	1	1	1	1	1	1	1	1	12

END OF SECTION

SECTION 32 13 13 - PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the requirements for providing, placing, curing and protecting Portland cement concrete paving, with or without reinforcement as indicated, constructed on a prepared subgrade.

1.2 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section:

1. ACI: American Concrete Institute:
   a. 301: Specifications for Structural Concrete for Buildings.
   b. 316R: Recommendations for Construction of Concrete Pavements and Concrete Bases.
2. ASTM: American Society for Testing and Materials:
   a. A 615:Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (with Supplement + S1).
   b. C 150:Specification for Portland Cement Type I or Type II.
   c. C 309:Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
   d. C 881:Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
   e. D 1565: Specifications for Flexible Cellular Materials Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
   f. D 1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient bituminous Types).
   g. D 1752: Specifications for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
   h. D 3405: Specification for Joint Sealants, Hot-Poured, for Portland Cement Concrete Pavement.

3. TxDOT: Texas Department of Transportation:
   a. Standard Specifications for Construction of Highways, Streets, and Bridges -- Latest Edition.
      1) Item 360, CONCRETE PAVEMENT.

B. Formwork Tolerances
   1. Formwork tolerances shall be as specified in ACI 316 R, Chapter 5.

C. Finishing Tolerance
   1. The top surface of pavement shall have a Class B tolerance as specified in ACI 316 R, Chapter 12.5 and ACI 301, Chapter 11.9.

D. The Portland Cement Paving Contractor/Subcontractor shall provide HCCS with evidence of his/her ability to perform the specified work. This evidence shall be in the form of at least five (5) successfully completed Portland Cement paving projects for either the HCCS, Harris County, City of Houston or any combination of the three.
   1. This list of projects shall be submitted to HCCS prior to any paving operations beginning so that HCCS will be able to inspect the quality of workmanship at the site and approve the Contractor/Subcontractor.

1.3 SUBMITTALS

A. In accordance with Section 013300 – Submittal Procedures of these Specifications, the following shall be submitted:
   1. Reinforcement Materials:
      a. As required in Section 032100 – Concrete Reinforcement of these Specifications.
   2. Concrete Materials:
      a. As required in Sections 311373.19 – Cast-in-Place Concrete, and 033013 – Portland Cement Concrete of these Specifications.
   3. Joint Materials:
      a. As required in Section 321319 – Concrete Pavement Joints of these Specifications.

1.4 EXTENDED WARRANTY

A. Manufacturer of joint sealant shall provide at least a 1 year written warranty against material degradation or failure and water and foreign matter infiltration through the joint from the time of written acceptance of the Work. This warranty shall not limit HCCS's rights or remedies as may otherwise be afforded under law or statute.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms:

1. Metal forms, as indicated in ACI 316 R, Chapter 5.

B. Welded Steel Wire Fabric:

1. Plain wire fabric, as specified in Section 032100 - Concrete Reinforcement of these Specifications.

C. Reinforcing Steel Bars:

1. As specified in Section 032100 - Concrete Reinforcement of these Specifications.

D. Dowel Bars:

1. Smooth, ASTM A 615 + S1, Grade 60, new billet steel, coated with a water-resistant lubricant immediately prior to placement of concrete in which unbonded ends of bars are to be embedded.

E. Dowel Bar Sleeves:

1. Sleeves, PVC or plastic, slightly larger than dowel bars, closed end, a minimum of 6 in. long, with 1-1/2 in. long compressible insert.

F. Concrete:

1. Class 3000, as specified in Section 321313 - Portland Cement Concrete of these Specifications.

G. Membrane Forming Curing Compound:

1. ASTM C 309, Type 2, unless otherwise directed.

H. Joint Materials:

1. Preformed Expansion Joint Filler: ASTM D 1751, ASTM D 1752, and D 1565.

2. Joint Sealing Material: See Section 321319, Concrete Pavement Joints of these Specifications.

I. Form Coating:

1. Commercial formulation form-coating compounds that will neither bond with, stain, nor adversely affect concrete surfaces and will not impair subsequent treatment of concrete surfaces. Contractor shall submit sample for approval prior to use.

J. Precast Concrete Wheel Stops:

1. Accurately formed and finished, of size and shape as indicated, reinforced and anchored as required. Fabricate wheel stops on Site or substitute approved precast units of like design and dimensions.

K. Epoxy Bonding Grout:

1. ASTM C 881, Type I.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Prepared subgrade shall be proof-rolled to check for unstable areas and need for additional compaction. Do not begin paving work until such deficiencies have been corrected and subgrade is ready to receive paving.

B. Loose material shall be removed from the compacted subgrade immediately prior to placing concrete and subgrade shall be uniformly dampened.

3.2 SETTING FORMS

A. Forms shall be set in accordance with the recommendations of ACI 316 R, Chapter 5, and as specified herein.

B. Forms shall be set in sufficient quantity to allow continuous progress of concrete placement, and to ensure that forms shall remain in place not less than 24 hours.

C. Forms shall be cleaned after each use and coated with an approved form release agent prior to each use.

3.3 INSTALLATION OF JOINTS, REINFORCEMENT, AND SEALANT

A. Joints and reinforcement shall be installed in accordance with the recommendations of ACI 316 R, Chapter 6, as specified in Section 032100 – Concrete Reinforcement of these Specifications, and in Section 321319 – Concrete Pavement Joints.

B. Sealant manufacturer's instructions and procedures shall be followed so as not to invalidate the warranty.

3.4 PLACING AND FINISHING CONCRETE

A. Concrete shall be placed and finished in accordance with the recommendations of ACI 316 R, Chapters 10 and 12.5, and as specified in Section 321373.19 -Cast-in-Place Concrete of these Specifications.

3.5 CURING AND PROTECTING CONCRETE

A. Concrete shall be cured in accordance with the recommendations of ACI 316 R, Chapter 11, using the membrane curing method and materials.

B. Protection as recommended in ACI 316 R, Chapter 11 shall be provided until written acceptance by HCCS.

3.6 INSTALLATION OF CONCRETE WHEEL STOPS

A. Install concrete wheel stops where indicated and in accordance with manufacturer's installation instructions as required. Where dowels are to be embedded into concrete, embed with epoxy bonding grout.

3.7 FIELD QUALITY CONTROL

A. Coring

1. After the pavement is placed and before final acceptance the Engineer may elect to determine pavement thickness by cores cut from the pavement or direct measurement of the edge thickness. Acceptable pavement thickness shall be deficient by no more than two tenths of an inch. Core holes shall be promptly repaired with concrete conforming to the requirements specified

herein by the Contractor at no cost to HCCS.

B. Deficient Pavement Price Adjustments

1. Where the average thickness of pavement is deficient in thickness by more than 0.2 inch, but not more than 0.75 inch, payment will be made at an adjusted price as specified in the following table.

Concrete Pavement Deficiency

Deficiency in Thickness Determined by Cores Inches	Proportional Part of Contract Price Allowed
0.00 to 0.20	100 percent
Over 0.20 to 0.30	80 percent
Over 0.30 to 0.40	72 percent
Over 0.40 to 0.50	68 percent
Over 0.50 to 0.75	57 percent

2. Any area of pavement found deficient in thickness by more than 0.75 of an inch but not more than one inch or 1/8 of the plan thickness, whichever is greater, shall be evaluated by the Engineer. If, in the judgment of the Engineer, the area of such deficiency should not be removed and replaced, there will be no payment for the area retained. If, in the judgment of the Engineer, the area of such deficiency warrants removal, the area shall be removed and replaced, at the Contractor's entire expense, with concrete of the thickness shown on the plans. Deficient pavement shall be removed for the full area of the slab between joints, or between pre-established limits.

END OF SECTION 32 13 13

SECTION 32 13 13 .26 - CONCRETE WALKS AND RAMPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the requirements for providing, placing, curing and protecting Portland cement concrete walks, wheelchair and driveway ramps, constructed on a prepared subgrade.

1.2 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. ACI: American Concrete Institute
   a. 301: Specifications for Structural Concrete for Buildings.
   b. 316R: Recommendations for Construction of Concrete Pavements and Concrete Bases.
2. ASTM: American Society for Testing and Materials
   a. C 150: Specification for Portland Cement Type I or Type II.
   b. C 309: Specification for Liquid Membrane - Forming Compounds for Curing Concrete.
   c. D 1565: Specifications for Flexible Cellular Materials Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
   d. D 1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
   e. D 1752: Specifications for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
   f. D 3405: Specification for Joint Sealants, Hot-Poured, for Portland Cement Concrete Pavement.
   g. C 920:Standard Specification for Elastomeric Joint Sealants.

1.3 SUBMITTALS

A. The following shall be submitted:

1. Reinforcement Materials

a. As required in Section 032100 – Concrete Reinforcement of these Specifications.

2. Concrete Materials

a. As required in Sections 321373.19 – Cast-in-Place Concrete, and 321313 – Portland Cement Concrete of these Specifications.

1.4 EXTENDED WARRANTY

A. Manufacturer of joint sealant shall provide at least a 1 year written warranty against material degradation or failure and water and foreign matter infiltration through the joint from the time of written acceptance of the Work. This warranty shall not limit HCCS rights or remedies as may otherwise be afforded under law or statute.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Forms

1. Either wood or metal, straight and free of warp.

B. Reinforcing Steel Bars

1. As specified in Section 032100 – Concrete Reinforcement of these Specifications.

C. Welded Steel Wire Fabric

1. Plain wire fabric, as specified in Section 032100 – Concrete Reinforcement of these Specifications.

D. Concrete

1. Class 3000, as specified in Section 321313 – Portland Cement Concrete of these Specifications.

E. Membrane Forming Curing Compound

1. ASTM C 309, Type 2, unless otherwise directed.

F. Joint Materials

1. Preformed Expansion Joint Filler: ASTM 1565, ASTM D 1751, and ASTM 1752.

2. Joint Sealing Material: See Section 321319 – Concrete Pavement Joints of these Specifications.

G. Form Coating

1. Commercial formulation form-coating compound that will neither bond with, stain, nor adversely affect concrete surfaces and will not impair subsequent treatment of concrete surfaces.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Prepared subgrade shall be inspected for unstable or unsuitable areas and need for additional compaction. Do not begin walk or ramp construction until all such deficiencies have been corrected.

B. Loose and foreign material shall be removed from the compacted subgrade immediately prior to placing concrete, and subgrade shall be uniformly dampened.

3.2 SETTING FORMS

A. Forms shall be set to the line and grade indicated and shall be securely staked to maintain set position during depositing and curing of concrete.

B. Forms shall be set in sufficient quantity to allow continuous progress of concrete placement, and to ensure that forms shall remain in place not less than 24 hours.

C. Forms shall be cleaned after each use and coated with an approved form release agent prior to each use.

3.3 INSTALLATION OF JOINTS, REINFORCEMENT, AND SEALANT

A. Reinforcement shall be installed as indicated on the Drawings and as specified in Section 032100 - Concrete Reinforcement of these Specifications.

B. Walks shall be constructed in sections, of the length indicated on the Drawings, with sections a minimum of 8 ft. long and a maximum of 20 ft. long. Sections shall be separated by joint fillers placed vertically and at right angles to the longitudinal axis of the walk. Transverse scored control joints shall be spaced at a dimension no greater than the width of the sidewalk.

C. Expansion joint fillers shall be installed for the full length and depth of joints, where walks or ramps abut rigid construction, and where obstructions protrude through walks or ramps.

D. Sealant manufacturer's instructions and procedures shall be followed so as not to invalidate the warranty.

3.4 PLACING AND FINISHING CONCRETE

A. Concrete shall be placed and finished as specified in Section 321373.19 - Cast-in-Place Concrete of these Specifications, and ACI 301, Chapter 11.9 and ACI 316R, Chapters 10 and 12.5.

B. Concrete shall be consolidated in accordance with Section 321373.19 - Cast-In-Place Concrete of these Specifications.

C. The top surface shall be wood floated to a uniform gritty texture. The edges and joints shall be rounded using an edging tool having a radius of 1/8 in. Scored joints shall be placed in a regular pattern, as indicated on the Drawings.

3.5 WALKS AND RAMPS

A. Thickness

1. Walk and ramp thickness shall be as indicated on Drawings.

B. Deficient Thickness

1. Thickness shall be determined in accordance with Item 360, Paragraph 360.13 of the TxDOT Standard Specifications.

2. Price adjustments for thickness deficiencies will be determined in accordance with Item 360, ARTICLE 360.13, SUBARTICLE of the TxDOT Standard Specifications.

3.6 CURING AND PROTECTING

A. Concrete shall be cured in accordance with the recommendations of ACI 316 R, Chapter 11, using the membrane curing method and materials.

B. Protection as recommended in ACI 316 R, Chapter 11, shall be provided until written acceptance by HCCS.

END OF SECTION 32 13 13.26

SECTION 32 13 19 - CONCRETE PAVEMENT JOINTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Joints for concrete paving; concrete sidewalks; concrete driveways, curbs, and curb and gutters.

B. Saw-cutting existing concrete or asphalt pavements for new joints.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.3 REFERENCES

A. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

B. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

C. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

D. ASTM D 3405 - Standard Specification for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements.

1.4 SUBMITTALS

A. Submit product data and samples in accordance with requirements of Section 013300 – Submittal Procedures.

B. Submit product data for joint sealing compound and proposed sealing equipment for approval.

C. Submit samples of dowel cup, metal supports, and deformed metal strip for

approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Board Expansion Joint Material: Filler board of selected stock. Use wood of density and type as follows:

B. Preformed Expansion Joint Material: Bituminous fiber and bituminous mastic composition material conforming to ASTM D 994 and ASTM D 1751.

C. Joint Sealing Compound: Hot-poured rubber-asphalt compound conforming to ASTM D 3405.

D. Load Transmission Devices:

1. Smooth, steel dowel bars conforming to ASTM A 615, Grade 60. When indicated on Drawings, encase one end of dowel bar in approved cap having inside diameter 1/16 inch greater than diameter of dowel bar.

2. Deformed steel tie bars conforming to ASTM A 615, Grade 60.

E. Metal Supports for Reinforcing Steel and Joint Assembly: Employ metal supports of approved shape and size that will secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete. Space supports as directed by Engineer.

PART 3 - EXECUTION

3.1 PLACEMENT

A. When new work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.

B. If the limit of removal of existing concrete or asphaltic pavement does not fall on existing joint, saw cut existing pavement minimum of 2 inches deep to provide straight, smooth joint surface without chipping, spalling or cracks.

3.2 CONSTRUCTION JOINTS

A. Place transverse construction joint wherever concrete placement must be stopped for more than 30 minutes. Place longitudinal construction joints at interior edges of pavement lanes using No. 6 deformed tie bars, 30 inches long and spaced 18 inches on centers.

3.3 EXPANSION JOINTS

A. Place 3/4-inch expansion joints at radius points of curb returns for cross street intersections, or as located in adjacent pavement but no further than 80 feet apart. Use no boards shorter than 6 feet. When pavement is 24 feet or narrower, use not more than 2 lengths of board. Secure pieces to form straight joint. Shape board filler accurately to cross section of concrete slab. Use load transmission devices of type and size shown on Drawings unless otherwise specified or shown as "No Load Transfer Device." Seal with joint sealing compound.

3.4 CONTRACTION JOINTS

A. Place contraction joints at same locations as in adjacent pavement or at spaces indicated on Drawings. Place smoothed, painted and oiled dowels accurately and normal to joint. Seal groove with joint sealing compound.

3.5 LONGITUDINAL WEAKENED PLANE JOINTS

A. Place longitudinal weakened plane joints at spaces indicated on Drawings. Seal groove with joint sealing compound.

3.6 SAWED JOINTS

A. Use sawed joints as an alternate to contraction and weakened plane joints. Circular cutter shall be capable of cutting straight line groove minimum of 1/2 inch wide. Depth shall be one quarter of pavement thickness plus 1/2 inch. Commence sawing as soon as concrete has hardened sufficiently to permit cutting without chipping, spalling or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing within 24 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.

B. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Provide at least one standby saw in good working order. Maintain an ample supply of saw blades at work site at all times during sawing operations. Sawing equipment shall be on job at all times during concrete placement.

3.7 JOINTS FOR CURB, CURB AND GUTTER

A. Place 3/4-inch preformed expansion joints through curb and gutters at locations of expansion and contraction joints in pavement; at end of radius returns at street intersections and driveways; and at curb inlets. Maximum spacing shall be 120-foot centers.

3.8 JOINTS FOR CONCRETE SIDEWALKS

A. Provide 3/4-inch expansion joints conforming to ASTM A 1751 along and across sidewalk at back of curbs, at intersections with driveways, steps, and walls; and across walk at intervals not to exceed 36 feet. Provide expansion joint material conforming to ASTM D 994 for small radius curves and around fire hydrants and utility poles. Extend the expansion joint material full depth of the slab.

3.9 JOINTS FOR CONCRETE DRIVEWAYS

A. Provide 3/4-inch expansion joints conforming to ASTM D 1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. Extend expansion joint material full depth of slab.

3.10 JOINT SEALING

A. Seal joints only when surface and joints are dry, ambient temperature is above 50 degrees F and less than 85 degrees F, and weather is not foggy or rainy.

B. Joint sealing equipment shall be in like new working condition throughout the joint sealing operation, and be approved by Engineer. Use concrete grooving machine or power-operated wire brush and other equipment such as plow, brooms, brushes, blowers or hydro or abrasive cleaning as required to produce satisfactory joints.

C. Clean joints of loose scale, dirt, dust and curing compound. The term joint includes

wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.

D. Fill joints neatly with joint sealer to depth shown. Pour sufficient joint sealer into joints so that, upon completion, surface of sealer within joint will be 1/4 inch above level of adjacent surface or at elevation as directed.

3.11 PROTECTION

A. Maintain joints in good condition until completion of Work.

B. Replace damaged joints material with new material as required by this Section.

END OF SECTION 32 13 19

SECTION 32 14 00 - UNIT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Concrete pavers set in sand setting beds over reinforced concrete base.

B. Edge restraints for unit pavers.

1.2 SUBMITTALS

A. Product Data: For materials other than water and aggregates.

B. Samples for unit pavers, joint materials and edge restraints.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups for each form and pattern of unit paver.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or build on frozen subgrade or setting beds.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936, made from normal-weight aggregates.

1. Basis-of-Design Product: Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

a. Pavestone

b. Mutual Materials

c. Or approved equal Thickness: 2-3/8 inches.

2. Rectangular, Face Size and Shape: 3-7/8 inches x 7-13/16 inches.

3. Square, Face Size and Shape: 7-13/16 x 7-13/16 inches.

4. Color: As selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

A. Aluminum Edge Restraints: L-shaped, 1/8-inch thick by 2-1/4-inch- high extruded-aluminum edging with holes to allow Ramset/Hilti 1" nail fastened to concrete sub-base @ 12" O.C.

1. 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:

2. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

a. BRICKSTOP Corporation.

b. Curv-Rite, Inc.

c. Permaloc Corporation.

d. Sure-Loc Edging Corporation.

B. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.

C. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.3 CONCRETE SETTING-BED MATERIALS

A. Concrete sub-base as indicated on paving details

B. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.

C. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

D. Drainage Geotextile: Nonwoven needle-punched geotextile made from polyolefins

or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following:

1. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
2. Permittivity: 0.5 per second, minimum; ASTM D 4491.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

B. Cut unit pavers with motor-driven masonry saw equipment to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.

1. Joint Pattern: As indicated.

C. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

D. Expansion and Control Joints: Provide foam filler as backing for sealant-filled joints. Install joint filler before setting pavers.

E. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.

F. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.2 CONCRETE SETTING - BED APPLICATIONS

A. Compact soil subgrade as indicated for concrete placement.

B. Place drainage geotextile over concrete sub-base course, overlapping ends and edges at least 12 inches.

C. Place leveling course and screed to a thickness of 1 to 1-1/2 inches, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

D. Treat leveling course with herbicide to inhibit growth of grass and weeds.

E. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars.

F. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz.

G. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.

END OF SECTION 32 14 00

SECTION 32 16 13 - CONCRETE CURBS AND CURB AND GUTTER

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the requirements for providing, placing, curing, and protecting Portland cement concrete curbs, and combination curbs and gutters, constructed on a prepared subgrade.

1.2 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. ACI: American Concrete Institute
   a. 316R: Recommendations for Construction of Concrete Pavements and Concrete Bases.
2. ASTM: American Society for Testing and Materials
   a. A 615: Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (with Supplement + S1).
   b. C 150: Specification for Portland Cement Type I or Type II.
   c. C 309: Specification for Liquid Membrane - Forming Compounds for Curing Concrete.
   d. D 1565: Specifications for Flexible Cellular Materials Vinyl Chloride Polymers and Copolymers (Closed Cell).
   e. D 1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient bituminous Types).
   f. D 1752: Specifications for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
   g. D 3405: Specification for Joint Sealants, Hot-Poured, for Portland Cement Concrete Pavement.
3. FS: Federal Specifications and Standards
   a. TT-P-86: Paint, Red-Lead-Base, Ready-Mixed.

B. Finishing Tolerance

1. The top surface of curbs and combination curbs and gutters shall have a Class A tolerance as specified in ACI 316 R, Chapter 12.5.

1.3 SUBMITTALS

A. In accordance with Section 013300 – Submittal Procedures of these Specifications, the following shall be submitted:

1. Reinforcement Materials

a. As required in Section 032100 – Concrete Reinforcement of these Specifications.

2. Concrete Materials

a. As required in Sections 321373.19 – Cast-in-Place Concrete, and 321313 – Portland Cement Concrete of these Specifications.

1.4 EXTENDED WARRANTY

A. Manufacturer of joint sealant shall provide at least a 1-year written warranty against material degradation and failure and water and foreign matter infiltration through the joint from the time of written acceptance of the Work. This warranty shall not limit HCCS rights or remedies as may otherwise be afforded under law or statute.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Forms

1. Either wood or metal, of the size and shape necessary for forming the item, straight and free of warp.

B. Reinforcing Steel Bars

1. As specified in Section 032100 – Concrete Reinforcement of these Specifications.

C. Dowel Bars

1. Smooth, ASTM A 615 + S1, Grade 60, new billet steel, unbonded ends painted with red-lead-base paint, FS TT-P-86, Type I and coated with a water-resistant lubricant immediately prior to placement of concrete in which unbonded ends of bars are to be embedded.

D. Dowel Bar Expansion Caps

1. PVC or plastic cap, slightly larger than dowel bar, closed end, a minimum of 6 in. long, with 1-1/2 in. long compressible insert.

E. Concrete

1. Class 3000, as specified in Section 321313 - Portland Cement Concrete of these Specifications.

F. Membrane Forming Curing Compound

1. ASTM C 309, Type 2, unless otherwise directed.

G. Joint Materials

1. Preformed Expansion Joint Filler: Nonextruding and resilient bituminous type, ASTM D 1751.

2. Joint Sealing Material: See Section 321319 of these Specifications.

H. Form Coating

1. Commercial formulation form-coating compound that will not bond with, stain nor adversely affect concrete surfaces and will not impair subsequent treatment of concrete surfaces.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Prepared subgrade shall be inspected for unstable or unsuitable areas and need for additional compaction. Notify the Engineer in writing of such deficiencies. Do not begin curb construction until all such deficiencies have been corrected.

B. Loose and foreign material shall be removed from the compacted subgrade immediately prior to placing concrete, and subgrade shall be uniformly dampened.

3.2 SETTING FORMS

A. Forms shall be set to the line and grade indicated, and shall be securely staked to maintain set position during depositing and curing of concrete. The inside form shall be rigidly attached to the outside form.

B. Forms shall be set in sufficient quantity to allow continuous progress of concrete placement and to ensure that forms shall remain in place not less than 24 hours.

C. Forms shall be cleaned after each use and coated with an approved form release agent prior to each use.

3.3 INSTALLATION OF JOINTS, REINFORCEMENT, AND SEALANT

A. Reinforcement shall be installed as indicated on the Drawings and as specified in Section 032100 – Concrete Reinforcement of these Specifications. Joints shall be installed where indicated on the Drawings and in accordance with Section 321319 – Concrete Pavement Joints of these Specifications.

B. Sealant manufacturer's instructions and procedures shall be followed so as not to invalidate the warranty.

3.4 PLACING AND FINISHING CONCRETE

A. Concrete shall be placed and finished as specified in Section 321373.19 – Cast-in-Place Concrete of these Specifications, and ACI 316 R, Chapters 10 and 12.5.

B. After concrete has been struck off and has sufficiently set, the exposed surfaces shall be worked with a wood float. The exposed edges shall be rounded using an edging tool.

C. After form removal, the surfaces of the curb or combination curb and gutter shall be plastered with a mortar consisting of one part Portland Cement and two parts fine aggregate. Mortar shall be applied with a template constructed to the shape and dimensions of the item to be plastered. All exposed surfaces shall be brushed to a uniform smooth texture.

3.5 CURING AND PROTECTING CONCRETE

A. Concrete shall be cured in accordance with the recommendations of ACI 316 R,

Chapter 11, using the membrane curing method and materials.

B. Protection as recommended in ACI 316 R, Chapter 11 shall be provided until written acceptance by the Engineer.

END OF SECTION 32 16 13

SECTION 32 17 23 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the requirements for providing pavement and island markings of the following types:

1. Paint.
2. Tape.
3. Traffic buttons.
4. Pavement markers (Reflectorized).

1.2 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. FS: Federal Specifications and Standards
   a. TT-P-115F: Paint, Traffic, (Highway, White, and Yellow).
   b. TT-B-1325B: Beads (Glass Spheres); Retro-Reflective.
2. TxDOT: Texas Department of Transportation
   a. Standard Specifications for Construction of Highways, Streets and Bridges --- Latest Edition. Item 666, REFLECTORIZED PAVEMENT MARKINGS; Item 668, PREFABRICATED PAVEMENT MARKINGS; Item 672, RAISED PAVEMENT MARKERS; Item 678, PAVEMENT SURFACE PREPARATION FOR MARKINGS.
   b. Texas Manual on Uniform Traffic Control Devices for Streets and Highways (Texas MUTCD).

B. All markings shall comply with the requirements of the TxDOT Standard Specifications for Construction of Highways, Streets and Bridges; the Texas Manual on Uniform Traffic Control Devices; and, the applicable regulations and standards of Harris County, Texas and the City of Houston, Texas.

1.3 SUBMITTALS

A. In accordance with Section 013300 – Submittal Procedures of these Specifications, the following shall be submitted:

1. Certificates

a. Certificates for each product indicating that the product complies with the requirements of the TxDOT Standard Specifications and the applicable Federal Specifications

2. Manufacturer's Data

a. Manufacturer's installation instructions, specifications and recommendations for each pavement marking product.

1.4 JOB CONDITIONS

A. Markings shall be installed only on clean and dry surfaces in accordance with TxDOT Standard Specifications relating to the type of marking being provided.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Paint

1. Marking paint shall comply with the requirements of FS TT-P-115F.

B. Tape

1. Marking tape shall be yellow or white and shall comply with the requirements of the TxDOT Standard Specifications, Item 668, RETRO-REFLECTIVE PREFABRICATED PAVEMENT MARKINGS.

C. Pavement Markers

1. Markers shall be reflectorized as indicated and shall comply with the requirements of the TxDOT Standard Specifications, Item 674, PAVEMENT MARKERS (Reflectorized).

PART 3 – EXECUTION

3.1 INSTALLATION

1. Surfaces shall be prepared and markings installed in accordance with the requirements of the applicable item in the TxDOT Standard Specifications and the Texas MUTCD.

2. Markings shall be protected from vehicular traffic until not subject to damage by such traffic. Contractor shall be responsible for repair and replacement of markings at no additional cost to HCCS until written acceptance by the Engineer, in addition to the general warranty of the Contract.

END OF SECTION 32 17 23

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Chain-Link Fences: Industrial.
2. Gates: Swing.

1.2 SUBMITTALS

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

B. Shop Drawings: Show locations, components, materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

C. Samples:

1. Galvanized steel wire for fabric.
2. Galvanized framing and accessories.

D. Maintenance Data: For galvanized chain link fence.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.

C. Mockups: No mockups needed.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: 6'-0" and 7'-0". Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Metallic wire with a diameter of 0.192 inch (4.88 mm)

   a. Mesh Size: 2 inches.
   b. Metallic (Zinc) Coating: ASTM A 392, Type II.
   c. Selvage: Twisted top and knuckled bottom.

2.2 INDUSTRIAL FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:

1. Group: IA, round steel pipe, Schedule 40.
2. Fence Height: 6'-0" and 7'-0". See plans for noted heights.
3. Strength Requirement: Light industrial according to ASTM F 1043.
4. Coating for Steel Framing:

   a. Metallic coating.

2.3 TENSION WIRE

A. General: Provide horizontal tension wire at to and bottom of fence fabric.

B. Metallic-Coated Steel Wire: 0.177-inch- (4.5-mm-) diameter, marcelled tension wire complying with ASTM A 817 and ASTM A 824.

1. Metallic Coating: Type III, Zn-5-Al-MM alloy.

2.4 FITTINGS

A. General: Comply with ASTM F 626.

B. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g /sq. m) zinc.

2.5 PRIVACY SLATS (FOR 7' HEIGHT FENCE SECTIONS ONLY)

a. Material: PVC, UV-light stabilized.

b. Color: As selected by Architect from manufacturer's full range.

2.6 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water.

1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi (20.7-MPa) compressive strength (28 days), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.

2.7 FENCE GROUNDING

A. Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.

1. Material above Finished Grade: Copper.
2. Material on or below Finished Grade: Copper.
3. Bonding Jumpers: Braided copper tape, 1 inch (25 mm) wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.

B. Connectors and Grounding Rods: Comply with UL 467.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

D. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment.

E. Line Posts: Space line posts uniformly at 8' o.c.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567. Install braces at end and gate posts and at both sides of corner and pull posts.

G. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing.

H. Top Rail: Install according to ASTM F 567.

I. Bottom Rails: Install, spanning between posts.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface and bottom selvage, unless otherwise indicated.

K. Tie Wires: Attach wire per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.2 GROUNDING AND BONDING

A. Fence Grounding: Install at maximum intervals of 1500 feet (450 m) .

B. Fences within 100 Feet (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet (225 m).

1. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches (150 mm) below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.

C. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

1. Connections: Make connections so possibility of galvanic action or electrolysis is minimized.

3.3 FIELD QUALITY CONTROL

A. Grounding-Resistance Testing: Engage a qualified independent testing agency to perform field quality-control testing.

END OF SECTION 32 31 13

SECTION 32 35 00 – SCREENING DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Screen panels and accessories.

B. Related Sections:

1. Section 03 30 00: Cast-in-Place Concrete: For setting fence posts.

3. Section 32 93 00: Plants.

1.02 REFERENCES:

A. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. ASTM A82 – Mechanical, Physical and Performance Properties of Carbon Steel Wire

C. ASTM A641 – Zinc-Coated (Galvanized) Carbon Steel Wire

D. ASTM A879 – Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.

E. ASTM B117 – Operating Salt Spray (Fog) Apparatus.

F. RAL – German Institute for Quality Assurance and Indication.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00.

B. Product Data: Submit manufacturer's product data, standard details, and installation instructions.

C. Shop Drawings: Submit showing sizes critical dimensions, panel layout

constraints using a 2 x 2 inch modular grid, and details and locations of accessories.

D. Color Submittals: Submit coupons 2 x 3/12 inches minimum showing color and texture to be provided.

1.04 QUALITY ASSURANCE

A. Manufacturer: Minimum 5 years experience manufacturing and supplying trellis structures of the type required for this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from damage. Store panels flat. Provide edge protection when strapping is used. Do not apply loads to panel edges.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. Greenscreen or approved equal.

2.02 PANELS

A. Panels shall be rigid, three-dimensional welded wire grid fabricated of 14-gage ASTM A641 galvanized steel wire.

B. Face Grid: Wires shall be welded at each intersection to form a 2 x 2 inch face grid on the front and back of panels,

C. Trusses: Face grids shall be separated by bent wire trusses spaced at 2-inch centers and welded to front and back face grids at each truss apex.

D. Thickness: 2 inches

E. Length and Width: Provide in 2-inch nominal increments.

F. Tolerance: 1/8 inch in width and ¼ inch in length.

2.03 ACCESSORIES

A. Trim:

1. Fabricate from 20-gage ASTM A879 galvanized steel.

2. Types:

a. Channel Trim: Thickness of panel x ½ inch legs.

b. Angle Trim: ½ inch x ½ inch legs.

D. Fence Posts: 3-inch diameter ASTM A500steel tube. Provide steel post caps.

E. Fasteners for Mounting Clips to Fence Posts: Self drilling, self tapping hex washer head screws, Type 410 stainless steel, and free from rust when salt spray tested for 300 hours in accordance with ASTM B117.

2.04 FABRICATION

A. Cut to size.

B. Weld trim to panels and grind smooth exterior surfaces of welds.

2.05 FINISHES

A. Metal components (except fasteners) shall be factory finished after fabrication.

B. Finish System: pretreat with general purpose, alkaline, water based cleaner / degreaser applied at 240 degrees F. prime with zinc-rich epoxy powder coat. Topcoat with polyester or polyester-urethane powder coat.

C. Salt Spray Resistance: Finish shall remain rust free when tested 1680 hours in accordance with ASTM B117.

D. Color: Color to be selected by Architect

E. Touch-Up Paint: Provide high quality, exterior-grade spray paint suitable for

conditions of use.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect substrates and conditions affecting work of Section. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Fence Posts: Install posts as shown on Drawing.

3.03 INSTALLATION

A. Install panels plumb and square, centered within area designated for panels, and aligned to maintain modular grid.

B. Avoid cutting panels in field. Where field cutting is essential, apply touch-up paint to cut edges.

C. Install securely with fasteners located [as shown on Drawings.] [To meet manufacturer's requirements.]

D. Repair bent or damaged panels. If panels cannot be repaired to satisfaction of Architect, remove from jobsite and replace with new panels.

32 35 00 END OF SECTION

SECTION 32 90 00 - PLANTING

PART 4 - GENERAL

4.1 RELATED DOCUMENTS

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

4.2 DESCRIPTION

A. Work under this section shall include the performance and completion of planting work indicated on the drawings and specified herein. It includes but is not limited to the following:

1. Soil amendments and mulch over existing planting and lawn areas.
2. Soil preparation and planting backfill, for Contractor provided planting and sod areas.
3. Plants and planting operations including trees, shrubs and sod and associated plant materials.
4. Root barrier material.
5. Decomposed crushed granite for walkways.
6. Protection and maintenance of existing plant materials during construction operations.

B. Related Work Specified Elsewhere:

1. Division 31, Earthwork
2. 32 91 19, Landscape Grading
3. 32 01 90, Operations and Maintenance of Planting
4. 32 80 00, Irrigation

4.3 SUBMITTALS

A. Submittals required for the Contractor to provide to the Owner's Representative:

1. Proposed work schedules within ten (10) days after the Notice to Proceed.

2. Documentation within thirty (30) days of first Payment Request that plant and turf materials have been located and ordered.

3. Purchase Orders of plant materials must be presented at time of installation to Landscape Architect prior to installation of materials.

4. Letter stating the intended plant material is suited for its intended purpose and is disease free and suited for planting during the season work is being performed – signed by material supplier.

5. Samples and analysis of materials: Submit a 1 qt. sample of topsoil, 1 qt. sample of compost, 1 qt. sample of shredded mulch in a Ziploc or sealable baggie with a label indicating the supplier of the material. Supplier name, address and phone number of a contact shall be clearly indicated on the label. Samples without labels will be returned without review. Suppliers of the compost shall include a copy of their most recent soil biology test results indicating the soil to be aerobic and in a viable condition. Samples must be submitted for approval prior to ordering.

6. Submit in writing the names of organic weed killers and method of application intended for use.

7. Submit sample and certified analysis of fertilizers to the Owner's representative prior to delivery.

8. For standard products, manufacturer's analysis will be acceptable with labels indicting source and composition of material. Materials may be analyzed by a licensed laboratory in accordance with the current method of the Association of the Agricultural Chemists.

9. Certificates of Inspection by the County or State Agriculture Inspector or verification by producing shipping invoices indicating the plants were grown by a licensed nursery, are to be submitted at time of inspection to the Owner's representative.

10. Submit manufacturer's label on all organic materials, for pest, disease and

weed control.

11. Submit maintenance instructions for the plants installed including water requirements, fertilization schedule, and other related maintenance items.

12. Material submittals shall be made as required and noted below in section 2.3 below.

4.4 STANDARDS

A. Botanical plant names used on the drawings conform to the most recent nomenclature authorities available including Hortus Third, Liberty Hyde Bailey Hortorium, 1977.

B. The following documents, used as standards are to be a part of these specifications: American Joint Committee on Horticultural Nomenclature "Standardized Plant Names" and the American Associations of Nurserymen, Inc. "American Standard for Nursery Stock" (latest edition).

4.5 REVIEW AND APPROVAL OF MATERIALS

A. Written request for required reviews of plant materials and work by Owner's representative must be received ten (10) days prior to the anticipated review.

B. Review: All materials shall be reviewed and approved by the Owner's representative at the source of supply if the supply location is within the local area or may be reviewed by photograph labeled indicating species, size, form and representation of the quality of the above ground growth. Such approval does not alter the Owner representative's right of review and rejection of materials upon delivery to the project site or during progress of the work for improper shipment, incorrect ball specification, or physical damage caused in handling and storage. All rejected materials shall be immediately removed from the site.

1. The plants shall be clearly labeled as to genus, species and variety with a weatherproof label attached to not restrict growth.

2. The Contractor shall assemble plants grouped to conform to plant list on the drawings, with separation between species of variety groups to allow reasonable access for viewing and inspection of plants.

3. The Owner's representative reserves the right to require root ball washing of two percent (2%) of materials to inspect root girdling or root bound conditions. If 2% are unsatisfactory, the entire lot shall be rejected. Rejected plants shall be removed immediately from the site and replaced with acceptable material. No placing or planting shall be done until the Owner's representative has approved plants for quality.

C. Approval of individual plant specimen by the Owner's representative may be construed as constituting approval of all other specimens of that plant species providing all specimens are identical in quality to the approved specimen. Approval shall not impair the right of further inspection and rejection of material during the progress of work.

D. Plants are also subject to inspection by the Owner's representative upon delivery and during the progress of work.

E. Owner's representative shall review the work after planting operations are complete for establishing the maintenance period covered under this contract.

F. Owner's representative shall review the work for final acceptance.

G. Material testing: The Contractor shall pay the cost of testing materials not meeting specifications.

4.6 PROTECTION AND HANDLING OF PLANTS

A. Insofar as is practicable, plant materials should be planted on the day of delivery to the site. In the event that this is not possible, the Contractor shall protect that stock not planted.

1. Container grown plants shall remain in their container until ready to be set in their plant pit.

   a. Plants shall not be bound with wire, rope or other materials in a manner which damage the bark, break branches, or destroy the shape of the plant. All plants shall be watered as necessary until planted.

B. Guarantees: Plant materials shall be guaranteed by the contractor to be in vigorous growing conditions from the date of final acceptance of the completed project by the Owner or from a date seven days after certification by the Owner's

representative that the project is complete, whichever comes first, for a period of time as follows: One year for all shrubs and one year for all trees.

1. Materials and workmanship include a one-year guarantee excluding traditional acts of nature and lack of Owner's maintenance.

C. Replacements: After thirty (30) days from Substantial Completion the site will be reviewed by Owner's Representative and any materials to be replaced under the guarantee are to be identified and Contractor shall provide replacement. Also, prior to the end of the one-year guarantee period if a plant is found to be dead, it shall be replaced by the Contractor within one week of the date requested by the Owner's representative.

1. All replacement plants shall be of the same kind, size and quality as originally specified.

2. Replacement shall be at the Contractor's expenses except for those required because of damage by vandals, animals, fire, neglect by the Owner, or other causes not attributable to the Contractor's neglect.

D. Personnel: Planting shall be performed by experienced workmen familiar with planting procedures and under the supervision of a qualified planting foreman. The planting foreman shall be on the job site whenever planting is in progress.

4.7 IN THE EVENT OF A DROUGHT

A. In the event that the City of Houston is experiencing a drought and watering restrictions have been set in place by the City of Houston, the Contractor shall NOT proceed with providing and/or installing plant materials including trees, shrubs, groundcover and sod without FIRST contacting the Architect to request additional information on how to proceed. Proceeding without first obtaining direction from the Architect indicates that the Contractor assumes all liability and responsibility for the plant materials installed and replacement of dead materials due to lack of watering will be the sole responsibility of the Contractor.

4.8 ONE YEAR MAINTENANCE

A. Maintenance covered under this contract shall begin immediately after each plant is planted and shall be continue to be maintained for 360 calendar days after

Substantial Completion for the landscaping and irrigation system is determined and plants are accepted in vigorous thriving condition. Contractor's work will be accepted only when it is in a fully completed, in undamaged condition with ALL of the Architect's and Consultants' final review punch list items completed. Until such time the Contractor will not be considered to have begun the 360 days of maintenance and the Contractor shall have full responsibility and ownership of all materials, workmanship and maintenance related to the Work.

B. Maintenance activities include watering, weeding, cultivating, mulching, adjusting of stakes, removal of dead materials, resetting plants to proper grades or upright positions, restoration of the planting saucer and any other procedure consistent with good horticultural practice including but not limited to:

1. Water all planting as necessary; quantity applied at any one time shall be sufficient to penetrate the soil to a minimum depth of three inches.
2. Weeding: Keep all planting areas free from weeds and undesirable grasses.

C. Refer to Section 32 01 90 Operation and Maintenance of Planting and Section 32 80 00 Irrigation for additional maintenance requirements and maintenance schedule.

PART 5 - MATERIALS

5.1 PLANT QUANTITIES

A. The Contractor shall supply plant materials in the quantities necessary to complete the Work as shown on the drawings. Quantities of sod and plant materials, as indicated on plans and in the plant list are approximate only. These materials shall be provided in quantities sufficient to properly plant the designated areas at the spacing indicated on the drawings.

B. Plants specified on drawings are available from, but not limited to:

1. Tree Source Wholesale Nursery, 6220 Elm Street, Tel. no. 713-667-5700.
2. Newton Nurseries, Inc., 1261 Brittmore Rd., Tel. no. 713-365-9917.
3. Magnolia Gardens Nursery, 1980 Bowler Road, Waller, TX, Tel. no. 800-931-9555.

4. Murff Turf Farm, Inc., 15204 Bohemian Hall Rd., Tel. no. 281-328-2812.
5. Montellaro's Nursery, Tel. no. 210-655-2192.
6. Native Texas Nursery, Tel. no. 877-962-8483.
7. Treesearch Farms, Tel. no. 713-937-9811.

C. GC shall provide written notice to Owner's Representative if specified materials are not available from local or national nurseries prior to start of work. If materials are available at time of Notice to Proceed being issued, but may be unavailable at time of planting, GC will be required to pay for materials in advance and store and maintain materials until the scheduled planting date.

5.2 PLANT QUALITY

A. All plants shall be sound, healthy specimens typical of their species with well-formed tops and roots and shall be free from injurious insects, insect eggs, or larvae, diseases, serious injuries to the bark, root or foliage, broken branches, or any other disfigurement.

1. All plants are to be container grown unless otherwise noted. Container grown plants shall be of a reasonable age and state of development for the size container specified. Plants shall have been growing in their container long enough to have developed a good sound root system capable of holding the entire soil mass intact after removal from the container, but not so long as to have become pot bound. All container grown nursery stock shall be healthy, vigorous, well-rooted, and established in the container in which was growing. Container grown nursery stock shall have a well-established root system reaching the sides of the container to maintain a firm ball when the container is removed but shall not have excessive root growth encircling the inside of the container.

2. Minimum acceptable tree Height-Caliper relationship:

Container	Height	Spread	Caliper at 1'-0" Above Root Cap	Branch Height
15 Gal	6' - 8'	2.5'-3'	1.25"-1.5"	3'-4'
30 Gal	8' -10'	4' -5'	2" -2.5"	4'-5'
45 Gal	10'-12'	5' -6'	2.5" -3"	5'+

65 Gal	12'-14'	6'	-7'	3"	-3.5"	5'+
95 Gal - 100 Gal	14'-16'	7'	-8'	4"	-4.5"	5'+

3. Plants with broken, pruned or multiple leaders shall not be acceptable.

4. Trees are to have trunks free from all cuts and scratches.

5.3 MATERIALS

A. Topsoil:

1. Imported topsoil shall be clean, fertile, friable, sandy loam soil capable of supporting plantings in a thriving condition. Worn out soil from rice farming that is contaminated with agricultural chemicals and salts, and full of weed seeds will NOT be accepted. Soils that contain more than 50% clay particle size 0.002, have rocks, debris or clods that will not pass a 1" screen, show signs that they were stripped form weed infested sites, or show appreciable amounts of subsoil with no organic matter shall not be delivered to the site. Submit a one-quart sample indicating source in writing on label for approval.

2. Existing soil: Existing soil shall be tested and modified at Contractor's expense if requested for use on site and shall be modified to provide a pH no less than 6 and no greater than 8. Provide Albrecht Soil Test and provide results and recommendations to correct imbalances to Landscape Architect for approval prior to proceeding with use of existing soil.

B. Compost: Shall be well decomposed, stable, weed free organic matter. Shall consist of very organic aerobically composted humus containing manures, leaves, bark fines, rice hulls, and other valuable organic components. Materials are to be fully composted under sustained temperatures to 165 degrees F, have high nutrient value, free of weeds, weed seeds, and insect pests. It shall contain no substances toxic to plants and shall be reasonably free (<1% by dry weight) of man-made foreign matter. The compost will possess no objectionable odors, shall not resemble the raw material from which it was derived, shall be a color that matches a 70% cocoa dark chocolate candy bar – the color is an indication of aerobic content in the compost and helps to avoid compost that has been burned and brought into an anaerobic state.

1. For acid loving plants, provide only compost that has not received the

addition of liming agents or ash by-products.

2. Compost containing available nutrients for plant materials and lawn areas must be provided; the use of unstable or immature compost will not be approved.

3. Compost shall have pH within a range of 5.5 – 8.0. Care shall be given when using compost possessing a basic pH >7 near acid loving plants. A pH adjustment of the finished soil/compost mix may be necessary.

4. Compost is available from (but not limited to) Nature's Way Resources, telephone number 1-936-321-6990. Submit sample with written label indicating source and confirming composition.

C. Commercial Fertilizer and Root Stimulant: All commercial fertilizer and root stimulant shall be organic and conform to all state fertilizer laws, delivered in original, unopened containers, each bearing the manufacturer's guaranteed analysis. Materials are available from but not limited to San Jacinto Environmental Supplies, Tel.no. 713-957-0909. Use the following fertilizers in the different areas noted below:

1. Tree installations:
   a. 4 oz. of Rhizanova Tree Transplant material blended with 32 oz of MicroLife Ultimate 8-4-6 Plant Fertilizer for each tree.

2. Shrub Areas:
   a. MicroLife 6-2-4 Plant Fertilizer applied at 40 lbs. per 1,000sf.

3. Plant stimulant for All provided sod, hydro-mulch areas, trees and shrub planting areas: Water all plants in well with Super Seaweed Biostimulate and thoroughly drench root mass at time of installation of plants and sod.

4. Compost tea for all landscape planting bed areas must be made after the hydro-mulch and planting beds are installed, a maximum of three (3) days after a rain event in order to be most effective. It is recommended that spraying be provided by Bill Wyatt with Grace Outdoor, tel. no. 281-543-9814. Other installers may be available if they are submitted by the Contractor for approval prior to their acceptance.

D. Plant Pit Backfill Mix:

1. For trees and shrub planting beds:
   a. Nature's Way Resources blended compost/top soil/washed sand mix or pre-approved equal. Nature's Way telephone number is 1-936-321-6990.
   b. Granular Humates Plus Soil Amendment applied 10lbs per 1,000sf. Granular Humates Plus is available from but not limited to San Jacinto Environmental Supplies, Tel.no. 713-957-0909.

E. Existing Plant Material Soil Amendments and Fertilizer are to be applied as follows:
   1. For Existing shrub planting beds:
      a. Provide Granular Humates Plus Soil Amendment applied at a rate of 10lbs per 1,000sf. Granular Humates Plus is available from but not limited to San Jacinto Environmental Supplies, Tel.no. 713-957-0909.
   2. For Existing lawn areas: Provide Microlife 6-2-4 at 20 lbs. per 1,000sf and Humates Plus at a rate of 10 lbs. per 1,000sf.

F. Weed Control: Provide Organic Post- emergent Herbicide during Preparations of all planting beds, tree wells and sod areas: Use Black Jack 21 or pre-approved equal to remove existing weeds prior to preparing planting beds and tree wells. Post-emergent herbicide must be applied in a manner that will not damage other plant materials that are not weeds. Contractor will be responsible for replacing any damaged plant materials resulting from lack of care during applications of post-emergent herbicides at no additional cost to Owner.
   1. Black Jack 21 is available from but not limited to: San Jacinto Environmental Supplies, 2221 West 34th St., Tel.no. 713-957-0909

G. Disease and Insect Control: Organic Insecticides and Pesticides are to be applied on an as needed basis only and are not a part of regularly scheduled maintenance tasks. When insecticides or pesticides are provided they must be applied in a manner that will not damage other plant materials that are not being treated. Primary form of insect and pest management should be organic controls unless determined to be ineffective or impractical. If organic controls cannot be used, chemical controls are to comply with applicable laws governing their use and are to be used with Contractor's care to read and follow all labels and instructions – ONLY

IF PRE-APPROVED by Landscape Architect.

1. Contractor will be responsible for replacing any damaged plant materials resulting from lack of care during applications of insecticides or pesticides at no additional cost to Owner.

H. Water: For all areas except for areas that have an existing irrigation system, the contractor shall provide the facilities needed to make connections and convey the water to the places where it will be needed.

I. Mulch for general planting shall be Native Double Shredded Cedar Mulch: A 2" coverage depth is to be applied on all planting beds and tree rings. DO NOT MOUND THE MULCH IN THE TREE RING AND DO NOT APPLY MULCH AT THE BASE OF THE TREE TRUNKS. Mulch shall not cover tree root flairs or leaves and branches of shrubs. Cedar oil shall be present within the shredded mulch. Submit sample with written label indicating source and confirming oils to be present. Available from (but not limited to) Living Earth Technology, telephone number 281-579-1472.

J. Green sand: Sand rich in iron, potassium, calcium and dozens of other minor and trace elements required for healthy plants. Available from (but not limited to) Nature's Way Resources. Nature's Way telephone number is 1-936-321-6990. Submit sample with written label indicating source and confirming composition.

K. Sharp sand: Shall consist of clean, washed sand, fine to course sizes meeting the requirements of ASTM C33. Submit sample with written label indicating source. Sharp sand may be used in backfill operations for decomposed granite pathways and at edging locations for Tempark, but NOT in planting bed backfill mix.

L. Edging:

1. At Decomposed Granite (DG) Pathway edge locations where abuts sod:
   a. Permaloc Asphaltedge Aluminum Restraint 4"x3" Black Duraflex Electrostatically applied baked on paint by Permaloc Corporation or pre-approved equal. Install according to detail shown on Drawings and Manufacturer installation instructions.
   b. Permaloc is available from but not limited to: San Jacinto Environmental Supplies, 2221 West 34th St., Tel.no. 713-957-0909

M. Tree Staking Materials: Contractor shall use staking materials necessary to meet requirements of specifications, subject to approval. Stakes shall be below grade tree stabilizing system as provided by Tree Staple, Inc. or pre-approved equal. Plant Schedule has 4 inch caliper trees specified. Model TS36-10-10 or TS42-12-12 may be required. The proper size Tree Staple shall be selected by measuring the depth of the root ball and adding 12 inches. The determined length should equal the long prong of the Tree Staple device. If necessary, round up to the next size. Provide tree staples for transplanted trees. Field verify the caliper sizes of the trees to ensure appropriate tree staples are provided for transplanted trees. Tree Staple, Inc. telephone number is 1-877-TREES-49. Submit manufacturer installation instructions for approval prior to ordering.

N. Medium Gray Beach Pebbles: Provide Medium Gray Beach Pebbles to 4 inch depth along Tempark Fabric edges where shown on the Drawings. Medium Gray Beach Pebbles shall be 1-1/2" to 2" sizes and is available from but not limited to Living Earth Technology Company, telephone number 281-579-1472.

O. Geotextile Fabric for over catch basin drains located within planting beds and at Black Star Gravel areas indicated on the Drawings: Provide Polyspun XL Soil Separator below areas to receive perimeter parking gravel and drainage river rock. Install according to manufacturer instructions. Polyspun XL Soil Separator is available from but not limited to San Jacinto Environmental Supplies, telephone number 713-957-0909.

P. Root Barrier: Provide BioBarrier root barrier or pre-approved equal, installed in accordance with manufacturer's instructions. Locate adjacent to paving where indicated on Drawings. BioBarrier is available from but not limited to San Jacinto Environmental Supplies, telephone number 713-957-0909.

Q. Decomposed Granite at tree areas and pathways:

1. Materials shall be in compliance with ASTM C33, crushed stone or crushed gravel. Material shall be clean, hard, durable particles or fragments of ¼" minus fines, select brown/gray crushed granite, river rock or basalt. Fines shall be evenly mixed throughout the aggregate. Color to be selected by Architect prior to ordering.

2. The portion retained on the No. 4 sieve shall have a maximum percentage of

wear of 50 at 500 revolutions as determined by AASHTO T96-77 and AASHTO T-90-81, respectively.

3. The crushed aggregate screening shall be free from clay lumps, vegetable matter, and deleterious material.

5.4 SOD

A. To repair areas affected by construction activities and where noted on drawings: Provide sod to match existing. Existing sod is St. Augustine Palmetto. See below for requirements.

B. Provide strongly rooted sod, not less than two years old with a heavy top and strong well-knit root system. Free of weeds and undesirable native grasses. Sod shall have been grown in a sod nursery certified by the Department of Agriculture on topsoil.

1. Provide Premium Grade sod composed 100% of St. Augustine Palmetto free of noxious weeds, undesirable grasses, stones, roots, thatch and extraneous material, having uniform color and leaf texture.

2. Sod shall be machine cut in 24 inch x 16 inch pieces with a full 3/4 inch of heavy clay soil covering the roots excluding top growth and thatch or rolled sod in uniform lengths and widths.

3. Provide only sod capable of vigorous growth and development when planted (viable, not dormant). Broken pads or pads with uneven ends will not be accepted. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10 percent of pad will be rejected.

C. Fall and Winter Application ONLY: Add Cereal Rye Grain at a 40lbs / acre application in addition to sod installation. Refer to Section 32 92 13 for information on Cereal Rye Grain.

D. Sod Maintenance under this contract: Refer to Section 32 01 90, Operations and Maintenance of Planting. Sod Maintenance includes mowing, weeding, watering and fertilizing of entire campus – both existing and Contractor provided areas.

1. Contractor provided sod areas: Mow within 7 – 10 days of installation. Bag

clippings for the first few mowing to remove debris and encourage new top growth. If installation is during warm months, mow once a week, maintaining a 2.5" mow height only within the first 6 months and 3.5" thereafter. If installation is within winter months, mow one time every 6 weeks, maintaining a 3" mow height within the first 6 months and 3.5" thereafter. Once established maintain Palmetto at 3.5"; Never cut more than 1/3 of the total length of the blade at any one mowing.

2. Existing sod areas: Mow in accordance with the schedule provided in Section 32 01 90. Maintain Palmetto at 3.5"; Never cut more than 1/3 of the total length of the blade at any one mowing. Do not bag clippings.

E. Sod Guarantees:

1. For Contractor provided sod areas: The contractor shall guarantee growth and coverage of Contractor provided sod under this section to the effect that a minimum 95% of the areas planted will be covered with specified planting after sixty (60) days with no bare spots greater than six (6) square inches.

2. For existing lawn areas: Contractor shall provide maintenance during construction and for the one year maintenance period. Refer to Section 32 01 90 for requirements and guarantees.

PART 6 - EXECUTION

6.1 SITE EXAMINATION

A. The Contractor shall make an examination of the site of the proposed work and completely familiarize himself with the nature and extent of the work to be encountered. No extra compensation will be allowed for any work made necessary by unusual conditions or obstacles encountered during the progress of the work which conditions or obstacles are readily apparent upon a visit to the site.

1. The Contractor shall notify the Owner's representative of any discrepancies between the plans and actual site condition.

2. It is required that commencement of planting operations be started only when the existing irrigation system is completely functioning and manual watering methods are in place and scheduled (automatically or manually).

6.2 PROTECTION OF EXISTING FACILITIES AND VEGETATION

A. The Contractor shall be held liable for the cost of repairing any damage inflicted by his operations to existing facilities (i.e., concrete curbs, sidewalks, etc.) and vegetation. The Contractor shall be responsible for the protection of foliage, trunk, branches, and roots of all existing trees, shrubs, groundcover and lawn areas designated to remain on project site.

B. Contractor shall provide maintenance during construction for existing lawn areas and plant materials. Refer to Section 32 01 90 for maintenance requirements.

6.3 TIME OF PLANTING

A. Planting operations shall be conducted under favorable weather conditions during the seasons that are normal for such work as determined by accepted practice in the locality.

6.4 LAYOUT AND EXCAVATION OF TREES AND PLANTING BED AREAS

A. Layout trees and planting beds in locations shown on drawings. Use wire stakes color-codes for each species of plant material. Stake location of each tree and outline of shrub beds prior to excavation for planting is begun. Notify Architect 3 business days in advance of date for desired review to obtain approval of tree locations and planting bed layouts. **Do not proceed without obtaining written approval of locations and bed layouts. Proceeding without obtaining the required approval will likely result in requirements to relocate plants and trees; project delays resulting from requirements to relocate materials will be at the Contractor's expense.**

B. If underground obstructions are encountered notify the Landscape Architect as to whether an adjustment or change of location is possible within the design intent. In order to minimize conflict, secure and verify with the project owner exact locations of all underground utility lines and other structures.

6.5 SOIL PREPARATION OF PLANTING AREAS AND TREE PITS

A. Spray the planting bed areas and tree pits with BlackJack 21 weed killer to eliminate any established and/or encroaching grasses or weeds. Follow label instructions.

Allow two weeks for complete results.

B. Spray for Fire Ants or detrimental insects with ONLY organic pesticides/insecticides ONLY if necessary. NOTIFY OWNER prior to proceeding with any applications in order to obtain approval for additional costs. Proceeding without obtaining approval in advance indicates that the Contractor is paying for these materials at NO ADDITIONAL COST TO OWNER.

C. Remove rocks, roots and debris and confirm weeds are dead and removed prior to proceeding with planting bed and tree installation.

6.6 EXCAVATION

A. Contact utility companies for locations of lines prior to start of excavation.

B. Do not excavate tree pits more than 24 hours in advance of planting operations.

C. Test drainage of plant beds and tree pits by filling with water twice in succession. Conditions permitting the retention of water for more than 24 hours shall be brought to the attention of the Owner's representative.

D. If rock, hardpan, underground construction work, tree roots or other obstruction are encountered in the excavation of plant pits and beds, alternate locations may be selected by landscape Architect. Where locations cannot be changed, the Contractor shall submit cost estimate required to remove obstructions to a depth of not less than 12" below the required pit or bed depth or for cost to provide under drains that shall connect to nearest storm drain.

6.7 PLANT MATERIALS HANDLING FOR PLANTING

A. Canned stock shall be removed carefully after cans have cut on two sides with approved cutter. Do not use spade to cut cans. Do not lift or handle container plants by tops, stems or trunk at any time.

1. Do not bind or handle any plant with wire or rope at any time so as damage bark or break branches. Lift and handle plants only from bottom of ball.

6.8 PLANTING BED AND TREE PIT BACKFILL INSTALLATION

A. Provide a 3” – 4” layer of well-rotted compost over the bed area and incorporate into

the beds. Add a one to two inch layer of green sand to help loosen soil and promote good drainage.

B. Subsoil shall not be worked when moisture content is so great that excessive compaction will occur, nor when it is so dry that clods will not break readily. Water shall be applied, if necessary, to bring soil to an optimum moisture content for tilling and planting.

C. Rototill planting backfill mix all together to a depth of 8 to 12 inches below original grade until all particles are golf ball size or smaller.

D. Fill all shrub beds and tree pits with plant bed mix to finished grade (compacted) plus two inches.

E. Excavate in planting mix for individual plant and install as required. Set plants plumb and brace rigidly in position until planting soil mix has been tamped solidly around the ball and roots.

F. Top of shrub rootballs shall be a maximum of two inches above finished grade and a minimum of 1 inch above finished grade. NO PLANT ROOT BALLS SHALL BE LOCATED AT GRADE OR BELOW GRADE.

G. Smooth planting areas to conform to specified grade after full settlement has occurred. Contractor shall bear final responsibility for proper drainage of planted areas.

H. Mulch all shrub beds with specified mulch, two inches in depth for top dressing. . Do not cover leaves or branches of shrubs. Do not cover tree root flares where trees are located within planting bed areas.

I. Water all plants immediately after planting. Spray with compost tea after planting installation is complete.

6.9 SETTING AND STAKING OF TREES

A. Gradually straighten the tree as the backfill is added.

B. Slice a shovel or spade around the backfill to settle the soil and remove air pockets. Break up heavy clay sods. Do not step firmly on the backfill which may cause excessive compaction.

C. Trees shall be set plumb and braced in position with Tree Staples. Tree Staples shall be installed (3) per tree and in accordance with the Installation Specifications as provided by the manufacturer.

D. The Contractor shall be responsible for materials remaining plumb and straight for all given conditions through the guarantee period.

6.10 SURFACE DRAINAGE and FRENCH DRAINS FOR PLANTING AREAS

A. The Contractor shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the drawings or specifications, obstructions on the site, or prior work done by another party, which Contractor feels precludes establishing proper drainage shall be brought to the attention of the Owner's representative in writing for correction or relief of said responsibility.

B. The Contractor shall provide positive surface and or sub-surface drainage. For landscaped areas provide a 2% slope of planting beds if possible, or provide French Drain.

C. French drains: Contractor shall provide French drains consisting of a 4 inch diameter A.D.S. perforated polyethylene tubing by Advanced Drainage System, Inc. or approved equal, with sock filter, end caps and fittings as required for a complete installation.

1. French drain shall be installed where planting beds and lawn areas meet, in tree wells, planters or other areas contained by walks and/or paving, or in areas of planting that a 2% slope cannot be achieved due to site conditions. French drains shall be connected to the storm sewer system if possible.

6.11 SOD INSTALLATION

A. Prior to planting, the designated areas shall be prepared a minimum of one week prior to the scheduled date for installation of the sod. Preparation shall include:

1. Prior to installation of St. Augustine Palmetto, the surface shall be cleared, to a depth of 4 inches (100 mm), of all trash, debris, stones larger than 1.0 inches (25m) in diameter, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting or maintenance operations.

2. Spray the planting areas with BlackJack 21 weed killer to eliminate any

established and/or encroaching grasses or weeds. Follow label instructions. **Allow two weeks for complete results**.

3. Soil amendments and fertilizer shall be uniformly incorporated into the top 4 inches (100 mm) of soil in accordance with manufacturer installation instructions.

4. Any undulations or irregularities in the surface, shall be smoothed prior to sod installation. Flooded, washed out areas, damaged or otherwise, shall be reconstructed and all grades re-established by the grading contractor in accordance with the drawings and/or other applicable specifications. Refer to Specification Section 32 91 19, Landscape Grading for final grading of new topsoil to meet elevations shown on Drawings.

5. Moisten areas before planting to depth of 1 inch but do not create a muddy soil condition. Water thoroughly upon installation, ensuring that both the Palmetto is wet and the soil is moist to a depth of 3".

B. All sod shall be laid in place within 24 hours of delivery to site. No St. Augustine Palmetto shall be placed on soil which has been chemically treated until sufficient time has elapsed to permit dissipation of all harmful materials (see manufacturers recommendations for re-entry date calculation). The general contractor shall assume full responsibility for any loss or damage to St. Augustine Palmetto arising from improper use of chemicals or due to his failure to allow sufficient time to permit dissipation of chemical residues, whether or not such materials are specified herein.

C. The first row of St. Augustine Palmetto shall be laid in a straight line, with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to insure that the pieces are not stretched or overlapped and that all joints are butted tightly to prevent voids that would cause air drying of the roots.

D. Roll smooth, rolling once in each direction to eliminate undulations and unevenness.

E. Water sod thoroughly after planting.

F. Acceptance: Acceptance shall be given by the architect upon satisfactory completion of each section or area(s) as indicated on the drawings.

G. Resod areas that do not take.

6.12 PRUNING OF PLANT MATERIALS

A. Pruning containerized plants shall be done at the nurseries supplying the material, prior to shipping to the site and only after obtaining Landscape Architect's written approval for proceeding with pruning procedures.

B. Pruning of trees once delivered to the site shall be limited to the minimum necessary to remove dead wood, suckers, injured twigs and branches, and to compensate for the loss of roots during the transplanting operations.

6.13 INSTALLATION OF DECOMPOSED GRANITE (DG) PAVING

A. Base Course (Prepared over Subgrade) Installation:

1. Surface Preparation: Do necessary final excavating and filling to prepare finished subgrade. Building up of subgrade under forms after they are in place will NOT be permitted. After forms are in place, test subgrade with template, reduce high spots to grade and raise low spots to grade with materials compacted in place by tamping.

2. Forms: Install adjacent paving or edging in lieu of forms, the full depth of decomposed granite area, and secure in place to hold firmly and grade as required.

3. Base Course: Construct a crushed 1/4" to 1/2" limestone base course (available from but not limited to Natural Earth Products Company, tel. no. 281-568-0800) layer to a depth of 2 inches (compacted). Do not haul over completed or partially completed work when subgrade is soft or there is tendency for Base Course to work down into existing subgrade.

4. Compact Base Course with aid of water. Provide sufficient moisture to prevent segregation into pockets of fine and coarse material.

5. Cover Base Course with Soil Separator Fabric.

B. Decomposed Granite (DG):

1. Place the DG on the soil separator fabric.

2. Place DG in one layer of 3 inches thickness and rake smooth using a steel tine

rake to desired grade and cross section. DO NOT APPLY DG DEEPER THAN 3 INCHES.

3. Water to achieve full depth moisture penetration. Watering is best accomplished using a garden hose with spray nozzle set to a coarse spray; pressure should not disturb leveled surface.

4. While DG is still moist, roll with a heavy lawn roller (minimum 225 pounds and maximum 30-inch width), to achieve finish grade and initial compaction. Hand tamp edges around poles, and other objects. Uses a heavy (1 ton minimum) small rider, after having initially used the lawn roller, to obtain the desired final dense, smooth, uniform texture.

5. Landscape header or edging is to remain in place, secured to hold firmly to approved line and grade. After finished compacted surface has been achieved, finish adjacent shoulders by backfilling required grade and cross sections.

6. Final thickness of completed area shall not vary more than ½ inch from grades indicated on civil drawings. Correct any variations in the thickness beyond the allowable ½" by repeating the procedures listed above.

6.14 CLEAN-UP AND PLANT MATERIAL REVIEWS AND ACCEPTANCE

A. Clean-up: Clean up all areas as required for complete and acceptable inspection. All areas of project must be free of any debris from the planting operations.

B. As planting operations are underway; all ropes, wires, empty containers, rocks, clods and all other debris shall be removed daily and the project site shall be kept neat at all times.

C. Reviews: Contractor shall notify the Landscape Architect by written request for review of planting operations. This request shall be made to the Landscape Architect at least three business days prior to the anticipated review date.

D. Contractor shall receive written acceptance from the Landscape Architect in order to establish the start of the 360 calendar maintenance period.

END OF SECTION 32 90 00

SECTION 32 91 19 - LANDSCAPE GRADING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Includes:

1. Machinery Restrictions.
2. Excavation, filling and backfilling of onsite material AND compacted base material.
3. Subgrade preparations and spreading of topsoil.
4. Finished grading for edges of decomposed granite pathways where Permaloc Asphalt Edging is being provided.
5. Prevention of excessive weed growth in lawns.

B. Related Work Specified Elsewhere:

1. Division 31, Earthwork
2. 32 90 00, Planting

1.2 GENERAL PROVISIONS

A. Finished grading shall be defined as placing and grading of additional soil that will be required to bring the grade to the required grades for lawns, shrubs, groundcover beds, and below decomposed granite pathway edges where Permaloc Asphalt Edging is being provided.

B. Additional fill materials shall generally be defined as topsoil as specified herein unless otherwise specified.

C. Where practicable and as directed, the use of heavy machinery shall be kept to a minimum.

PART 2 - MATERIALS

2.1 TOPSOIL

A. Topsoil material that will be required for finish grading operations shall conform to the requirements included within this section.

B. General Qualifications: Topsoil shall be considered as imported material conforming to the following minimum criteria.

1. Natural, friable, loamy soil, typical of local topsoil which produces heavy vegetative growth, free from subsoil, weeds, sods, stiff clay, stones larger than one (1) inch, toxic substances, debris, or other substances which may be harmful to plant growth. Do not deliver in muddy condition.

2. Acidity/Alkalinity: pH 6.0 to pH 7.5.

C. Grading Analysis: Two (2) inch sieve, 100% minimum passing. Number 4 sieve, 90 percent minimum passing. Number 10 sieve, 80 percent minimum passing.

1. Sand, silt, and clay content (from ASSHTO M146):
   a. Sand 20 to 75 percent
   b. Silt 10 to 60 percent
   c. Clay 5 to 30 percent

2. All topsoil shall be free from all herbicides and insecticides which might adversely affect subsequent growth of turf or plantings or which might otherwise contain materials toxic to humans and pets.

D. Non-conforming Material: The Contractor shall not be permitted to use on-site material that does not conform to the above minimum criteria for fine grade operations. At the discretion of the owner, such material can either be amended to meet the minimum requirements or shall be removed from the site and replaced with suitable material as specified herein.

E. It shall be the Contractor's responsibility to verify that the existing topsoil conforms to these specifications. Topsoil determined to be non-conforming subsequent to the award of a contract shall not be means for extra compensation unless otherwise provided for herein.

2.2 SAND

A. Sand shall be "Sharp Sand" to A.S.T.M. C-33. Sample shall be submitted for approval. Sand shall not be permitted for fill purposes if the depth exceeds two (2) inches to achieve the finished grade. Sharp sand is NOT to be used as backfill for planting bed or tree installation locations.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. Work shall be performed by personnel trained and experienced in this work and shall be done under the direction of a superintendent on the Contractor's staff.

3.2 PREPARATION OF SUBGRADE AND SPREADING OF TOPSOIL

A. The sub grade soil shall be loosened to a depth of four (4) inches and graded to remove all ridges and depressions so that it will be everywhere paralleled to proposed finished grade. All stones over one and one-half (1-1/2) inches in any dimensions, sticks, rubbish and other extraneous matter shall be removed during this operation. No heavy objects except rollers shall be moved over lawn areas after the sub grade soil has been prepared before topsoil is spread.

B. After the subgrade soil has been prepared, topsoil shall be spread evenly therein to depth of two (2) inches by an approved method and the area then rolled with a 200-pound roller.

C. For Compacted Base locations required to be provided below edging material (at decomposed granite pathways and along Tempark edge locations) comply with the general notes for DG installation provided on the drawings.

D. On all sod areas, the finished surface of the topsoil shall conform to the finished grade and shall be free from hollows or other inequalities, stones, stocks and other extraneous matter.

3.3 FINISH GRADING

A. In areas to receive sod, the Contractor shall till, disc, or otherwise scarify the soil,

removing all clods, stones, and related material one (1) inch or larger. Place and spread any additional material that may be required. Roll completely.

B. Contractor shall be responsible for minor adjustments to the finished sub grade if such treatment is required in the opinion of the Owner's Representative.

C. The Contractor may use machinery acceptable to the Owner's Representative to complete most of the work to re-establishing finished grade.

D. Hand-rake the surface, removing all clods and undesirable material greater than one-half (1/2) inch from ground surface. Fill all low spots and cut irregularities to the acceptance of the Owner's Representative. Roll the entire surface evenly with a 200-pound water ballast roller or other means acceptable.

E. During the finished grading operations, all swales and additional swales that may be required to drain areas where there are existing plant materials, shall be finished. In general, all grade adjustments shall be made so there are no areas that will have standing water.

F. To prevent excessive weed growth in the lawn areas, the Contractor should be prepared to immediately install the sod upon the completed and acceptable finished grade.

END OF SECTION 32 91 19