

S P E C I F I C A T I O N S

POJOAQUE VALLEY RECREATION COMPLEX

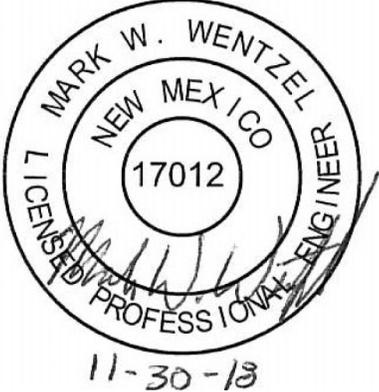
Santa Fe County
Santa Fe, New Mexico

November 30, 2018

Prepared by

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CERTIFICATION PAGE

<p>A. Landscape Architect</p> <ol style="list-style-type: none">1. Claudia Horn, PLA2. #3713. Responsible for portions of Sections 01 through 32	 <p>Landscape Architect</p>
<p>B. Architect</p> <ol style="list-style-type: none">1. Michael Krupnick, AIA2. #0039073. Responsible for Sections 06 10 00 and 09 24 00	 <p>Architect</p>
<p>C. Electrical Engineer</p> <ol style="list-style-type: none">1. Mark Wentzel2. #170123. Responsible for Division 26	 <p>Electrical Engineer</p>

END OF SECTION

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END OF SECTION

Within the Drawings if inconsistencies are found, written directions/instructions/notes take precedence over graphic illustrations; written dimensions over scaled; and large scale details over small scaled plans or sections. However, Contractor shall promptly bring to the Owner's and Landscape Architect's attention any discrepancies, inconsistencies, or ambiguities within the Drawings, or within the Contract Documents, prior to proceeding with the Work.

END OF SECTION

PART I - CONTRACTS

1.01 GENERAL

- A. Work to be done under this contract and in accordance with these Contract Documents consists of providing complete site improvements.
- B. The main features of the work include, but are not limited to, the following:
 - 1. Demolition
 - 2. Earthwork
 - 3. Concrete Paving
 - 4. Utilities
 - 5. Steel Shade Structures and Building Additions
 - 6. Playgrounds
 - 7. Site Furnishings
 - 8. Fencing and access control
 - 9. Signage
 - 10. Planting
 - 11. Seeding
 - 12. Irrigation

PART 2 - OWNER OCCUPANCY

2.01 GENERAL

- A. If a portion of the permanent construction has been satisfactorily completed and this portion will be immediately useful for the Owner to occupy, use, or gain access to other parts of the complex, the Owner may, by written notice, advise the Contractor that the Owner accepts such portion of work.
- B. Action by the Owner will in no way affect the obligation of the Contractor under the terms and provisions of the contract with respect to work not completed and accepted.

PART 3 - CONTRACTOR USE OF PREMISES

3.01 GENERAL

- A. Owner or his representative shall designate access areas to the project site, areas for construction personnel parking and for material and equipment storage as well as locations of temporary office and other construction building.
- B. Limit use of Project site to areas within the Limit of Work as designated on in the Contract Documents. Do not disturb portions of the Project site beyond areas in which the Work is indicated. Keep driveways, entrances, and parking areas serving the premises clear and available to the Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
- C. Carry out work in a manner which allows continuous operation of necessary functions of existing parking areas, buildings, recreational fields, and associated circulation areas during recreational

league seasons of use. Install temporary fencing to delineate construction zones from publicly accessible areas of the site. Maintain fencing, if necessary, for the duration of construction as required for user safety.

- D. Maintain portions of existing buildings affected by construction operations in a weathertight condition throughout the construction period. Repair damage caused by construction operations.

PART 4 - LABOR AND MATERIALS

4.01 GENERAL

- A. Provide complete materials and labor for proper execution and completion of work.
- B. Provide order and enforce strict discipline among employees and do not employ a person unskilled or unfit in task assigned to him.
- C. Provide completion of work items in proper sequence and order so that no items of construction or installation will be affected by the delay or premature application of another.
- D. Provide installation of work in accordance with manufacturer's specifications, when not otherwise specified.

PART 5 - PROJECT COORDINATION

5.01 GENERAL

- A. Comply with reasonable instructions of local public agencies and ordinances and codes of local government regarding sign, advertising, traffic, fires, explosives, danger signals, noise, and barricades. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Limit work on site to normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated.
- C. Notices, demands, requests, instructions, approvals, proposals and claims must be in writing.
- D. Papers required to be delivered to Owner shall be delivered to Owner's authorized representative, unless otherwise specified in writing to the Contactor.
- E. Inform Owner when required samples and submittals are ready for approval. Owner will require a minimum of five days notice prior to approval trips.

END OF SECTION

PART 1 - GENERAL

1.01 SCHEDULE OF VALUES

- A. Submit printed schedule on AIA G703 - Continuation Sheet for G702.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section.
- D. For each major line item list sub-values of major products or operations under the item.
- E. Revise schedule to list approved Change Orders with each Application for Payment.
- F. Upon request of the Landscape Architect, support the values with data which will substantiate their correctness.
 - 1. The Schedule of Values, unless objected to by the Landscape Architect, shall be used only as the basis for the Contractor's Applications for Payment.
- G. Form and Content of Schedule of Values:
 - 1. Type schedule on 8-1/2" x 11" white paper; Contractor's standard forms and automated printout will be considered for acceptance by Landscape Architect upon Contractor's request. Identify schedule with:
 - a. Title of Project and location
 - b. Landscape Architect and Project number
 - c. Name and Address of Contractor
 - d. Contract designation
 - e. Date of submission
 - 2. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
 - 3. For the various portions of the Work:
 - a. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - b. For items on which progress payments will be requested for stored materials not paid for, breakdown the value into:
 - 1) The cost of the materials, delivered and unloaded, with taxes paid.
 - 2) The total installed value.
 - 4. The sum of all values listed in the schedule shall equal the total contract sum.

1.02 APPLICATION FOR PAYMENT

- A. Submit three copies of each Application for Payment on AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702. with all copies containing original signatures and notarization as required. The forms included at the end of this section must be used for pay requests. (See Samples)
- B. The Item and Description columns in the AIA G703 form must be filled out to follow the Contract bid sheets which may be abbreviated (use as many as required). A computer generated form may be substituted for the AIA forms.
- C. Content and Format: Use Schedule of Values for listing items in Application for Payment.

- D. Submit information in typewritten form
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit three copies of each application for payment.
- I. Include three copies of the following with the application:
 - 1. Partial release of liens from all Subcontractors and vendors from previous payout.
 - 2. Partial release of lien from General Contractor for current pay request.
 - 3. Contractor's Sworn Statement for the Contract Price.
 - 4. Certified Payroll.
- J. When Landscape Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- K. Submit updated construction schedule with each Application for Payment.
- L. Payment Period: monthly.

1.04 CONTRACT MODIFICATION PROCEDURES

- A. Upon the Owner's approval of a proposal from the Contractor, submitted either in response to a Proposal Request issued by the Landscape Architect or as a request for change from the Contractor, the Contractor will issue a Change Order on AIA Document G701, for all changes to the Contract Sum or Contract Time.
- B. When the Owner and Contractor disagree on the terms of a proposal, the Landscape Architect may issue a Construction Change Directive on AIA Document G714, instructing the Contractor to proceed with the change. The Construction Change Directive will contain a description of the change, and designate the method to be followed to determine changes to the Contract Sum or Contract Time.

1.03 TAXES

- A. Provide sales and use taxes currently imposed by legislative action and as administered by the local jurisdiction agencies in this bid and contract price.
- B. If not required to bear the burden or if a refund is obtained from State sales or use tax, interest or penalty which was to be included in the bid and contract price shall be reduced by the amount. This reduction will be to the benefit of the Owner.
- C. Submit 3 copies of each Application for Payment on AIA Document G702/703, in accordance with the schedule established in the Agreement.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump Sum allowances.
 - 2. Unity Cost allowances.
 - 3. Quantity allowances.
 - 4. Contingency allowances.

1.02 ACTION SUBMITTALS

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

1.03 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in the same manner as for other portions of the Work.

1.04 COORDINATION

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

1.05 ALLOWANCES

- A. The following Allowances are to be included in the Bid and Contract Sum:
 - 1. Memorial Pillar: \$12,000.00
 - 2. Miscellaneous Utilities: \$7,500.00
 - 3. Temporary Construction Fencing: \$ 3,500

1.06 SCHEDULE OF ALLOWANCES

- A. The Allowance includes materials, labor, freight and delivery, installation, insurance, bonding, overhead and profit, and similar costs for the work provided by the subcontractor. In all cases, the Contractor shall be the responsible party for coordinating between the Contractor's work and the subcontractor. The Contractor shall also be responsible for protection and repair of any damage to the work of the subcontractor once installed within the project site.

The general description of the work provided by the subcontractor includes:

1. Allowance No. 1: Memorial Pillar (Lump Sum Allowance)
Contractor shall provide all materials, labor, and installation services for a monolithic stone memorial as per detail 1/L3-05. Work includes finish surface treatment to visible stone surfaces, include sandblasting one surface of the stone with a quote, and producing and installing 3 unique signs with graphics with blind stud mounting to the face of the stone pillar. The size, material, content, and finish of the graphic sign panels to be submitted to the Contractor for pricing prior to approval. Final installation locations, templates (as required), and digital graphic files to be provided by the Landscape Architect.
1. Allowance No. 2: Miscellaneous Utilities (Contingency Allowance)
The purpose for this allowance is to reimburse the Contractor for the work of relocating, adjusting, or replacing any unforeseen required utility as necessary to complete the construction of the project as per the Contract Documents. In order to be eligible for payment under this item, the Contractor must submit a written proposal to the Owner Representative for approval for the required relocation or adjustments of existing utilities before work begins in these areas.
2. Allowance No. 3: Temporary Construction Fencing (Contingency Allowance)
The purpose for this allowance is to reimburse the Contractor for the work of installation, maintenance, and removal of 6' height chain link temporary construction fencing during all or portions of the construction period to allow safe access to portions of the project site not under construction for use by the sports organizations. In order to be eligible for payment under this item, the Contractor must submit a written proposal to the Owner's Representative for approval of the temporary fence layout, length, and duration before installation. Reimbursement to the Contractor will be paid at the unit cost per linear foot of fencing.

END OF SECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.03 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. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. 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.

1.04 PROCEDURES

- A. Coordination: Revise 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, each party involved shall be notified in writing of the status of each alternate, in particular whether alternates have been accepted, rejected, or deferred for later consideration. Notification shall include a complete description of negotiated revisions 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**

3.01 SCHEDULE OF ALTERNATES

A. Deductive Alternate No. 1: Bullpen

1. Base Bid: 8'x60' bullpen at the southeast corner of the multi-use field as indicated on Sheet L1-02, L2-02, C2-06, and C4-01 along with associated details and applicable furnishings outlined in the plans and 32 33 00 Site Furnishings. Work includes the supply, construction, and installation of new perimeter curb, 8 ft. height chainlink fencing, and pedestrian gate; retrofit of an existing 60 ft. section of 4 ft. height chain link fencing to 8 ft. height chain link fence; earthwork and finish surfacing; and supply and installation of a pitcher's mound.
2. Alternate: No new bullpen as described above and as indicated on Sheets L1-02, L2-02, C2-06, and C4-01 along with associated details and 32 33 00 Site Furnishings. No existing chain link fence demolition in this area is necessary with this alternate.

B. Deductive Alternate No. 2: Small Picnic Shelter

1. Base Bid: Steel frame picnic shelter (roof area 22' x 37') over a 9.75'x15' garden shed building and associated site furnishings indicated on Sheet L2-02, C2-06, A1-02, and A2-02 along with associated details and furnishings outlined in 32 33 00 Site Furnishings. Work includes the supply, manufacture, and installation of a steel frame structure and roof; construction of a wood frame / stucco finish garden shed over a new concrete pad; supply, delivery, and installation of picnic tables, wall-mounted bench, trash / recycling receptacles, and cobble swale.
2. Alternate: No new garden shed building, associated site furnishings, concrete pad, and cobble as described on Sheets L2-02, C2-06, A1-02, and A2-02 along with associated details and 32 33 00 Site Furnishings. Swale to be graded in this location.

C. Deductive Alternate No. 3: Picnic Tables

1. Base Bid: 8 sets of picnic tables within the pedestrian promenade as indicated on sheet L2-01 along with associated details and 32 33 00 Site Furnishings. Work includes the supply, delivery, and installation of new picnic tables.
2. Alternate: No picnic tables installed at promenade as described on sheet L2-01 along with associated details and 32 33 00 Site Furnishings.

D. Deductive Alternate No. 4: Garden Fence

1. Base Bid: Garden perimeter 7' height deer proof fence (ca. 475 LF), pedestrian access gates (2), and a vehicular gate (1) as indicated on sheet L2-02 and associated details. Work includes the supply, manufacture, and installation of the fence and gates along with rabbit proof mesh on the inside of a 190 lf section of existing chain link fence.
2. Alternate: No new garden perimeter fence or rabbit proof mesh along existing chain link fence as described on sheet L2-02 and associated details.

E. Deductive Alternate No. 5: Bleachers

1. Base Bid: 5 sets of bleachers with underlying concrete pads as indicated on Sheets L2-01, L2-02, L2-03, C2-02, and C2-06 along with associated details and products outlined in 32 33 00

Site Furnishings. Work includes the supply, delivery, and installation of 3 different sizes of bleachers over new 4" concrete pads.

2. Alternate: No new bleacher pads or bleacher sets as described on Sheets L2-01, L2-02, L2-03, C2-02, and C2-06 along with associated details and products outlined in 32 33 00 Site Furnishings.

END OF SECTION

PART I – GENERAL**1.01 SUBSTITUTIONS**

- A. Base bids upon providing the specific materials, processed products, persons or organizations, etc., identified in this Specification and/or indicated on the Drawings.
- B. For a period of thirty (30) consecutive calendar days after the signing of the Contract by the Owner, other fully equal materials will be considered by the Owner. No substitutions will be considered after thirty (30) days.
- C. The burden of proof of equality rests with the Contractor, and supporting technical literature, samples, drawings and performance data must be submitted with each request for substitutions.
- D. The Owner reserves the right to accept or reject proposed substitutions. Each request shall state the amount of savings to the Owner, if the substitution is approved.
- E. Cost of any testing required for analysis of proposed substitution shall be paid for by the Contractor at a testing agency selected and approved by the Owner.
- F. Should a substitution be accepted, the Contractor shall be responsible to make all necessary adjustments in the Work which may be affected as a result of the substitution at no additional cost.
- G. Should a substitution be accepted and this substitution prove to be defective within the one year guarantee period, the Contractor shall replace the substitute material with that specified and bear the costs incurred thereby.

1.02 PRODUCT SUBSTITUTIONS

- A. Contractor's Options
 - 1. For Products specified only by reference standard, select any product meeting that standard.
 - 2. For products specified by naming several products or manufacturer's select any one of the products or manufacturer's named, which complies with the specifications.
 - 3. For Products specified by naming only one Product or manufacturer, Contract must submit a request as for substitutions for any Product or manufacturer not specifically named.
 - 4. For products specified by naming only one Product and manufacturer and indicated as "no substitute", there is no option.
- B. Submit a separate request for each Product Substitution, supported with complete data, with drawings and samples as appropriate, including:
 - 1. Comparison of the qualities of the proposed substitution with that specified.
 - 2. Changes required in other elements of the work because of the substitution.
 - 3. Effect on the construction schedule.

4. Cost data comparing the proposed substitution with the Product specified.
 5. Any required license fees or royalties.
 6. Availability of maintenance service, and source of replacement materials.
- C. A request for substitution represents that the Contractor:
1. Has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified.
 2. Will provide the same warranties or bonds for the substitution as for the Product specified.
 3. Will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects.
 4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
- D. Owner will review requests for substitutions with reasonable promptness, and notify Contractor, in writing, of the decision to accept or reject the requested substitution.

END OF SECTION

PART 1 - PRECONSTRUCTION CONFERENCES

1.01 GENERAL

- A. A preconstruction conference will be held prior to beginning of construction, notice of meeting will be sent by Owner to Contractor regarding time and place for the meeting.

PART 2 - PROGRESS MEETINGS

2.01 GENERAL

- A. Progress meetings shall be held as directed, with the Contractor, Construction Manager, Owner's Representative, Landscape Architect and Subcontractors whose presence is required, for the purpose of discussing, coordinating and expediting the work.
- B. Representatives at the meeting should be qualified to act on behalf of the Contractor or subcontractor they represent.
- C. Contractor will be responsible scheduling progress meetings, for keeping minutes of the meeting and distribution of one typed copy of minutes to Owner, Landscape Architect and subcontractors.

PART 3 - JOB SITE ADMINISTRATION

3.01 GENERAL

- A. The Owner, its authorized representatives and agents, will be allowed access to and be permitted to observe and review work, materials, equipment, payrolls, personnel records, employment conditions, and material invoices relevant to this Contract.
- B. Instructions and approval with respect to work will be given only by the Owner through its authorized agents.

END OF SECTION

PART 1 - GENERAL**1.01 PROJECT MANAGEMENT AND COORDINATION**

- A. Verify layout information shown on Drawings, in relation to property survey and existing benchmarks, before laying out the Work.
- B. Progress meetings will be held at Project site bi-weekly. Owner, Landscape Architect, Contractor, and each subcontractor or other entity concerned with current progress or involved with planning or coordination of future activities, shall attend.
 - 1. Minutes of each meeting will be prepared by Contractor and distributed to Owner, Landscape Architect and all other parties present.

1.02 CONSTRUCTION SCHEDULE

- A. Prepare a horizontal bar-chart-type, construction schedule. Provide a separate time bar for each activity and a vertical line to identify the first workday of each week. Use same breakdown of Work indicated in the Schedule of Values. As Work progresses, mark each bar to indicate actual completion.
 - 1. Submit within 10 calendar days of the date established for Commencement of the Work.
 - 2. Prepare the schedule on reproducible media, of width sufficient to show data for the entire construction period.
 - 3. Coordinate each element with other activities. Show each activity in proper sequence. Indicate sequences necessary for completion of related Work.
 - 4. Indicate Substantial Completion and allow time for Landscape Architect's procedures necessary for certifying Substantial Completion.
 - 5. Schedule Distribution: Distribute copies to Owner, Landscape Architect, subcontractors, and parties required to comply with dates.
 - 6. Updating: Revise the schedule after each meeting or activity where revisions have been made.

1.03 SUBMITTAL PROCEDURES

- A. Coordinate submittal preparation with construction schedule, fabrication lead-times, other submittals, and other activities that require sequential operations.
 - 1. The Contractor shall submit two (2) sets of the items specified below to the Landscape Architect for review and approval at least seven (7) working days prior to ordering. No material shall be ordered, delivered or any work preceded in the field until the required submittals have been reviewed in its entirety and stamped approved. Delivered material shall match the approved samples.
 - 2. No extension of Contract Time will be authorized due to failure to transmit submittals in time to permit processing sufficiently in advance of when materials are required in the Work.
 - 3. Landscape Architect will not accept submittals from sources other than Contractor.
- B. Prepare submittals by placing a permanent label on each for identification. Provide a space on the label or beside title block to record review and approval markings and action taken. Include the following information on the label:

1. Project name.
 2. Date.
 3. Name and address of Contractor.
 4. Name and address of subcontractor or supplier.
 5. Number and title of appropriate Specification Section.
 6. Contractor's certification that materials comply with specified requirements.
- C. Product Data: Mark each copy to show applicable choices and options. Include the following:
1. Data indicating compliance with specified standards and requirements.
 2. Notation of coordination requirements.
 3. For equipment data, include rated capacities, dimensions, weights, required clearances, and furnished specialties and accessories.
- D. Shop Drawings: Submit newly prepared information drawn to scale as outlined in Section 6L. Shop Drawings and Samples of the General Conditions and as indicated herein. Indicate deviations from Contract Documents. Do not reproduce Contract Documents or copy standard information. Submit 1 reproducible print and 1 blue- or black-line print on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (762 by 1067 mm). Landscape Architect will return the reproducible print. Include the following:
1. Dimensions, profiles, methods of attachment, coordination with adjoining work, large scale details, and other information, as appropriate for the Work.
 2. Identification of products and materials.
 3. Notation of coordination requirements.
 4. Notation of dimensions established by field measurement.
- E. Samples: Submit Samples finished as specified and identical with the material proposed. Where variations are inherent in the material, submit at least 3 units that show limits of the variations. Include product name or name of the manufacturer.
- F. Mock-Ups:
1. Mock-ups shall be submitted for major systems and items as required on the Drawings and in the specifications.
 2. The mock-ups are to remain in place until the end of the project in an area where they will be protected from any damage, until otherwise directed by the Owner.
 3. Mock-up upon approval by the Owner will become the minimum construction quality standard for the system or item throughout the project.
 4. The Contractor shall provide corrections or resubmittals of the mock-up until approved by the Owner. Any corrections or resubmittals shall be at no additional cost to the Owner.
- G. Landscape Architect will review each submittal, mark as appropriate to indicate action taken, and return copies less those retained. Compliance with specified requirements remains Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL

- A. Contractor to employ and pay for services of an independent Testing Laboratory to perform specified testing. Cooperate with laboratory to facilitate execution of required services.
- B. Employment of laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Certification of Products: Respective sections of Specifications.
- C. Design of Concrete Mixes: Section 03 30 00.

1.03 QUALIFICATIONS OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E-329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in the State in which the Project is located.
- D. Acceptable to Owner.
- E. Testing equipment at reasonable intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.04 AUTHORITY AND DUTIES OF LABORATORY

- A. Cooperate with Owner and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction.
- C. Promptly notify Owner and Contractor of observed irregularities or deficiencies of work or products.
- D. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of the Work.
 - 3. Perform any duties of the Contractor.
- E. Promptly submit written report of each test and inspection; 4 copies each to Owner and Contractor. Each report shall include:

1. Date issued.
2. Project title and number.
3. Testing laboratory name, address, and telephone number.
4. Name and signature of laboratory inspector.
5. Date and time of sampling and inspection.
6. Record of temperature and weather conditions.
7. Date of test.
8. Identification of product and Specification Section.
9. Location of sample or test in the Project.
10. Type of inspection or test.
11. Results of tests and compliance with Contract Documents.
12. Interpretation of test results that indicate unsatisfactory conditions.

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to Work or to manufacturer's operations.
- B. Deliver to laboratory adequate quantities of representative samples of materials proposed for use and which require testing.
- C. Provide to laboratory preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- D. Notify laboratory sufficiently in advance of operations (minimum of 2 days) to allow for laboratory assignment of personnel and scheduling of tests.
- E. Furnish incidental labor and facilities:
 1. To provide access to Work to be tested.
 2. To obtain and handle samples at Project site or at source of product to be tested.
 3. To facilitate inspections and tests.
 4. For storage and curing of test samples.
- F. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience.
- G. Employ and pay for services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents.

1.06 REFERENCE STANDARDS

- A. American Concrete Institute (ACI): 301-73, Specifications for Structural Concrete for Buildings.
- B. American Society for Testing and Materials (ASTM) (latest editions):
 1. ASTM C31, Making and Curing Concrete Compressive and Flexural Strength Test Specimens in the Field.
 2. ASTM C39, Test for Compressive Strength of Cylindrical Concrete Specimens.
 3. ASTM C42, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 4. ASTM C143, Test for Slump of Portland Cement Concrete.
 5. ASTM C172, Methods of Fresh Concrete, Sampling.

6. ASTM C231, Test for Air Content of Freshly Mixed Concrete by the Pressure Method.

PART 2 - NOT APPLICABLE

PART 3 - EXECUTION

3.01 CONCRETE CONTROL AND TESTING

- A. Secure composite samples in accordance with ASTM C172.
- B. Mold and cure 3 specimens from each sample in accordance with ASTM C31.
- C. Test specimens in accordance with ASTM C39. Test two specimens at 28 days for acceptance and test one at 7 days for information.
- D. Make one set of strength tests (three cylinders) for each 100 cu. yd. or fraction thereof, or each mix design of concrete placed in any one day.
- E. Determine slump for each strength test and when consistency of concrete appears to vary in accordance with ASTM C143.
- F. Determine total air content of air entrained normal-weight concrete sample for each strength test in accordance with ASTM C231.
- G. Determine temperature of concrete sample for each strength test.
- H. Control addition of water to concrete at job site and length of time concrete is allowed to remain in truck during placement.
- I. Certify each concrete delivery ticket indicating class of concrete delivered, amount of water added and time at which cement and aggregate was discharged into truck, and time at which concrete was discharged from truck.
- J. Evaluation and Acceptance
 - 1. Strength level of concrete will be considered satisfactory if 90% of strength test results equal or exceed specified strength and no individual test result is below specified strength by more than 500 psi.
 - 2. Completed concrete work will be accepted when it conforms to requirements of ACI 301, Chapter 18.
 - 3. Where average strength of laboratory control cylinders, as shown by tests for portion of structure, falls below specified minimum ultimate compressive strength, Owner shall have right to require Contractor to provide improved curing, conditions of temperature and moisture to secure required strength.
 - 4. If average strength of laboratory control cylinders fall significantly below design strength and Owner requires drilling concrete core specimens, test specimens in accordance with core procedure or ASTM C42. If results of core tests indicate that strength of structure is inadequate, such replacement, load testing, or strengthening as ordered by Owner shall be provided by Contractor without cost to Owner. If core tests are so ordered, and results of such tests indicate that strength of structure is as required by Contract Documents, cost of tests will

be paid by Contractor.

K. Concrete Test Reports

1. Compile reports and distribute immediately after respective tests or inspections are completed.
2. If reports indicate deviations from Contract Documents, include in report a determination or probable cause of deviation and, where applicable, a recommendation for corrective action.
3. Where a trend of decreasing quality in concrete is determined due to changing seasons, conditions of curing or other cause, notify Owner and Contractor of conditions and submit a recommendation for corrective action to be taken before materials fall below specified quality requirements.

3.02 EARTHWORK

- A. Perform Plasticity Index Test on select fill material prior to use to determine compliance with the Contract Documents (ASTM D-424).
- B. Perform an in place density test on select fill for each 5,000 square feet of area or fraction thereof for each lift in place (ASTM D-2922).
- C. Perform a minimum of 4 density tests per lift under floor slabs on grade.

3.03 CONCRETE WALL AND COLUMN FOOTINGS EXCAVATION

- A. Soils testing laboratory shall inspect each concrete wall and column footing excavation to determine that proper bearing stratum is obtained and utilized for bearing and that excavations are properly clean and dry before concrete is placed.

3.04 PREWETTING SUBGRADE SOIL

- A. Soils Testing Laboratory shall conduct periodic auger borings to determine soil moisture contents at selected locations and depths (ASTM D-698 or D-1557).
- B. Surface construction shall not proceed over prewetted subgrade until desired moisture level is attained throughout the treated area.
- C. After moisture content is approved, construction shall proceed so as not to permit a loss in soil moisture content.

3.05 REINFORCING STEEL:

- A. If reinforcing steel is purchased direct from a United States mill, manufacturer's approved test sheet will suffice. Steel supplier shall furnish mail certificate reports.
- B. If steel is from dealer's stock, perform tension and bending test on three separate samples for each size of bar in every 5 tons of each type of steel as specified in the appropriate ASTM Specification. Contractor shall furnish all material for testing and pay for all such test.
- C. Tie-back cables shall be tested same as reinforcing steel.
- D. Perform visual inspection prior to placement for size, type and quality of materials.

- E. Observe the report on placement of reinforcement, including size, vertical location, horizontal spacing, correctness of bends, splices, clearance between bars and forms, firmness of installation, and security of supports and ties, immediately prior to concreting.
- F. Observe and report on placement of embedded items, including size, vertical location, horizontal spacing, correctness of fabrication, and firmness of installation immediately prior to concreting.

3.06 STRUCTURAL CONCRETE CONTROL AND TESTING

- A. Secure composite samples in accordance with C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
- B. Concrete with a design strength of 6,000 psi or more shall be tested as follows:
 - 1. Mold and cure six specimens from each sample in accordance with ASTM C31.
 - 2. Two specimens shall be tested at 7 day for information, two shall be tested at 28 days for information, and two shall be tested at 56 days for acceptance. Acceptance tests results shall be the average of the strengths of the two specimens tested at 56 days. Minimum acceptable strength at 28 days for concrete with a design strength of 6,000 psi shall be 5,100 psi (85 percent of the 56 day requirement).
- C. Concrete with a design strength less than 6,000 psi shall be tested as follows:
 - 1. Mold and cure four specimens from each sample in accordance with ASTM C31.
 - 2. Two specimens shall be tested at seven days for information and two shall be tested at 28 days for acceptance. Acceptance test results shall be the average of the strengths of the two specimens at 28 days.
- D. Any deviations from the requirements of ASTM Specifications shall be recorded in the test report. Test concrete specimens in accordance with ASTM C39.
- E. Make at least one strength test (six specimens for all 6,000 psi or above concrete, four specimens for other concrete) for each 100 cu. yd. of fraction thereof, of each mix design of concrete placed in any one day. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C143.
- F. Inspect each batch of concrete, adjust amounts of mixing in water to assure uniform consistency from truck to truck. Check mixing time of concrete in trucks.
- G. Should strength of concrete fall below the minimum, the additional tests may be required. These tests, if required, shall be made at the Contractor's expense and shall be in accordance with ASTM C42, and ACI 318. If core sample strength tests do not meet strength requirements, then the structure, or any part of the structure shall be removed and replaced at the Contractor's expense.
- H. Test reports shall show time test was made, truck ticket number, slump and time of batching, and location of each placement.
- I. Report promptly to Owner details of reasons for rejection of quantities of concrete. Give information concerning locations of the concrete pours, quantities, date of pours and other pertinent facts concerning concrete represented by the specimens.

3.7 STRUCTURAL CONCRETE MIX DESIGNS

- A. Trial mixtures having portions and consistencies suitable for the work shall be made based on ACI 211.1, using at least three different water-cement ratios which will produce a range of strengths encompassing those required for this Project.
- B. Trial mixes shall be designed to produce slump within 3/4 inch of the maximum permitted, and for air-entrained concrete, within .5 percent of maximum allowable air content. The temperature of concrete used in trial batches shall be the maximum temperature specified in the Structural Concrete Section.
- C. For each water-cement ratio, at least three compression test cylinders for each testage shall be made and cured in accordance with ASTM C192. Cylinders shall be tested at 7 and 28 days in accordance with ASTM C39. Where the required design strength is 6,000 psi, an additional set of cylinders shall be tested at 56 days in accordance with C39.
- D. From the results of the 28 days tests, a curve shall be plotted showing the relationship between the water-cement ratio and compressive strength. From this

curve, the water-cement ratio to be used in the concrete shall be selected to produce the average strength required.
- E. The cement content and mixture proportions to be used shall be such that this water-cement ratio is not exceeded when slump is the maximum permitted. Control in the field shall be based upon maintenance of proper cement content, slump and air content.
- F. Mix designs furnished by the concrete supplier, accompanied by test data showing an acceptable strength history and certified by the testing laboratory, will be considered as an acceptable alternative to the procedure described in paragraphs A through D above.
 - 1. Temperature of concrete in test data shall be within 5 F. of maximum temperature specified or expected for this project.
 - 2. Strengths indicated in test data shall be in accordance with ACI 318, paragraph 4.3.
 - 3. The specified strength of concrete used in supporting test data shall vary no more than 500 psi plus or minus from that specified for this project.
- G. Where fly ash is used in the mix design, fly ash shall comprise no more than 20% by weight of the total cementitious material in the mix.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION REQUIREMENTS

- A. Standards: Comply with NFPA 241, "Standard for Safeguarding Construction, Alterations, and Demolition Operations"; ANSI A10 Series standards for "Safety Requirements for Construction and Demolition"; and NECA Electrical Design Library's "Temporary Electrical Facilities."
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.
- B. At the earliest possible time, change over from use of temporary utility services to use of permanent utilities.
- C. Remove temporary facilities and controls before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Provide new materials and equipment for construction of temporary facilities and controls.

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES

- A. Provide temporary lighting, fire-protection, and telephone services to project site for use during construction. Arrange for and coordinate service(s) with local utility companies.
 - 1. Contractor shall pay all use charges for temporary utilities.
- B. Provide temporary heat for curing or drying of work, and for protection of new construction from adverse effects of low temperatures. Use of gasoline-burning heaters and open-flame heaters is not permitted.
- C. Provide temporary sanitary facilities. Comply with regulations and health codes for type, number, location, and maintenance of facilities.
- D. Contractor shall have access to existing owner-provided electric power and water.

3.01 TEMPORARY CONSTRUCTION FACILITIES

- A. Provide field offices, storage trailers, and other support facilities as necessary for efficient prosecution of the Work.
 - 1. Temporary facilities located within the construction area or within 30 feet (9 m) of building lines shall be of noncombustible construction.

- B. Provide temporary enclosures for protection of construction and workers from exposure and inclement weather and for containment of heat.
- C. Install project identification and other signs in locations approved by Owner to inform the public and persons seeking entrance to Project.
- D. Collect waste daily and dispose of waste off-site according to local ordinances, when containers are full.
 - 1. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material according to applicable laws and regulations.
 - 2. Cost for removal and disposal of construction related waste materials and debris shall be paid by the Contractor.
- E. Costs for removal and disposal of construction related waste shall be paid by the Contractor.

3.02 TEMPORARY CONTROLS

- A. Provide temporary fire protection until permanent systems supply fire-protection needs.
 - 1. Provide adequate numbers and types of fire extinguishers.
 - 2. Store combustible materials in fire-safe containers in fire-safe locations.
 - 3. Prohibit smoking in hazardous fire-exposure areas.
 - 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- B. Provide temporary barricades, warning signs, and lights to protect the public and construction personnel from construction hazards.
 - 1. Enclose construction area(s) with fence(s) with lockable entrance gates, to prevent unauthorized access.
- C. Provide temporary environmental controls as required by authorities having jurisdiction including, but not limited to, erosion and sediment control, dust control, noise control, and pollution control, Environmental Protection Agency requirements. Contractor shall be responsible for arranging and paying for all activities related to providing temporary environmental controls.
- D. Contractor shall be responsible for and pay for all activities related to Environmental Protection Agency environmental control requirements.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION REQUIREMENTS

- A. Provide products of same kind from a single source.
- B. Deliver, store, and handle products according to manufacturer's written instructions, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage and to prevent overcrowding construction spaces.
 - 2. Deliver in manufacturer's original sealed packaging with labels and written instructions for handling, storing, protecting, and installing.
 - 3. Inspect to ensure compliance with the Contract Documents and to ensure items are undamaged and properly protected.
 - 4. Store heavy items in a manner that will not endanger supporting construction.
 - 5. Store items subject to damage aboveground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required.

PART 2 - PRODUCTS

2.01 PRODUCT OPTIONS

- A. Provide items that comply with the Contract Documents, are undamaged, and are new at the time of installation.
 - 1. Provide products and equipment complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.
- B. Do not attach manufacturer's labels or trademarks, except for required nameplates, on surfaces exposed to view in occupied spaces or on the exterior.
- C. Select products as follows:
 - 1. Where these Specifications name only a single product or manufacturer, provide the item indicated. No substitutions will be permitted.
 - 2. Where these Specifications name two (2) or more products or manufacturers, provide one (1) of the items indicated. No substitutions will be permitted.
 - 3. Where products or manufacturers are specified by name, accompanied by the term "or equal," comply with provisions concerning "product substitutions" to obtain approval for use of an unnamed product or manufacturer.
 - 4. Where these Specifications describe a product and list characteristics required, with or without naming a brand or trademark, provide a product that complies with the characteristics and other requirements.
 - 5. Where these Specifications require compliance with performance requirements, provide products that comply and are recommended in writing by the manufacturer for the application.
 - 6. Where these Specifications require compliance with codes, regulations, or reference standards, select a product that complies with the codes, regulations, or reference standards.

- D. Unless otherwise indicated, Landscape Architect will select color, pattern, and texture of any product from manufacturer's full range of options.

2.02 PRODUCT SUBSTITUTIONS

- A. Reasonable and timely requests for substitutions will be considered. Substitutions include changes proposed by the Contractor after award of the Contract, in products and methods of construction required by the Contract Documents.
 - 1. Do not submit unapproved substitutions on Shop drawings.
- B. Submit two (2) copies of each request for product substitution. Identify product to be replaced, provide complete documentation showing compliance of proposed substitution with all specified requirements, and include the following:
 - 1. A full comparison with the specified product.
 - 2. A list of changes to other Work required to accommodate the substitution.
 - 3. Any proposed changes in the Contract Sum or Contract Time should the substitution be accepted.
- C. Landscape Architect will review the proposed substitution and notify Contractor of its acceptance or rejection.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

PART 1 - GENERAL

1.01 CLOSEOUT SUBMITTALS

- A. Record Drawings: Maintain a set of Contract Drawings as Record Drawings. Mark to show installation that varies from the Work originally shown.
- B. Record Specifications: Maintain one (1) copy of the Project Manual, including addenda, as Record Specifications. Mark to show variations in Work performed in comparison with the text of the Specifications and modifications.
- C. Operation and Maintenance Data: Organize data into 3-ring binders, with pocket folders for folded sheet information. Mark identification on front and spine of each binder. Include the following:
 - 1. Emergency instructions.
 - 2. Spare parts list.
 - 3. Copies of warranties.
 - 4. Wiring diagrams.
 - 5. Irrigation zone diagrams.
 - 6. Shop Drawings and Product Data.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION**

3.01 EXAMINATION AND PREPARATION

- A. Examine substrates and conditions for compliance with manufacturer's written requirements including, but not limited to, surfaces that are sound, level, and plumb; substrates within installation tolerances; surfaces that are smooth, clean, and free of deleterious substances; and application conditions within environmental limits. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Prepare substrates and adjoining surfaces according to manufacturer's written instructions, including, but not limited to, the application of fillers and primers.

3.02 CUTTING AND PATCHING

- A. Do not cut structural members without prior written approval of Landscape Architect.
- B. For patching, provide materials whose installed performance will equal or surpass that of existing materials. For exposed surfaces, provide or finish materials to visually match existing adjacent surfaces to the fullest extent possible.

3.03 INSTALLATION

- A. Comply with manufacturer's written instructions for installation. Anchor each product securely in place, accurately located and aligned. Clean exposed surfaces and protect from damage. If applicable, prepare surfaces for field finishing.

- B. Comply with NFPA 70 for installation of electrically operated equipment and electrical components and materials.

3.04 FINAL CLEANING

- A. Clean each surface or item as follows before requesting inspection for certification of Substantial Completion:
 1. Remove labels that are not permanent.
 2. Clean transparent materials, including mirrors. Remove excess glazing compounds. Replace chipped or broken glass.
 3. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Leave concrete floors broom clean.
 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean plumbing fixtures. Clean light fixtures and lamps.
 5. Clean the site. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds to a smooth, even-textured surface. Remove weeds.

3.05 CLOSEOUT PROCEDURES

- A. Request Substantial Completion inspection once the following are complete:
 1. Advise Owner of pending insurance changeover requirements.
 2. Submit Record Drawings and Specifications, maintenance manuals, warranties, and similar record information.
 3. Deliver spare parts, extra stock, and similar items.
 4. Changeover locks and transmit keys to Owner.
 5. Complete startup testing of systems and instructions of operation and maintenance to personnel.
 6. Remove temporary facilities and controls.
 7. Complete final cleanup.
 8. Touch up, repair, and restore marred, exposed finishes.
 9. Obtain final inspections from authorities having jurisdiction.
 10. Obtain certificate of occupancy.
- B. Upon receipt of a request for inspection, Landscape Architect will proceed with inspection or advise Contractor of unfilled requirements. Landscape Architect will prepare the Certificate of Substantial Completion after inspection or advise Contractor of items that must be completed or corrected before the certificate will be issued.
- C. Arrange for each installer of equipment that requires operation and maintenance to provide instruction to Owner's personnel. Include a detailed review of the following:
 1. Startup and shutdown.
 2. Emergency operations and safety procedures.
 3. Noise and vibration adjustments.
 4. Maintenance manuals.
 5. Spare parts, tools, and materials.
 6. Lubricants and fuels.
 7. Identification systems.

8. Control sequences.
 9. Hazards.
 10. Warranties and bonds.
- D. Request inspection for certification of final acceptance and final payment, once the following are complete:
1. Submit final payment request with releases of liens and supporting documentation. Include insurance certificates.
 2. Submit a copy of the Substantial Completion inspection list stating that each item has been completed or otherwise resolved for acceptance.
 3. Submit final meter readings for utilities, a record of stored fuel, and similar data as of the date of Substantial Completion.
 4. Submit consent of surety to final payment.
- E. Landscape Architect will re-inspect the Work on receipt of notice that the Work has been completed.
1. On completion of re-inspection, Landscape Architect will prepare a certificate of final acceptance. If the Work is incomplete, Landscape Architect will advise Contractor of the Work that is incomplete or obligations that have not yet been fulfilled.

END OF SECTION

PART 1 - GENERAL

1.01 INTRODUCTION

- A. This work shall consist of selective demolition, clearing and grubbing, grading, irrigation pipe installation, concrete, base course, sub-grade preparation, testing, fencing, permanent signing and striping, planting, and overall project coordination and project scheduling required by the construction documents for this project.

PART 2 – TECHNICAL SPECIFICATIONS

2.01 GENERAL

- A. For all site work the “New Mexico APWA Standard Specifications”, Latest Edition, are hereby incorporated by reference, the same as if fully written herein and shall govern this project except where revised, amended, or supplemented by the construction plans, or superseded by the specifications and contract documents.
- B. All work shall be paid for by unit price per quantity for base bid and any selected alternative. All work as part of additions or deletions shall be paid for or deducted as per Contractor submitted unit cost per item.

PART 3 – NPDES PERMITTING

3.01 GENERAL

- A. This item will be paid on a Unit Price basis for the entire project. This includes excavation for temporary sediment basins, straw bales, silt fence, temporary gravel construction entrance/exit installed prior to any construction and removed at completion of project, use of temporary earth swales, implementation of the Storm Water Pollution Prevention Plan (SWPPP) in accordance with Section 603 of the New Mexico Department of Transportation 2005 Interim Specifications and as amended by the Supplemental Technical Specifications Section 603 and all other materials and equipment required to complete erosion control plan and SWPPP.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included: Perform all site demolition work complete, as shown, and as specified.

1.02 REFERENCES

- A. ASTM - American Society for Testing and Materials.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: Demolish existing site improvements as indicated on the Drawings, in an orderly and careful manner. Comply with local codes and ordinances.
- B. Equipment: Use equipment specifically designed for the demolition of each type of material.
- C. Labor: Employ workmen skilled in the use of the equipment being utilized for demolition.

1.04 DELIVERY, STORAGE, AND DISPOSAL

- A. Delivery and Storage: Do not deliver to the job site nor store thereon demolition equipment and materials prior to receiving written notice to proceed. Confine storage to areas designated by Owner.
- B. Disposal: Legally dispose off site products of demolition during or at end of each day's work. Contractor to coordinate with Owner which site demolition items will be salvaged and disposed of or relocated. Contractor to pay all removal and disposal costs.

1.05 PROJECT/SITE CONDITIONS

- A. Existing Conditions: Inspect site prior to commencing work. Determine scope of applicable site conditions.
- B. Access and Testing: Make test excavations and borings required to determine existing conditions, subject to Owner's convenience.
- C. Acceptance: Commencing work constitutes Contractor's acceptance of site conditions, both surface and subsurface. No extra payment shall accrue to Contractor by virtue of unknown conditions or difficulties of performing this demolition work.

1.06 PROTECTION

- A. Protection of Existing Site Improvements:
 - 1. References: Verify and maintain benchmarks, monuments and other reference points. Replace if disturbed or destroyed.
 - 2. Protection: Protect existing improvements noted to remain within designated limits of work. Supply shoring, bracing, reinforcing and barricades required.
 - 3. Utilities: Keep in operation existing utility circuits and piping to remain including sprinkler irrigation except at the direction of the Owner's Representative. Provide 48 hour notice of

interruption of service. Notify Owner's Representative should utilities not shown on drawings can be found during demolition.

4. Repair: If damage to site improvements to remain occurs during the course of the work, restore to the satisfaction of the Owner at no additional cost.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verification: Verify with Owner items to be removed, salvaged or to remain prior to commencement of work.
- B. Compliance: Proceed with demolition in an orderly and careful manner, in compliance with local codes and ordinances.
- C. Utilities:
 1. Capping: Disconnecting and capping of utilities must be in accordance with the regulations of the utility company affected.
 2. Removal: Removal of buried pipes or conduits is not required if such pipes or conduits lay a minimum of 24 in. below the work required under other Sections of this contract.
- D. Paving and Walls:
 1. General: Remove completely concrete slabs and asphalt paving, foundations, metal supports, walks and paving including and connected equipment. Aggregate base may be reused or remain if it meets the subgrade specifications for the proposed finish, otherwise remove.
 2. Sawcutting: Accurately and cleanly sawcut existing concrete and asphalt paving as shown on Drawings. Confine cuts to areas shown. Avoid damage to adjacent improvements.
 3. Footings: Excavate as required to remove complete footing. Backfill excavation and compact to 95 percent density.
 4. Finishing: Rough grade excavated areas as necessary to achieve the final line and grade as called for in other Sections of this work. Compact to the density of the surrounding area. The final surface shall be smooth, even and tight, free from loose or soft areas.
- E. Subgrade: Fill depressions made by demolition and restore excavated areas to a smooth and even grade. Compact to the density of the surrounding soil or as needed to meet specification for proposed finish condition.

3.02 DE-WATERING

- A. General: Provide and operate equipment and do ditching and pumping necessary to keep the project area free from water.
- B. Storm Water: Pump off storm runoff or other water until such time as new work in other Sections shall effectively remove such water.
- C. Disposal of Water: Take measures required to dispose of surface and subsurface water in compliance with municipal requirements.

3.03 SALVAGE

- A. Contractor is to remove items “to be salvaged” in a manner that maintains the integrity of the item for reuse by the Owner.
- B. Contractor to clean items “to be salvaged” for future reuse to Owner’s satisfaction.
- C. All items marked as “to be salvaged” are to be delivered to a location as directed by Owner. Transport in safe, legal manner.

END OF SECTION

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

- B. Section Includes: Execution and completion of Rough Carpentry in accordance with the Specifications and Drawings including but not limited to;
 - 1. Dimensional lumber.
 - 2. Wall, floor, and roof sheathing.
 - 3. Cellulose honeycomb wall, floor and roof panels.

- C. Related Sections:
 - 1. Division 01 Section "General Requirements."
 - 2. Division 01 Section "Special Procedures."
 - 3. Division 01 Section "Construction Waste Management".
 - 4. Division 06 Section "Finish Carpentry".

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

- B. ASTM International.

- C. American Wood Preservers Association (AWPA).

1.3 DEFINITIONS

- A. SPF may be pine, spruce, fir, hemlock, or another similar species. You'll also see studs and construction lumber labeled as SPF Certified.

- B. RTD refers to the method used to manufacture the plywood. This is, essentially, next generation CDX plywood which is manufactured with a quality control system using RTDs (Resistance Temperature Detectors) to maintain correct temperature during the bonding process.

1.4 SUBMITTALS

- A. Submit under provisions of Divisions 01 Section "General Requirements" and "Special Procedures."

1.5 QUALITY ASSURANCE

- A. Inspection: Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is completed to the point where this installation may properly commence.
- B. Discrepancies: In the event of discrepancy, immediately notify the Project Manager. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.
- C. Lumber may be rejected by the Project Manager, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be properly packed and handled while in transit so as to arrive at the job site in undamaged condition. Manufactured materials shall be delivered in suitable containers plainly marked with brand and manufacturer's name.
- B. Storage arrangements shall be subject to Project Manager's approval and shall afford every access for inspection and identification of each item. Lumber shall be piled off the ground, on skids, in a manner which prevents twisting or warping and affords proper ventilation, drainage and protection from termites and decay, rain and excessive sun. Plywood shall be protected from dampness. Material shall be protected from the elements and from damage or deterioration.
- C. Damaged or deteriorated materials or assemblies shall not be used in the work and shall be replaced at no extra cost to University.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Material shall conform to these specifications and to the applicable current editions of the Standard Specifications of ASTM and CBC. [The source of new lumber shall be certified sustainable harvested lumber.]
- B. Lumber may be pine, spruce, fir, hemlock, or another similar species. You'll also see studs and construction lumber labeled as SPF
- C. Lumber Size and Patterns: Surface four sides, dress sizes to UBC Chapter 23; work to sizes shown. Sizing and surfacing shall be as required and approved for the particular location. Framing shall be sized and where exposed shall be surfaced.
- D. SYP (southern yellow pine) RTD Plywood: U.S. Product Standard PS1 (latest edition), grade stamped and edge branded to DFPA Standards of the American Plywood Association.
- E. Dimensional lumber 2 inches (50 mm) or less in thickness shall have an average moisture content of 19 percent or less but no portion of a shipment shall be over 25 percent. Air dried lumber is desired but, if necessary, lumber may be kiln dried, however, the drying process must be slow and regulated to cause only an amount of checking comparable with air-dried stock. .
- F. Sills and equipment curbs which rest on concrete shall be foundation grade preservative pressure treated Pine.
- G. Framing, blocking, backing, etc., unless otherwise shown, shall be Pine. All interior wood and plywood used for blocking and built into roofing, or otherwise shown shall receive fire retardant pressure treatment in accordance with paragraph 2.5.B. Exterior stair framing and decking, and wood exposed to the exterior, or otherwise shown, shall receive the preservative type pressure treatment in accordance with paragraph 2.5.A.

2.2 WALL, FLOOR AND ROOF SHEATHING

- A. Plywood: See Paragraph 2.1 D.
- B. Oriented Strand Board: Phenolic-glued low-formaldehyde board. Factory edge painted to prevent swelling

2.3 LUMBER FASTENINGS (EXCEPT FOR PRESERVATIVE PRESSURE TREATED LUMBER FASTENINGS)

- A. Nails and Spikes: Common Wire unless otherwise noted
 1. Nailing of wood members shall conform to Uniform Building Code and/or as indicated. Box nails are not permitted.
 2. Penetration: half-length of nail into piece receiving point.
 3. To connect pieces 2 inches (25 mm) net in thickness, 16d nails may be used.
 4. Do not drive nails closer together than half their length, nor closer to edge of piece of lumber or timber than 1/4 their length.
 5. Spacing and size of nails to be such that splitting will not occur. Pre-bore holes for nails wherever necessary to prevent splitting. Bore diameter of holes smaller than diameter of nail or spike (3/4 dia.).
 6. For plywood nailing, barbed plywood nails, size and spacing as indicated. Nails shall have edge distances of not less than 3/8 inch (9.5 mm).
 7. Use galvanized nails where exposed to weather or where members are built-in to roofing.
- B. Screws: Bright steel wood screws:
 1. Screws are to be turned into place, not driven. Self-tapping where required for fastening to metal framing.
 2. Countersink where heads will interfere or as required.
 3. Screw bolt holes the same diameter and depth as shank; bore holes for threaded portion of screws with bit no larger than base of thread.
 4. Use galvanized or cadmium plated screws on fastenings exposed to weather or where members are built-in to roofing.
- C. Bolts: Standard mild steel, square or hex head machine bolts with square nuts and malleable iron or steel plate washers, conforming to ASTM A307.
 1. To be installed in drilled holes the diameter of the bolt, 1/32 inch (0.8 mm) to 1/16-inch (1.6 mm) over size.
 2. Bolting of wood members shall conform to UBC requirements and as called for on the drawings.
 3. Washers: Provide bolts bearing on wood, unless noted otherwise on the drawings, with malleable iron, or steel plate washers under heads and nuts. Do no final bolting until structure has been properly aligned.
 4. Use galvanized bolts, nuts and washers where exposed to weather or where members are built-in to roofing.
- D. Lag Screws: Conform to "National Design Specification for Stress Graded Lumber and Its Fastenings," NFPA, latest edition.
 1. Lag screws shall be screwed and not driven into place. Penetration in each timber shall not be less than 2/3 of the length of the lag screw.
 2. Hole shall be bored the same diameter and depth as the shank, after which the hole shall be continued to a depth equal to the length of the lag screw with a diameter no larger than 3/4 of the shank diameter.
 3. Washers: Provide lag screws bearing on wood with malleable iron or steel plate washers under heads.
 4. Use galvanized lag screws and washers where exposed to weather or where members are built-in to roofing.

2.4 ROUGH HARDWARE (EXCEPT FOR PRESERVATIVE PRESSURE TREATED LUMBER FASTENINGS)

- A. Provide rough hardware related to carpentry work which is not specifically called out under other headings. This shall include, but not be limited to, the following:
1. General: Fastenings, devices, and other rough hardware not specifically indicated on drawings or specified herein shall be submitted for approval prior to installation. Conform to ASTM A7 or A36.
 2. Framing clips, hangers, etc.: Standard products of Universal Company, Simpson, or Silver.
 3. Sheet metal straps: Galvanized sheet steel of gauges and designs indicated.
 4. Expansion anchors shall have a current ICC evaluation report and be size, number and type shown, installed as described in the evaluation report.
 5. Powder Driven Fasteners: shall have a current ICC evaluation report and be size, number and type shown, installed as described in the evaluation report.

2.5 PRESSURE TREATMENT

- A. Where called for on the drawings or specified herein, exposed lumber to receive preservative-type pressure treatment shall have a minimum moisture content of 19 percent after pressure treatment and shall be pressure treated using Ammoniacal copper quaternary compound (ACQ). Preservative shall penetrate a minimum of 3/8-inch (9.5 mm) deep into wood. Materials shall be compatible with stain coatings when specified in Division 09 Section "Painting". Fasteners and connectors used with preservative pressure treated lumber shall be G185 hot dip galvanized, Type 304 stainless steel or Type 316 stainless steel.
1. Dimensioned Lumber (all other): AWPA C-2, retention of 0.25 lbs/c.f. per quality standard LP-2 for above ground use.
 2. Pre-treated lumber shall be preserved with ACQ Preserve®, Chemical Specialties Inc.
- B. SubContractor shall furnish to the Project Manager, upon delivery of the members to the job, a certificate certifying that the material has been pressure treated as specified.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. General: Rough carpentry shall produce joints true, tight, and well nailed with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Selection of lumber pieces: Carefully select members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections.

3.2 WOOD PRESERVATIVE

- A. All exterior framing and wood trims coming in contact with concrete or masonry, to be pressure treated shall be treated with ACQ Preserve®. Preservatives shall be compatible with stain coatings when specified in Division 09 Section "Painting".

3.3 INSTALLATION - LUMBER AND DECKING

- A. Secure decking perpendicular to framing members with ends staggered over firm bearing where possible.
- B. Maintain deck joints of 1/16 inch (1.6 mm).
- C. Surface Flatness: +/- 1/4-inch (6 mm) in 10 feet (3 m) maximum.

3.4 FRAMING

- A. Install framing in strict accordance with the requirements of UBC unless more stringent requirements are specified herein or shown on the Drawings.
- B. Optimum Value Engineering: Where indicated on drawings or, with prior approval by the Project Manager, the following framing techniques may be employed. Nothing in this Section shall supersede requirements of UBC as modified by Division 01 Section "Lateral Force Procedures", or other requirements in the Drawings or Specifications.
 - 1. Wall studs spaced at 24 inches on center (Verify with Project Manager and ensure that wall finish materials can meet spans)
 - 2. On non-bearing walls, a single continuous top plate may be used.
 - 3. Built up headers may be used in lieu of solid lumber.
 - 4. Frame corners with two studs and framing clips.
 - 5. Use blocking for attachments in lieu of continuous stud.
 - 6. Delete headers at non-load bearing walls.
 - 7. Layout framing to take advantage of sheathing or siding dimensions.

3.5 CLEANUP

- A. At the end of each shift and upon completion of the work, remove debris, rubbish and surplus materials from the site which resulted from work under this section. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill. Take positive measures to ensure that saw dust and wood shavings do not enter the storm drainage system.

3.6 WASTE MANAGEMENT

- A. Separate wood waste in accordance with the Waste Management Plan. (if applicable)
- B. Separate stained, painted and treated lumber from clean lumber and place in designated area for hazardous materials. (if applicable)
- C. Separate and store separately in a clean and dry location the following categories for salvage or re-use on site: (if applicable)
 - 1. Sheet materials larger than 2 square feet (1.19 m).
 - 2. Framing members larger than 16 inches (400 mm).
 - 3. Multiple offcuts of sizes larger than 12 inches (300 mm).
- D. The following categories may be re-used in the manufacture of particle board or MDF.
 - 1. Composite wood, (for example, plywood, OSB, LVL, I-Joist, parallel strand, MDF, particleboard).
 - 2. Clean dimensional lumber.
- E. Set aside damaged wood for acceptable alternative uses, for example use as bracing, blocking, cripples, or ties
- F. Sequence work to minimize use of temporary HVAC to dry out building and control humidity.

END OF SECTION 061000

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Architectural metal roof panels, including trim accessories.

1.02 REFERENCES

- A. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.
- B. ASTM International:
1. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 2. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
 6. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 7. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems
- C. Underwriters Laboratories (UL):
1. UL 263 - Fire Tests of Building Construction and Materials.
 2. UL 580 - Tests For Uplift Resistance of Roof Assemblies.
 3. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
 4. UL 2218 - Impact Resistance of Prepared Roof Covering Materials.
- D. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): "Architectural Sheet Metal Manual."

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Conduct preinstallation meeting to clarify Project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.04 ACTION SUBMITTALS

- A. Product Technical Data: For each type of product required, including manufacturer's preparation recommendations, storage and handling requirements, and recommended installation methods.

- B. Shop Drawings: Showing methods of installation, plans, sections, elevations and details of roof and wall panels, specified loads, flashings, roof curbs, vents, sealants, interfaces with all materials not supplied by the metal panel system manufacturer, and identification of proposed component parts and their finishes. Do not proceed with fabrication prior to approval of shop drawings.
- C. Samples: Selection and verification samples for finishes, colors and textures. Submit two complete sample sets of each type of panel, trim, clip and fastener required.
- D. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- E. Test and Evaluation Reports: Showing compliance with specified performance characteristics and physical properties.
- F. Qualifications Statements: For manufacturer and installer.
- G. Design Submittal: Comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by a qualified professional engineer.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.
- B. Warranty: Warranty documents required in this section.

1.06 MAINTENANCE MATERIAL

- A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 01 Closeout Submittals Section.
 1. Quantity: Furnish quantity of metal roof panel SF and fasteners equal to 5% percent of amount installed.
 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 1. Provider of advanced installer training.
 2. Minimum of ten years experience in manufacturing metal roof systems.
 3. Provider of products produced in a permanent factory environment with fixed roll-forming equipment.
- B. Installer Qualifications:

1. At least five years experience in the installation of architectural metal roof panels.
 2. Experience on at least five projects of similar size, type and complexity as this Project that have been in service for a minimum of two years with satisfactory performance of the roof system.
 3. Employer of workers for this Project who are competent in techniques required by manufacturer for installation indicated and who shall be supervised at all times when material is being installed.
- C. Mock-Ups: Install at Project site a mock-up using required products and manufacturer's approved installation methods. Obtain Owner and Architect approval of finish, color, texture, pattern, trim, fasteners and quality of installation before proceeding with further work.
1. Size: 2 panel widths along full length of roof.
 2. Maintenance: Maintain mock-up during construction for quality comparison. Remove and lawfully dispose of mock-up construction when no longer required.
 3. Incorporation: Mock-up may be incorporated into final construction upon Owner approval.

1.08 DELIVERY, STORAGE AND HANDLING

- A. General: Comply with manufacturer's current printed product storage recommendations.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage: Store materials above ground, under waterproof covering, protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Provide proper ventilation of metal panel system to prevent condensation build-up between each panel and trim or flashing component. Tilt stack to drain in wet conditions. Remove strippable plastic film before storage under high-heat conditions. Store products in manufacturer's unopened packaging until just prior to installation.
- D. Handling: Exercise caution in unloading and handling metal panel system to prevent bending, warping, twisting and surface damage.

1.09 WARRANTY

- A. Special Exposed Panel Finish Warranty: Manufacturer's standard form PVDF (Fluorocarbon) System Warranty for film integrity, chalk rating and fade rating in which manufacturer agrees to repair or replace panels that show evidence of deterioration within specified warranty period.
1. Deterioration shall include but is not limited to:
 - a. Color fading of more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling or failure of paint to adhere to bare metal.

2. Warranty Period: Film integrity for 45 years and chalk and fade rating for 35 years from date of Substantial Completion.
 3. Manufacturer's warranty may exclude surface deterioration due to physical damage and exposure to salt air environments.
- B. Special Warranty: Installer's standard form in which installer agrees to repair or replace standing seam panels that fail due to poor workmanship or faulty installation within the specified warranty period.
1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 METAL ROOF PANELS

- A. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; 7/8" Corrugated.
- B. Substitution Limitations: All other manufacturers: Submit substitution request in accordance with Section 012500 - "Substitution Procedures"
- C. Product Options:
1. Panel coverage: 36 inches.
 2. Rib Height: 1 1/2" inches.
 3. Material: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, [AZ50] [AZ55] coating designation, structural quality, Grade 50, 24 gauge, 0.0236-inch (0.60-mm) minimum thickness.
 4. Minimum Roof Slope Capability: 1:12, or as indicated on the drawings.
 5. Attachment: Exposed direct fastened panel.
 6. Application: Designed for application over open framing or solid substrate.
 7. Rib Configuration: Sinusoidal.
 8. Surface Finish: Acrylic-Coated Galvalume
 9. Color: Silver.
 10. Fire Resistance Rating: Comply with UL 263 and UL 790 Class A Fire Resistance Ratings.
 11. Impact Resistance: Comply with UL 2218, Class 4.
 12. Wind Uplift Resistance: Comply with UL 580, Class 90 Wind Uplift, Construction #649.
 13. Air Leakage: 0.004 cfm/sq. ft. at 6.24 psf when tested according to ASTM E 283.
 14. Air Leakage: 0.007 cfm/sq. ft. at 6.24 psf when tested according to ASTM E 1680.
 15. Water Penetration: None at 12 psf when tested according to ASTM E 331.
 16. Water Penetration: None at 12 psf when tested according to ASTM E 1646.
 17. Code and Testing Agency Approvals: Comply with applicable State of New Mexico adopted Building Codes.

2.02 FIELD-INSTALLED THERMAL INSULATION

- A. General: Refer to and coordinate with requirements in Division 07 - Thermal Insulation.

B. Products: see plans

2.03 ACCESSORIES

A. General: Trim, flashing, end caps, closure strips, sealants, gaskets, and other finish accessories.

B. Products: see plans

1. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; <Insert manufacturer's product designations>.
2. Color: to match roof panel (Galvalume).

2.04 SOURCE QUALITY CONTROL

A. Source: Obtain architectural metal roof panels, trim and other accessories from a single manufacturer.

B. Quality Control: Obtain architectural metal roof panels, trim and other accessories from a manufacturer capable of providing on-site technical support and installation assistance.

PART 3 - EXECUTION

3.01 PREPARATION

A. Miscellaneous Framing: Install furring, eave angles, subpurlins, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's recommendations.

3.02 THERMAL INSULATION INSTALLATION

A. Board Insulation: install in interior locations as designated on the plans. Comply with installation requirements in Division 07 Section "Thermal Insulation."

3.03 ARCHITECTURAL METAL ROOF PANEL INSTALLATION

A. General: Comply with panel manufacturer's installation instructions including but not limited to special techniques, interface with other work, and integration of systems.

B. Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and using proper fasteners as recommended by panel manufacturer.

3.04 ACCESSORY INSTALLATION

- A. General: Install accessories using techniques recommended by manufacturer and which will assure positive anchorage to building and weather tight mounting. Provide for thermal movement. Coordinate installation with flashings and other components.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and the SMACNA "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and install units to true level. Install work with laps, joints, and seams that will be permanently watertight.

3.05 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Repair or replace any installed products that have been damaged.
- C. Clean installed panels in accordance with manufacturer's instructions prior to Owner's acceptance.
- D. Remove and lawfully dispose of construction debris from Project site.

3.06 PROTECTION

- A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION

CSI SECTION 09 24 00 – PORTLAND CEMENT PLASTER

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Supply and Installation of El Rey FastWall® 100 Stucco Assemblies or approved equal.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 04 20 00 - Unit Masonry
- C. Section 06 16 00 - Sheathing
- D. Section 07 25 00 - Weather Barriers
- E. Section 07 62 00 - Sheet Metal Flashing and Trim
- F. Section 07 90 00 - Joint Protection
- G. Section 08 50 00 - Windows
- H. Section 09 21 16 - Gypsum Board Assemblies

1.3 REFERENCES

- A. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar
- B. ASTM C578 - Specification for Preformed, Cellular Polystyrene Thermal Insulation
- C. ASTM C847 - Standard Specification for Metal Lath
- D. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plaster
- E. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster
- F. ASTM C933 - Standard Specification for Welded Wire Lath
- G. ASTM C1032 - Standard Specification for Woven Wire Plaster Base
- H. ASTM C1063 - Standard Specification for Installation of Lathing and Furring for Portland Cement Based Plaster
- I. ASTM C1177 - Specification for Glass Mat Gypsum for Use as Sheathing
- J. ASTM C1278 - Specification for Fiber-Reinforced Gypsum Panel
- K. ASTM C1396 - Standard Specification for Gypsum Board
- L. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- M. ASTM E119 - Method for Fire Tests of Building Construction and Materials
- N. ASTM E330 - Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static air Pressure Difference
- O. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
- P. ICC Acceptance Criteria 219 - Acceptance Criteria for Exterior Insulation And Finish Systems
- Q. ICC Acceptance Criteria 11 - Acceptance Criteria for Cementitious Exterior Wall Coatings

1.1 ASSEMBLY DESCRIPTION

- A. El Rey Fastwall 100 Krakmaster™ Stucco Assembly or approved equal: A code complying water resistive barrier, wire fabric or metal lath, Fastwall Stucco Base (Fastwall Stucco Base Concentrate or Fastwall Stucco Base Sanded), Parex USA reinforcing mesh embedded in Level Coat, and an acrylic or elastomeric based finish coat.

1.2 SUBMITTALS

- A. General: Submit Samples, Evaluation Reports and manufacturers product datasheets in accordance with Division 1 General Requirements Submittal Section.

- B. Samples: Submit samples for approval. Samples shall be of materials specified and of suitable size as required to accurately represent each color and texture used on project. Prepare each sample using same tools and techniques for actual project application. Maintain and make available, at job site, approved samples.
- C. Manufacturer's Warranty: Submit sample copies of Manufacturer's Warranty indicating Single Source Responsibility for Water Stucco Base coat, finish coat and optional Primer, level coat and reinforcing mesh as specified.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Shall have marketed stucco assemblies in United States for at least five years and shall have completed projects of same general scope and complexity.
 - 2. Applicator: Shall be experienced and competent in installation of stucco materials, and shall provide evidence of a minimum of 5 years experience in work similar to that required by this section.
- B. Functional Criteria:
 - 1. General: Stucco application shall be to vertical substrates or to substrates sloped for positive drainage. Substrates sloped for drainage shall have additional protection from weather exposure that might be harmful to coating performance.
 - 2. Testing to meet International Code Council Acceptance Criteria AC11
 - 3. Performance Requirements

Fastwall	Method	ICC AC 11 Criteria	Results
Accelerated Weathering	ASTM G153	2000 Hours	No deleterious effect
Freeze-Thaw Resistance	ICC AC 11	10 cycles	Pass
Transverse Wind Load Resistance	ASTM E330	Meet Design Loads	Refer to ICC-ES ESR-2564
Fire Resistance	ASTM E119	One hour fire	Refer to ICC-ES ESR-2564
Drainage	ICC AC 11	90%	Refer to ICC-ES ESR-2564

- C. Substrate Conditions:
 - 1. Substrate materials and construction shall conform to the building code having jurisdiction.
 - 2. Substrates shall be sound, dry and free of dust, dirt, laitance, efflorescence and other harmful contaminants.
 - 3. Substrate Dimensional Tolerances: Flat with ¼ in (6.4 mm) within any 4 ft (1.22 m) radius.
 - 4. Maximum deflection of substrate system under positive or negative design loads shall not exceed L/360 of span.
- D. Expansion and Control Joints: Continuous expansion and control joints shall be installed at locations in accordance with ASTM C1063 and ASTM C926.
 - 1. Substrate movement, and expansion and contraction of El Rey Fastwall 100 Stucco and adjacent materials shall be taken into account in design of expansion joints, with proper consideration given to sealant properties, installation conditions, temperature range, coefficients of expansion of materials, joint width to depth ratios, and other material factors. Minimum width of expansion joints shall be as specified by the designer or shown on the project drawings.
 - 2. In accordance with ASTM C1063, expansion or control joints shall be installed in walls not more than 144 ft² (13.4 m²) in area, and not more than 100 ft² (9.3 m²) in area for all non-

vertical applications. The distance between joints shall not exceed 18 ft (5.5 m) in either direction or a length-to-width ratio of 2-½ to 1.

3. For direct application to concrete or masonry, stucco joints are required only at control/expansion joints in the underlying concrete or masonry

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver Stucco products in original packaging with manufacturer's identification.
- B. Storage: Store Stucco products in a dry location, out of direct sunlight, off the ground, and protected from moisture.

1.5 SITE / ENVIRONMENTAL CONDITIONS

- A. Substrate Temperature: Do not apply El Rey products to substrates whose temperature are below 40°F (4.4°C) or contain frost or ice.
- B. Inclement Weather: Do not apply El Rey products during inclement weather, unless appropriate protection is employed.
- C. Sunlight Exposure: Avoid, when possible, installation of the El Rey products in direct sunlight. Application of El Rey Finishes in direct sunlight in hot weather may adversely affect aesthetics.
- D. Do not apply stucco base coats or finishes if ambient temperature falls below 40°F (4°C) within 24 hours of application. Protect stucco from uneven and excessive evaporation during dry weather and strong blasts of dry air.
- E. Prior to installation, the wall shall be inspected for surface contamination, or other conditions that may adversely affect the performance of the El Rey Fastwall 100 Stucco Assembly, and shall be free of residual moisture.

1.6 COORDINATION AND SCHEDULING:

- A. Coordination: Coordinate Stucco Assembly installation with other construction operations.

1.7 WARRANTY

- A. Warranty: Upon request, at completion of installation, provide Standard Limited El Rey Fastwall 100 Stucco Assembly Warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Parex USA, Inc., 4125 E. La Palma Ave., Suite 250, Anaheim, CA 92807 or approved equal.
- B. Components: Obtain components manufactured by Parex USA of El Rey Fastwall 100 Stucco Assembly from authorized distributors or approved equal.

2.2 MATERIALS

- A. El Rey Fastwall 100 Stucco or approved equal Assembly Materials:
 1. El Rey Fastwall 100 Stucco Base (¾ in – ½ in -one coat)
 - a. El Rey Fastwall Stucco Base Concentrate: Proprietary mixture of portland cement, and proprietary ingredients mixed with clean, cool, potable water, and ASTM C897 or ASTM C144 sand added in the field.

-OR-

 - a. El Rey Fastwall Stucco Base Sanded: Proprietary mixture of portland cement, and proprietary ingredients mixed with clean, cool, potable water in the field.
- B. Leveling and Reinforcing Coat:
 1. Parex USA Stucco Level Coat™ or approved equal: Copolymer based, factory blend of cement and proprietary ingredients requiring addition of water.

2. Parex WeatherDry or approved equal: Waterproof Base coat mixed with portland cement in the field.
 3. Parex USA 355 Standard Mesh or approved equal: Weight 4.5 oz/yd² (153 g/m²) reinforcing mesh.
- C. El Rey Finish:
1. El Rey Perma-Flex Elastomeric Finish or approved equal: Factory blended, 100 % acrylic polymer based elastomeric textured finish, integrally colored.
 - a. Finish texture and color as selected by Project Designer

2.3 RELATED MATERIALS AND ACCESSORIES

- A. General: El Rey Fastwall 100 Stucco Assembly or approved equal and its related materials shall conform to the requirements of ICC-ES Evaluation Report No. 2564 and shall conform to this specification.
- B. Substrate Materials:
1. Gypsum Sheathing: Minimum ½ in (13 mm) thick, core-treated, weather-resistant, exterior gypsum sheathing complying with ASTM C79 or ASTM C1177.
 2. Cement Board Sheathing, Minimum ½ in (13 mm) thick, conforming to ASTM C1186.
 3. Fiberboard: Minimum ½ in (13 mm) thick fiberboard complying with ANSI/AHA A194.1 as a regular density sheathing.
 4. Plywood: Minimum 5/16 in (8 mm) thick exterior grade or Exposure I plywood for studs spaced 16 in (406 mm) o.c. and 3/8 in (9.5 mm) thick exterior type plywood minimum for studs spaced 24 in (610 mm) o.c. Plywood shall comply be exterior grade or Exposure 1 and comply with DOC PS-1
 5. Oriented Strand Board (OSB): 7/16 - ½ in Wall-16 or Wall-24, approved by the APA, TECO, or PSI/PTL. Stamped as Exposure 1 or Exterior Sheathing with a PS2 or PRP-108 rating. The system is qualified for application to OSB (oriented strand board) sheathing only in areas shown in the Parex USA "Acceptable Substrates and Areas of Use" Technical Bulletin.
 6. Concrete Masonry Construction: Painted (coated) and non-painted (uncoated). Shall be in conformance with the building code.
 7. Other Approved by Parex USA in writing prior to the project
- C. Water Resistive Barriers:
1. For non-wood based sheathing shall be either:
 - a. 1 layer asphalt-saturated felt complying with ASTM D 226 Type I.
 - b. Lath with appropriate paper backing
 - c. Other recognized equivalent
 2. For wood based sheathing shall be either:
 - a. 2 layers of Grade D asphalt saturated Kraft building paper, or 1 layer of the Kraft building paper plus paper backed lath
 - b. Grade D paper with a water resistance equal to or greater than 60 minutes, with an intervening nonwater-absorbing layer or drainage space.
 - c. Other recognized equivalent
 3. Open Framing:
 - a. 1 layer Grade D asphalt saturated Kraft building paper.
 - b. 1 layer asphalt-saturated felt complying with ASTM D 226 Type I.
 - c. Other recognized equivalent

- D. Lath and Accessories: Conform to ASTM C847, ASTM C933, ASTM C1032, ASTM C1063 and Appendix
 - 1. Accessories: Manufacturer's standard steel products with minimum G60 galvanizing unless otherwise indicated as rigid polyvinyl chloride (PVC plastic) or zinc alloy
 - 2. Metal Plaster Bases: Minimum 17 gauge self-furred stucco netting, minimum 2.5 lb/yd² (1.4 kg/m²) or 3.4 lb/yd² (1.8 kg/m²) expanded metal diamond lath, or welded wire lath in accordance with applicable codes and standards.
 - 3. Weep Screeds: Foundation weep screed with minimum 3-½ inch vertical attachment flange.
- E. Expanded Polystyrene Features over El Rey Fastwall 100 Stucco
 - 1. Adhesive and Base Coat
 - a. El Rey Insul-bond: Modified portland cement adhesive and basecoat for exterior foam shapes, such as pop-outs, plant-ons, cornices and reveals mixed with water.
 - 2. Insulation Board
 - a. Produced and labeled under a third party quality program as required by applicable building code and produced by a manufacturer approved by Parex USA.
 - b. Shall conform to ASTM C578, ASTM E2430 Type I, and the Parex USA specification for Molded Expanded Polystyrene Insulation board.
 - 3. Reinforcing Mesh
 - a. Parex USA Standard Mesh or approved equal: Weight 4.5 oz/yd² (153 g/m²) reinforcing mesh.
- F. Seals, Sealants and Bond Breakers: Sealants shall conform to ASTM C920, Grade NS, Class 25, Use NT. Backer rod shall be closed-cell polyethylene foam.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify project site conditions under provisions of Section 01 00 00.
- B. Compliance: Comply with manufacturer's instructions for installation of El Rey Fastwall 100 Stucco Assembly products or approved equal.
- C. Substrate Examination: Examine prior to El Rey Fastwall Stucco Base or approved equal installation as follows:
 - 1. Substrate shall be of a type approved by Parex USA. Plywood and OSB substrates shall be gapped ¼ in (3.2 mm) at all edges.
 - 2. Substrate shall be examined for soundness, and other harmful conditions.
 - 3. Substrate shall be free of dust, dirt, laitance, efflorescence, and other harmful contaminants.
 - 4. Substrate construction in accordance with substrate material manufacturer's specifications and applicable building codes.
- D. Advise Contractor of discrepancies preventing installation of the El Rey Fastwall 100 Stucco Assembly. Do not proceed with the El Rey Fastwall 100 Stucco Assembly work until unsatisfactory conditions are corrected.
- E. Ensure that flashing has been installed per Specification Section 07 60 00 - Flashing and Sheet Metal.

3.2 PREPARATION

- A. Water Resistive Barrier:

1. The Water Resistive Barrier is placed over all substrates except concrete or unpainted masonry. Painted (coated) CMU is to use a bond breaker such as asphalt paper and lath if the paint or coating cannot be removed.
2. Installed according to manufacturers instructions.
- B. Wire Fabric Lath and Metal Lath: Install according to ICC Evaluation Report ESR 2564, ASTM C1063 and Appendix and the Building Code.
- C. Concrete (Cast-in-Place): Provide a surface that is slightly scarified, water absorbent, straight and true to line and plane. Remove form ties and trim projecting concrete so it is even with the plane of the wall. Remove form release agents.
- D. Concrete Masonry Units: Remove projecting joint mortar so it is even with the plane of the wall. Remove surface contaminants such as efflorescence, existing paint or any other bond inhibiting material by sandblasting, waterblasting, wire brushing, chipping or other appropriate means. Pre-moisten the surface with water just prior to placement of stucco, or apply Parex USA Adacryl Bonder & Admix.

3.3 MIXING

- A. Mix El Rey products or approved equal in accordance with manufacturer's instructions.
- B. Admix - Parex USA Adacryl Bonder & Admix or approved equal.
Mix up to 1 gal (3.8 L) per 1 bag of El Rey Fastwall Stucco Concentrate or approved equal. Mix up to 1 qt (1 L) per bag of El Rey Fastwall Sanded. Add after dry components and the majority of the water has been mixed. Mix no longer than required to provide a uniform mixture. DO NOT OVER-MIX. Overmixing entrains excessive amounts of air which weaken the material. Do not re-temper mixes over 20 minutes old.

3.4 APPLICATION

- A. General: El Rey Fastwall 100 Stucco Assembly or approved equal and its related materials shall conform to the requirements of ICC-ES Evaluation Report No. 2564 and shall conform to this specification.
- B. Bonding Agent - Parex USA Adacryl Bonder & Admix or approved equal
 1. Apply at an approximate rate of 250 ft² per gallon using a low-pressure sprayer, brush or roller. (application in direct sunlight may cause the product to dry too quickly)
- C. El Rey Fastwall Stucco Base or approved equal
 1. Either El Rey Fastwall Stucco mixtures or approved equal shall be applied in one or two coats to a minimum thickness of $\frac{3}{8}$ in (9.5 mm) by hand troweling or machine spraying the mixture to the wire lath in accordance with Product Data Sheets. The maximum thickness applied in one pass is $\frac{1}{2}$ in (12.7 mm).
 2. Rod surface to true plane and float to densify.
 3. Trowel to smooth and uniform surface to receive acrylic polymer finish coat.
- D. Leveling and Reinforcing Coat (El Rey Fastwall 100 Krakmaster Stucco Assembly or approved equal):
 1. After Moist Curing, allow El Rey Fastwall Stucco Base or approved equal to air dry a minimum of 24 hours before applying the leveling and reinforcing coat.
 2. Using a stainless steel trowel, apply the El Rey Level Coat over the Stucco Base at a thickness of $\frac{1}{16} - \frac{3}{32}$ in. (1.6 – 2.4 mm).
 3. Fully embed the Parex USA Standard Mesh or approved equal into the wet Stucco Level Coat including diagonal strips at corners of openings and trowel smooth. If Standard Mesh is used, seams are overlapped 2½ in (63 mm).
 4. The El Rey acrylic primer and finishes can be applied as soon as the Parex USA Stucco Level Coat has cured, typically within 24 hours.
- E. Expanded Polystyrene Featured over Stucco Base:

1. Install back-wrap mesh at EPS terminations.
 2. Apply El Rey adhesive or approved equal to backs of insulation boards with a notched trowel. Allow to dry a minimum of 12 hours.
 3. Apply Base coat to the entire foam shape and pull the backwrap mesh around the foam shapes and fully embed it into the base coat.
 4. Immediately embed the reinforcing mesh in the wet Base coat.
- F. Primer and Finish:
1. Remove surface contaminants such as dust or dirt without damaging the substrate.
 2. Ambient and surface temperature must be 40°F (4°C) or higher during application and drying time. Supplemental heat and protection from precipitation must be provided as needed.
 3. Use only on surfaces that are sound, clean, dry, unpainted, and free from any residue that might affect the ability of the finish to bond to the surface.
 4. El Rey Fastwall 100 Krakmaster Stucco Assembly or approved equal
 - a. Before the application of the finish, the base coat must have cured a minimum of 24 hours or longer as required by weather conditions. Examine the cured base coat for any irregularities.
 - b. Correct these irregularities to produce a flat surface.
 5. Protect El Rey Finish Coats from inclement weather until completely dry.
- G. Curing:
1. El Rey Fastwall Stucco Base or approve equal: Keep stucco moist for at least 48 hours (longer in dry weather) by lightly fogging walls. Start light fogging after initial set of 1–2 hours.
 2. Air dry acrylic based and elastomeric finish coats only, do not wet cure.

3.5 CLEAN-UP

- A. Removal: Remove and legally dispose of Stucco component debris material from job site.

3.6 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
- B. Provide protection of installed stucco from dust, dirt, precipitation, and freezing during installation.
- C. Provide protection of installed finish from dust, dirt, precipitation, freezing, and continuous high humidity until fully dry.
- D. Clean exposed surfaces using materials and methods recommended by the manufacturer of the material or product being cleaned. Remove and replace work that cannot be cleaned to the satisfaction of the Designer/Owner.

END OF SECTION

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. Section includes surface preparation and the application of paint systems on Interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Steel.
 - 3. Galvanized metal.
 - 4. Wood.
 - 5. Aluminum (not anodized or otherwise coated)
 - 6. Gypsum board.
- B. Related Requirements:
 - 1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
 - 2. Section 099600 "High-Performance Coatings" for high-performance and special-use coatings.
 - 3. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.03 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.04 SUBMITTALS

- A. Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures
- B. Product Data: For each type of product. Include preparation requirements and application instructions.
- C. Samples for Initial Selection: For each finish and for each color and texture required.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

- E. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 3. VOC content.

- 1.05 CLOSEOUT SUBMITTALS
 - A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

- 1.06 MAINTENANCE MATERIAL SUBMITTALS
 - A. Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
 - 1. Product name and type (description).
 - 2. Batch date.
 - 3. Color number.
 - 4. VOC content.
 - 5. Environmental handling requirements.
 - 6. Surface preparation requirements.
 - 7. Application instructions.

 - B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

- 1.08 FIELD CONDITIONS
 - A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
 - B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 - C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
 - 1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

- 1.09 QUALITY ASSURANCE
 - A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- A. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 10 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company products indicated or comparable product from one of the following:
1. Benjamin Moore & Co.
 2. Kwal, Division of Sherwin-Williams.
 3. Glidden Professional, Division of PPG Architectural Finishes, Inc.
 4. PPG Architectural Finishes, Inc.
- B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.02 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction [and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].
1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Dry-Fog Coatings: 400 g/L.
 4. Primers, Sealers, and Undercoaters: 200 g/L.
 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.

- 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Floor Coatings: 100 g/L.
 - 9. Shellacs, Clear: 730 g/L.
 - 10. Shellacs, Pigmented: 550 g/L.
- D. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - E. Colors: As selected by Architect from manufacturer's full range.
- 2.03 METAL PRIMERS
- A. Alkyd Anticorrosive Metal Primer: MPI #79.
 - 1. VOC Content: E Range of E1.
- 2.04 QUICK-DRYING ENAMELS
- A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
 - 1. VOC Content: E Range of E1.
- 2.05 SOURCE QUALITY CONTROL
- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
 - 1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.

- d. Gypsum Board: 12 percent.
 - e. Plaster: 12 percent.
2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
 3. Plaster Substrates: Verify that plaster is fully cured.
 4. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.
 - D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - E. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 1. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 2. Sand surfaces that will be exposed to view, and dust off.
 3. Prime edges, ends, faces, undersides, and backsides of wood.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.

- g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 PAINTING SCHEDULE

- A. CMU Substrates at Interior:
 1. Epoxy-Modified Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Interior/Exterior Block Filler, B25 Series, at 8 mils dry, per coat.
 - b. Intermediate Coat: Epoxy-modified latex, interior, gloss, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, exterior, gloss, S-W Pro Industrial Waterbased Catalyzed Epoxy Gloss, B73-300 Series, at 2.0 to 4.0 mils dry, per coat.

- B. Metal Substrates (Aluminum, Steel, Galvanized Steel):
1. Pigmented Polyurethane over Acrylic Primer System:
 - a. Prime Coat: Primer, rust-inhibitive, water based: S-W Pro-Cryl Universal Primer, B66-310 Series, at 2.0 to 4.0 mils dry, per coat.
 - b. Intermediate Coat: Polyurethane, two-component, pigmented, matching topcoat.
 - c. Topcoat: Polyurethane, two-component, pigmented, semi-gloss: S-W Waterbased Acrolon 100 Polyurethane, B65-720 Series, at 2.0 to 4.0 mils dry, per coat.
- C. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.
1. Epoxy-Modified Latex System:
 - a. Prime Coat: Primer sealer, latex, interior or exterior: S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry.
 - b. Intermediate Coat: Epoxy-modified latex, interior or exterior, semi-gloss, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, interior or exterior, semi-gloss: S-W Pro Industrial Water-based Catalyzed Epoxy Gloss, B73-300 Series, at 2.0 to 4.0 mils dry, per coat.
- D. Gypsum Board Substrates:
1. Epoxy-Modified Latex System:
 - a. Prime Coat: Primer sealer, latex, interior: S-W ProMar 200 Zero VOC Interior Latex Primer, B28 Series, at 1.0 mils dry, per coat.
 - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, interior, gloss, (Gloss Level 6): S-W Pro Industrial Water-based Catalyzed Epoxy Gloss, B73-300 Series, at 2.0 to 4.0 mils dry, per coat
- E. CMU Substrates at Exterior:
1. Latex System:
 - a. Prime Coat: Block filler, latex, interior/exterior, MPI #4.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.
 - d. Additional Topcoat for Graphic System: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.
 - e. Protective Coating over entire wall receiving graphic: 2K Water-based urethane anti-graffiti coating, satin finish.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

END OF SECTION

PART 1- GENERAL**1.1 REQUIREMENTS**

- A. Signage Contractors/Sub-contractors must refer to the Pojoaque Valley Recreation Complex Design Intent Drawings for Signage, Message Schedule, and Sign Location Plans prepared by the Landscape Architect. The design Intent documentation drawings and sign location plans are included as part of the Construction Documents.

1.02 FORMAT

- A. Signs illustrated in the drawing package are for design intent only, and therefore are not for construction. Selected Sign Fabricator is responsible for all final construction documents and engineering required for the fabrication and installation of the designs, subject to approval by Landscape Architect and Owner.
- B. If an alternate method of fabrication would result in reduction of the overall cost without compromising the Design Intent, it shall be included in the pricing in addition to the price per the drawing specifications. Otherwise, the signs will be made as specified in the Design Intent Documentation Drawings.

1.03 CODES

- A. It will be the responsibility of the successful bidder to meet any and all local, state and federal code requirements when fabricating and installing signs, to include ADAAG (Americans with Disabilities Accessibility Guidelines; ICC/ANSI (International Code Council and American National Standards Institute) requirements, as well as any supplementary items necessary to complete the installation, as applicable.

1.04 EXAMINATIONS

- A. Bidders shall carefully examine all documents including: Pojoaque Valley Recreation Complex Construction Document Drawings, Message Schedule, and Sign Location Plans. Failure to do so shall in no way relieve the Bidder from any obligation with respect to his Bid.
- B. Product Specification. Bidders are responsible for a thorough evaluation of all products specified in the Design Intent Drawings to determine whether a specific product is fit for its particular purpose and suitable for the method of its application.
- C. It is the Bidder's responsibility to gather and dispense all information to its subcontractors regarding provisions of the Specification and any other information the subcontractor may require to prepare its proposal.
- D. Field Measurements: All architectural and field condition dimensions contained within the Design Intent Drawings reflect information available at the time of documentation preparation. It shall be the responsibility of the contracted fabricator to conduct a thorough survey of both existing and future conditions, to verify all as-built conditions/dimensions for fabrication and installation.

1.05 FABRICATION AND INSTALLATION SPECIFICATIONS

Provide Architectural signage/graphics in accordance with requirements of the Contract Documents, i.e., Design Intent Documentation Drawings and Specifications, Sign Location Plans and Sign Message Schedule. It is intended that all finish work be of the highest quality in order to pass eye-level examination and scrutiny by the Owner.

All Work shall be free from burrs, dents, row edges and sharp corners. Finish all welds on exposed surfaces as required so they are not visible in the finished work. Finish all surfaces smooth, U.O.N., or specified. Surfaces that are intended to be flat, shall be free from bulges, oil canning, gaps or other physical deformities. Such surfaces shall be fabricated to remain flat under installed conditions. Fabricate all cabinets, panels or components with smooth, mechanically finished edges. All edges shall be true and corners shall be square. Where edges are specified to be painted, fill and sand smooth as required prior to painting. Cut routed letterforms and/or graphics clean and true to match adjacent surface-applied letterforms and/or graphics. Fabricate all internally illuminated sign cabinets as required to provide a weather tight housing for all lighting and electrical components. Exercise care to protect all polished and/or plated surfaces so that they remain unblemished in the finished work. Isolate dissimilar materials. Exercise particular care to isolate nonferrous metals from ferrous metals as required to prevent corrosion.

All surfaces shall be flat to a tolerance of plus or minus 1/16" when measured at any point with a ten-foot straight edge. All visible sign surfaces of the same type shall have the same finish. Color and/or finish shall be consistent across the entire surface of a sign.

All reveals shall be uniform width; all butt joints shall be tight and closed along the entire length; all access panels shall have a nominal, uniform gap all around. All expansion joints, when required, shall be positioned so as not to interfere with the look or finish of any sign message or the overall appearance of the sign face. All gaps between milled components, when assembled, shall not exceed a tolerance of .005" Provide colors and/or finish textures as specified or indicated in the drawings or, as selected by Designer.

1.06 SIGN ITEM NUMBERS AND CHARACTERISTICS

Refer to the Sign Message Schedule for precise definition and proposed message of each sign. Refer to the Sign Location Plan for general location of each sign.

1.07 TIME OF COMPLETION

Time is of the essence. Sign Fabricator shall complete all work in accordance with the schedule milestones provided by General Contractor. All activities shall be sequenced to coordinate with field progress.

1.08 REFERENCES

A. UBC

1. Uniform Building Code

B. NAAMM

1. National Association of Architectural Metal
2. Manufactures: "Metal Finishes Manual"

C. AWS

1. American Welding Society
2. AWS D1.1 "Structural Welding Code, Steel"

3. AWS D1.2 "Structural Welding Code, Aluminum"

D. UL

1. Underwriters Laboratories Inc.

2. Standards for Safety, UL Publication 48 "Electric Signs"

1.09 SUBMITTALS BY SIGN FABRICATORS

A. Artwork: One prototype artwork template per sign type (in Adobe Illustrator CS, Macintosh format) shall be provided to Fabricator to illustrate design intent. It is the responsibility of the Fabricator to generate all subsequent artwork for review and approval (submittals to be a full size representation of each layout, unless otherwise agreed upon in writing) to resolve any and all issues of compatibility pertaining to the provided artwork, prior to fabrication.

B. Map Art: Fabricator shall be responsible for all technical production, i.e., color separation, registration and trapping as required, and for securing all necessary regulatory approvals from the Fire Department (including, but not limited to, the final locations of stairs, exit routes and symbols) for Fire & Life Safety maps. Vendor shall submit half size black and white laser prints of all map artwork approved by the Fire Department to Designer for final review and graphic layouts and obtain Designer's written approval of same, prior to fabrication.

C. Shop Drawings: Shop Drawings provided by Sign Fabricator for review and approval, must be signed and stamped by Licensed Structural Engineer in the State where the project is located. Otherwise, it must be reviewed by a Licensed Structural Engineer in the State of the project location at the Sign Fabricators Expense. Furnish elevations, details of fabrication and erection, including all materials, shapes, dimensions, finishes, wind load calculations, anchorage, and method of connections. Show proper letter spacing and dimensions of letter heights.

D. Color and Material Samples: Submit per schedule, for approval. Provide 1 set of 12" x 12" non-returnable samples of all materials, colors, and finishes as specified.

E. Full Size Patterns and Lettering: Submit for approval. Provide full-size patterns of each sign with solid black letter forms and graphic elements on a white background with sign face outlined. Typography and graphic elements must be represented in exact typeface with letter spacing and positioning as specified in digital artwork files.

F. Text Verification: Provide a list of all text to be included on signage for approval, prior to fabrication. Text shown on Drawings is provided for the purpose of pricing only. Final wording on signage is subject to confirmation and possible revision by the Owner, after the start of the Contract, prior to fabrication.

G. Extra Materials: Deliver to the Owner the following, in manufacturer's original packaging, and store at the project site where directed:

1. One (1) gallon of each finish paint color for touch-up purposes.

H. Supplementary Product Literature: Submit for information. Furnish within seven (7) days of completed installation, manufacturer's literature describing the general properties of each product used in the Work.

- I. Field Conditions: Sign Fabricator is responsible for thorough survey of existing and future conditions, as well as full coordination with the General Contractor. Field conditions may cause signs to be adjusted; and if necessary, exact modifications to each sign must be shown on shop drawings. Also, design and engineering of support systems required on the site will be the responsibility of the Fabricator.
- J. Structural Calculations: Provide exterior sign assemblies designed, tested, and installed, to withstand positive and negative wind loads per site requirements approved by a licensed Structural engineer, registered in the State of New Mexico. Furnish engineering calculations to show maximum stresses and deflections of signage, and signage support system; do not exceed specified performance requirements under full design loading. Calculations must be prepared and sealed by a Structural engineer licensed in the State of New Mexico and submitted to the Owner for review, prior to fabrication.

1.10 QUALITY ASSURANCE

- A. Mock-ups and Prototypes
Provide a mock-up (complete mock-up for single panel signs, partial mock-up for multi-letter signs), (unless otherwise noted), of each sign type requested at the fabrication facility for review. The requested sign types are:

ENTRY MONUMENT SIGN
KIOSK SIGN

Refer to sign drawings for further information. Utilize the same materials and installation methods in the mock-up and/or prototypes as intended for the final Work. Schedule the installation so that the mock-up/prototype may be examined, and any necessary adjustments made, prior to commencing fabrication of the final Work. Replace unsatisfactory items as directed. When accepted, mock-up shall serve as the standard for materials, workmanship, and appearance for such Work throughout the project. Prototypes, once accepted may be used in final installation.

- B. Work-In-Progress Approvals: Provide work-in-progress sign elements for review. Scheduled or unscheduled viewing at the Shop or Factory may be initiated as deemed necessary to ensure continued quality control and to make any adjustments required during fabrication. Unsatisfactory items are to be corrected by the Sign Fabricator as directed at no additional cost to the Client.
- C. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals and permits from all such authorities as required.
- D. Markings and Labels: Locate markings, labels, manufacturer names and other identifications so as to be concealed from public view and as acceptable to the Owner.
- E. Final Location of Signs: The location of signs as shown on the Layout Plans is for general reference only and in some cases is not representative of the exact final location. Final locations of signs shall be field located in coordination with the Landscape Architect, Owner, General Contractor and Engineer at the site. Sign Fabricator shall arrange for meetings at the site to accommodate direction of final locations according to project schedule.

- F. Message Schedules: The Message Schedule is the only document that should be used to determine sign messages. If sign layouts are provided to the Sign Fabricator by the Landscape Architect or others, it is the responsibility of the Sign Fabricator to check the accuracy of the messages against the Sign Schedule. If discrepancies exist, the Fabricator must coordinate with the Landscape Architect and/or Owner to determine which is correct. Since signs often change between the award of bid and the fabrication process, Sign Fabricator should coordinate with the Owner's Project Manager in charge to ensure that their information is current. Fabricator's shop drawing package (and revisions to the package) should always include a current Sign Schedule so that the Landscape Architect can confirm the accuracy of the messages.
- G. Lettering:
1. The Sign Fabricator shall be responsible for the quality control of all lettering. All letterforms shall be crisp, sharp, and free of nicks, ragged edges and discontinuous curves. All lettering shall conform to approved typeface, weight and letter spacing.
 2. No substitutions of typeface foundry, brand or version or implementation technique will be accepted without prior approval. Unapproved letterforms shall be replaced at Fabricator's expense.
 3. Vinyl Die Cut Graphics: All artwork shall be derived from computer artwork for cutting on a Gerber Sign Maker II or approved equal.
 4. All cutting and routing shall be executed in such a manner that all edges and corners of finished letterforms are true and clean. Letterforms with rounded positive or negative corners, nicked, cut, or ragged edges, etc., will not be accepted. All letterforms shall be so aligned as to maintain a baseline parallel to the sign format. Margins must be maintained as specified on the Drawings.
 5. All work under this contract shall be performed by skilled craftsmen under the supervision of trained foremen, experienced in the trade of craft required to accomplish the Work and produce product of high quality.
- H. Quality of Workmanship: The Sign Fabricator shall be responsible for the quality of all materials and workmanship required for the execution of this contract including materials and workmanship of any firm or individual who act as Sign Fabricator's subcontractor. Sign Fabricator shall be responsible for providing up-to-date Drawings, Specifications, Message Schedule, etc., to all subcontractors.
- I. Dimensions: Written dimensions on drawings shall have precedence over scaled dimensions. Sign Fabricator shall verify and be responsible for all dimensions and conditions shown by these drawings. Shop details must be approved prior to fabrication.
- J. Discrepancies: The General Contractor shall be notified by Sign Fabricator of any discrepancies in the Drawings, Message Schedule, in field dimensions/conditions and/or changes required in construction details.
- K. Rights to Designs: Sign Fabricator may not manufacture, reproduce, or exhibit these designs, or modify them for any other purpose outside of this current contract without written approval of the Landscape Architect and the Owner.

1.11 WARRANTY

- A. Sign Warranty: Submit to Construction Manager for Owner's documentation, a 2-year written warranty (effective the date of final acceptance) covering all signs, signed by the Sign Fabricator and Installer, agreeing to repair or replace Work which has failed as a result of defects in materials, workmanship or installation. Upon notification of such defects, within the warranty period, make necessary repairs or replacement at the convenience of the Owner.
- B. Linear Polyurethane Paint Factory Finish Warranty. Submit to Construction Manager for Owner's documentation. Furnish 2 year written warranty, warranting that the factory-applied linear polyurethane finishes will not develop excessive fading or excessive non-uniformity of color or shade, and will not crack, peel, pit, corrode or otherwise fail as a result of defects in materials or workmanship within the following defined limits:
 - 1. "Excessive Fading"
A change in appearance which is perceptible and objectionable as determined when visually compared with the original color range standards
 - 2. "Excessive Non-Uniformity"
Nonuniform fading to the extent that adjacent panels have a color difference greater than the original acceptable range of color.
 - 3. "Will Not Pit or Otherwise Corrode"
No pitting or other type of corrosion, discernible from a distance of 10' (3m), resulting from the natural elements in the atmosphere at the project site.

Upon notification of such defects, within the warranty period, make necessary repairs or replacement at the convenience of the Owner.

1.12 MAINTENANCE

- A. Maintenance and Operating Manuals: Submit 2 copies to Construction Manager for Owner's documentation. Furnish complete manuals describing the materials, devices and procedures to be followed in operating, cleaning and maintaining the Work. Include manufacturers' brochures and parts lists describing the actual materials used in the Work, including metal alloys, finishes, electrical components and other major components. Assemble manuals for component parts into single binders identified for each system.
- B. Instruction: Prior to acceptance, establish with the Owner an instruction and training program for Owner's personnel. Notify the Owner in writing at least 7 days prior to commencement of the program providing an outline of topics indexed to the Maintenance and Operating Manual. Provide a trained instructor. Provide 2 consecutive 4-hour periods of training scheduled during the normal 8-hour working day. Instruction and training shall include, but are not limited to, procedures to be followed in the normal day-to-day maintenance and operation of the Work.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

As previously noted, the sign fabricator is responsible for a thorough evaluation of all products specified in this drawing package and determining whether a specific product is fit for a particular purpose and suitable for the method of its application.

- A. Adhesives: Silicone adhesive used for installing signs shall be manufactured by Dow Corning or equal. Polyfoam or "Isotac" contact adhesive tape manufactured by 3-M, shall be used in

conjunction with silicone adhesives for installation of wall signs, in minimum thicknesses available.

B. All Specified Metals

1. Aluminum shall be suitable for ornamental, architectural work. Surface finish shall be smooth, free of extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of the specific application.
2. Stainless steel shall be suitable for ornamental and architectural work. Provide stainless steel plate, sheet or strip AISI Type 302, complying with requirements of ASTM A 167. Surface finish shall be smooth, free of all extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of specific application.
3. Structural metal for concealed framing shall be of galvanized rolled steel or equal, as required, to satisfy structural requirements.
4. Aluminum Sheet: Provide aluminum sheet of alloy and temper recommended by the sign manufacturer for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.
5. Aluminum Extrusions: Provide aluminum extrusions of alloy and temper recommended by the sign manufacturer for the type of use and finish indicated, and with no less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

C. Acrylic Sheet Plastic: Use Plexiglas II as manufactured by Rohm and Haas Co., Cyro-Acrylite or approved equal. Thickness shall be as indicated on drawings or not less than 1/8" thick. Sign Fabricator shall provide color and finish samples of all plastics for approval before fabrication; no substitution in color, thickness, or finish of plastics will be accepted without written approval. All plastics shall be of uniform color, translucence and illumination, as supplied by manufacturer. Any exposed edges of acrylic shall be finished with no visible saw marks. Colored Acrylics to have UV protective properties.

D. Concrete Foundation: Sign Fabricator shall provide structurally engineered concrete footings/foundations and non-structural (mow-strip) pads at grade (in landscaped areas only) to meet local building code requirements.

E. Decal or Transfer: Provide special printed paper or vinyl suitable for reproducing the design onto material indicated, as required. Submit samples for approval.

F. Fasteners: Bolts, nuts, screws, washers, anchors and other devices required to complete the work. Same basic metal or alloy as the metal fastened and finished to match in color and texture. Stainless steel 300 series alloy where used to join dissimilar materials.

G. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

H. Brackets: Fabricate brackets and fittings for bracket-mounted signs to suit sign panel construction and mounting conditions indicated. Factory-paint brackets as indicated.

I. 3M VHB™: Tape Provide concealed 3M VHB™ tape that is fit for the intended use and the method

of application, where indicated.

- J. Hardware/Hinges: Provide and install all incidental hardware necessary for the proper functioning of the signs, including but not restricted to materials and products covered in this section. Provide stainless steel hinges for all hinged access panels. Provide pin tumbler locks for all access panels requiring locks. Provide stainless steel fasteners for assembling ferrous and nonferrous metals. Where brass finishes need to be matched, exposed stainless steel hinges need to be brass plated or dipped.
- K. Insulation: Separate all ferrous and nonferrous metals with nonconductive gaskets to prevent electrolysis. In addition to gaskets, provide stainless steel fasteners for some cases as required.
- L. Welding Electrodes and Filler Metal: Provide the alloy and type required for strength, workability, compatibility and color match after grinding smooth and finishing the fabricated product as required.

2.02 ELECTRICAL COMPONENTS

- A. Electrical Wiring and Equipment
Provide and install electrical materials such as ballasts, transformers, lamps, sockets, neon units, connectors, and all other equipment, which shall be new, and U.L. approved.

2.03 FINISHING MATERIALS

- A. Linear Polyurethane Coatings: Provide the following, or other products as acceptable:
 1. Acrylic Linear Polyurethane enamel two components, acrylic aliphatic isocyanate/acrylic polyurethane having ultraviolet (UV) inhibitors and engineered for exterior application by Matthews Paint Company or approved equal.
 2. Primer for Aluminum Two part component primer: One-coat Matthews 74-734 and 74-735 Metal Pretreat at .25 mils dry film thickness or one-coat Matthews 74-793 Spray Bond at .15 to .25 mils dry film thickness or Wyandotte/AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied per manufacturer's specifications or approved equal (primer) for the application of the pre-approved and pre-formulated paint system.
 3. Primer for Steel Two part component primer: One-coat Matthews 74-734 and 74-735 Metal Pretreat at .25 mils dry film thickness or Wyandotte/AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied per manufacturer's specifications or approved equal for the application of the pre-approved and pre-formulated paint system.
 4. Clear Sealers Crystal-clear matte polyurethane sealers by Matthews Paint Co. or approved equal. Sealers are to resist rust and corrosion associated with exposure to salt air as required, and of highest quality available, applied per manufacturer's specifications.
- B. Silk Screening Materials: Provide photo processed screening, arranged to furnish sharp and solid images without edge buildup or bleeding of the coating. Screen mesh size to be 280 or finer. Pattern-cut screens may be used for non-repeat copy, provided that final image copy is equal to photo screen quality. Provide only weather-resistant coating materials, compatible with the intended substrates.

- C. Vinyl Die-Cut and Pattern Cut-out Graphics: Use 3M Scotchcal Opaque, Translucent or Scotchlite Reflective Sheeting as specified. Use pressure-sensitive, non-yellowing, non-peeling and weather resistant vinyl as specified. Use approved fonts and equipment as specified. For specific information contact Lee Butler (3M Commercial Graphics Division) at 1- 949-366-9919.

2.04 FABRICATION OF SIGNS AND SIGN SUPPORTS

- A. General: Provide custom-manufactured sign assemblies, components completely fabricated and finished at factory before delivery to site. Construct to accurate detail and dimensions as shown on shop drawings and as reviewed. Fit and assemble the Work at the shop to the greatest extent possible, and mark the components as required to facilitate assembly during installation. No site application or finishing will be permitted except for touch up. Exposed fasteners on finished faces will not be allowed, unless specifically indicated. Waviness and oil canning of surfaces is not acceptable. Minimum material thickness is to be 0.090 inches. Conceal wiring, conduct and other electrical items within sign enclosures.
- B. Seams and Joints: Added joints shall be ground filled and finished flush and smooth with adjacent work. Such seams shall be invisible after final finish has been applied. Spot welded joints shall not be visible on exterior of signs after final finish has been applied. No gaps, light leaks, waves, or oil canning will be permitted in the Work.
- C. Metal Signs and Supports: Fabricate exposed surfaces uniformly flat and smooth, without distortion, pitting, or other blemishes. Form exposed metal edges to a smooth radius. Permanently bond laminated metal components and honeycomb core with adhesive or sealant in accordance with product manufacturer's recommendations. Grind exposed welds and rough areas to make flush with adjacent smooth surfaces.
 - 1. Welding: Make welds continuous. Comply with American Welding Society, Aluminum Association, and Copper Development Association standards for the type of metal. Welding to be performed by an AWS-certified welder.
 - 2. Fasteners: Use exposed fasteners only where indicated. Perform drilling and tapping at the shop.
 - 3. Dissimilar Materials: Where metal surfaces will be in contact with dissimilar materials, coat the surfaces with epoxy paint or plate with zinc chromate, or provide other means of dielectric separation as recommended by manufacturer to prevent galvanic corrosion.
- D. Hardware: Provide all hardware necessary for the proper functioning of signs. All hardware must conform to the external appearance of the sign. Where accessible to the public, provide vandal-resistant hardware.
- E. Supports and Backing in Walls: Sign Fabricator shall provide engineered sign supports anchored to building structure where required and to meet requirements of applicable building codes. Support or backing requiring installation within the building wall construction shall be immediately relayed to the General Contractor for field coordination.

2.05 SHOP APPLICATION OF SIGN FINISHES

- A. Sign Graphics: Provide the letters, numerals, symbols, and other graphics markings, using the finish materials as indicated on drawings. Apply the graphics neatly, uniformly proportioned and spaced, and accurate within the dimensions indicated. Prepare the substrate surfaces and apply

finish materials in accordance with manufacturers' instructions.

- B. Metal Finishes: Remove scratches, abrasions, dents and other blemishes before applying finish. Apply the finish to the fabricated Work, with texture and reflectivity as required to match the approved sample.
- C. Linear Polyurethane Finishes: Clean the surfaces as required for proper adhesion of coatings. Use 3M "Scotch Brite" pads with cleanser and water, and/or chemically treat as recommended by paint manufacturer to remove deleterious film or residue.
 - 1. Linear Polyurethane Paint: Provide pretreatment and primer in accordance with manufacturer's recommendation. Add ultra violet inhibitors to paint subject to sunlight exposure.
 - 2. Clear Linear Polyurethane Finish: Provide pretreatment, primer, and matte or semi-gloss finish coatings in accordance with manufacturer's recommendations. Actual gloss level to be determined by S/P, based on samples. Apply 1.5 to 2.0 mils (0.0375 to 0.050 mm) dry film thickness.

2.06 GRAPHIC APPLICATION

- A. Preparation: Surfaces to receive the graphic markings shall be clean, dry, and otherwise made ready for application of the materials. Accurately measure and lay out the required marking configurations as indicated on drawings.
- B. Vinyl Graphics: Use pressure sensitive, non-yellowing, non-peeling and weather resistant vinyl adhesive letters or images, custom flood coated as required, die cut from ScotchCal or ScotchLite manufactured by 3M Company, as specified. Apply in strict accordance with manufacturer's instructions. Make uniformly smooth and free from bubbles, wrinkles, stretching and blemishes.
- C. Painted or Silk-screened Graphics: All graphics to be applied using photo-processed screens from camera-ready digital art, arranged to furnish sharp and solid images without edge buildup or bleeding of the coating. Comply with coating manufacturer's application instructions. Provide proper type of primer to suit each substrate and obtain a permanent bond. Verify compatibility of each substrate with the coatings to be used in the Work. Apply the markings with neat edges, minimum 3 mils (0.075 mm) dry film thickness and as required to obtain solid markings without voids or fading.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Sign Fabricator must examine the areas to receive the Work and the conditions under which the Work would be performed. Contractor shall remedy conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected or with approval from the Owner.
- B. A pre-installation meeting will be held with the Landscape Architect, the Owner and General Contractor to mutually agree on all installation details, placement, etc.

3.02 INSTALLATION OF SIGNS

- A. General: Complete installation shall be in accordance with manufacturers' printed instructions and accepted shop drawings, to produce Work complying with the Contract Documents. The Sign Fabricator will be responsible for daily cleanup of signs and their areas of work.
- B. Erection of Signs: Set and attach the Work accurately in location, alignment and elevation, plumb, level and true, as measured from established reference points and from other Work already in place. Fit components accurately together to form tight joints and secure connections. Coordinate, through the Construction Manager with other trades and make connections of illuminated signs to electrical service. Exterior wall penetrations and blocking are to be coordinated immediately upon award of contract. Test illuminated sign components and adjust operation for proper performance.
- C. Installation Method: Site conditions include installation of signs on sloped landscaped areas, sloped concrete, flat concrete, etc. Sign Fabricator is responsible for thorough survey of existing and future conditions. Exact modifications to each sign must be shown on shop drawings.
- D. Footings for Landscape Installation: Those signs that are freestanding in landscape will be mounted to concrete spread footings concealed below grade. Sign Fabricator shall verify location of existing sprinkler pipes, conduit and other conditions that might have to be modified to allow for sign foundations.
- E. Footings for Hardscape Installation: Those signs that are freestanding on hardscape will be mounted to sleeves that have been set into cored concrete. Sign Fabricator to verify location of slab below, post tension cables and other conditions that might affect the locations that concrete can be cored.

3.03 ADJUSTING

Neatly repair minor blemishes or marring on finished surfaces so that repairs are imperceptible. Completely replace components having permanent non-removable scratches, stains, or other defacement.

3.04 CLEANING

Upon completion of the Work, remove unused materials, debris, containers and equipment from the project site. Remove protective coverings and clean the exposed surfaces of the Work to remove dirt, stains and other substances, by methods as recommended by manufacturer.

3.05 PROTECTION

Protect the Work during the construction period so that it will be without any indication of use or damage. Leave the Work clean and free from defects at the time of acceptance.

3.06 FINAL WALK-THRU AND PUNCH-LIST

Final walk-through will be held with the Landscape Architect, the Owner and General Contractor to review the finished installation. Sign Fabricator will prepare a punch-list of all items requiring modification. Owner, General Contractor and Landscape Architect reserve the right to reject all or part of a sign that does not correspond to the Design Development drawings and Specifications or the approved shop drawings, lettering patterns, color and material samples or prototypes, etc.

3.07 FABRICATION ERRORS

If the Sign Fabricator has made an error in copy (message), color, material, quality, etc. these items must be corrected within thirty (30) days of observation of error (at no additional cost to the Owner). Sign Fabricator will be notified with a written punch-list as errors are discovered.

3.08 REPAIRS AND REPLACEMENTS

Clean up, repair, or replace at no cost to Owner all property damaged by reason of the required Work,

including restoring all disturbed areas, surfaced and un-surfaced, to the original condition on completion of the Work as approved. Work potentially impacted includes precast, brick, ornamental metal, gypsum board, millwork, windows, fixtures, etc. All patchwork or replacement shall match existing. Painted surfaces shall be painted to match the adjacent areas. Painting shall extend to include the entire plane of the surface subjected to a line where an inconspicuous break can occur, as directed by the Owner's Representative. Avoid damaging existing conditions and protect existing surfaces from impacts due to installation of the Work.

3.09 GUARANTEE

Contractors and Installer agrees to repair or replace Work, which has failed as a result of defective material, workmanship, or installation. Failure is defined if any of the following occurs within two (2) years of the acceptance of Work by the Owner or any other agreement period determined between the Owner and the Sign Fabricator:

1. Electrolytic decomposition of any metal.
2. Oxidation of any metal.
3. Dissociation of fasteners, anchors, welds, or any other connecting devices.
4. Delaminating of graphic materials and substrates.
5. Pitting or non-adhesion of finishes or coatings.
6. Sign panel warping or oil canning.
7. Fading and/or non-uniform fading of color.

Sign Fabricator shall replace/repair any defective work within thirty (30) days after notification by the Owner throughout the duration of this period, at no additional cost to the Owner.

END OF SECTION

SECTION 26 0505
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Owner before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- E. Repair adjacent construction and finishes damaged during demolition and extension work.
- F. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Wire pulling lubricant.
- F. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 26 0505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- G. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2007.
- H. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- N. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
- O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 2. Tinned Copper Conductors: Comply with ASTM B33.
- H. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.04 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Provide equipment grounding conductor unless otherwise indicated.
- B. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.

2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.

2.06 WIRING ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
- B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- C. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).

- D. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- G. Terminate cables using suitable fittings.
- H. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- K. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
- N. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor colorcoding.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2007.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form a complete grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Ground Rod Electrode(s):
 - a. Provide copper-clad steel unless otherwise indicated or required.
 - 1) Size: 5/8 inch width by 96 inches length.
 - b. Space electrodes not less than 6 feet (3.0 m) from each other and any other ground electrode.
- E. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.

3. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
4. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
5. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
- D. Ground Rod Electrodes:
 1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
- D. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.

4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION

SECTION 26 0533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Intermediate metal conduit (IMC).
- C. Electrical Metallic tubing (EMT).
- D. Rigid polyvinyl chloride (PVC) conduit.
- E. Liquidtight Flexible metal conduit (LFMC).
- F. Conduit fittings.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0533.16 - Boxes for Electrical Systems.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
- B. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit(EIMC); 2005.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- G. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2005 (Reaffirmed 2013).
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.
- J. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series; 2015.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- M. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- N. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- O. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
 - 2. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 - 3. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
 - 4. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Fittings for Grounding and Bonding: Also comply with Section 26 0526.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT an unthreaded thinwall raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings.

- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of EMT conduit to be installed.
 - 2. Compression type only with nylon insulator. Set screw connections are not acceptable
 - 3. Material: Use steel.
 - 4. Exterior: Steel compression rain-tight fittings with nylon insulator to be installed.

2.06 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install electrical metallic tubing conduit (EMT) using only tools approved by the manufacturer.
- F. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- G. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
- H. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

- I. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 - 6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

- J. Penetrations:
 - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 - 4. Conceal bends for conduit risers emerging above ground.
 - 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 - 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 - 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

- K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 - 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 - 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 - 3. Where conduits are subject to earth movement by settlement or frost.

- L. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
 - 1. Where conduits pass from outdoors into conditioned interior spaces.
 - 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

- M. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 508A - Industrial Control Panels; 2013.
- J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.

2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use suitable concrete type boxes where flush-mounted in concrete.
 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 6. Use shallow boxes where required by the type of wall construction.
 7. Do not use "through-wall" boxes designed for access from both sides of wall.
 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 12. Wall Plates: Comply with Section 26 2726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- E. Install boxes plumb and level.
- F. Flush-Mounted Boxes:
 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.

2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- G. Install boxes as required to preserve insulation integrity.
- H. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- I. Close unused box openings.
- J. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- K. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Underground warning tape.
- E. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.03 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Transformers:
 - 1) Identify kVA rating.
 - 2) Identify voltage and phase for primary and secondary.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify load(s) served. Include location when not within sight of equipment.
 - c. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.

2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
- B. Identification for Conductors and Cables:
 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 1. Materials:
 - a. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch (3 mm).
- F. Color: Black text on white background unless otherwise indicated.

2.04 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).
- C. Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.

- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:

2.05 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 3. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.
- G. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 2416
PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e (Amended 2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 67 - Panelboards; Current Edition, Including All Revisions.
- K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

PART 2 PRODUCTS

2.01 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- C. Short Circuit Current Rating:

1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.02 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 1. Phase and Neutral Bus Material: Aluminum.
 2. Ground Bus Material: Aluminum.
- D. Circuit Breakers:
 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
- E. Enclosures:
 1. Provide surface-mounted enclosures unless otherwise indicated.

2.03 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 3. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 4. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required supports in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 26 0526.
- I. Install all field-installed branch devices, components, and accessories.
- J. Provide filler plates to cover unused spaces in panelboards.

END OF SECTION

SECTION 26 2726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Receptacles.
- B. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0533.16 - Boxes for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- I. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

2.02 RECEPTACLES

- A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- B. GFCI Receptacles:
 - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - 2. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.03 WALL PLATES

- A. Wall Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard; 3.13" x 4.88" or to match back box opening dimensions.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.
- J. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- K. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- L. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

END OF SECTION

SECTION 26 2816.13
ENCLOSED CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed circuit breakers.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 ENCLOSED CIRCUIT BREAKERS

- A. Description: Units consisting of molded case circuit breakers individually mounted in enclosures.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- D. Short Circuit Current Rating:
 - 1. Provide enclosed circuit breakers with listed short circuit current rating not less than the available fault current at the installed location indicated on the drawings.
- E. Conductor Terminations: Suitable for use with the conductors to be installed.
- F. Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.
- G. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

H. Provide externally operable handle with means for locking in the OFF position.

2.02 MOLDED CASE CIRCUIT BREAKERS

- A. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
- B. Interrupting Capacity:
 1. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 2. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
- C. Conductor Terminations:
 1. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
- D. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed circuit breakers are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed circuit breakers.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required supports in accordance with Section 26 0529.
- E. Install enclosed circuit breakers plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed circuit breakers such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with manufacturer's instructions and NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for circuit breakers used for service entrance and for circuit breakers larger than 1000 amperes. Tests listed as optional are not required.
- D. Test GFCI circuit breakers to verify proper operation.
- E. Correct deficiencies and replace damaged or defective enclosed circuit breakers.

END OF SECTION

SECTION 26 4300
SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 2416 - Panelboards.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Protected Modes:
 - 1. Wye Systems: L-N, L-G, N-G, L-L.
- C. UL 1449 Voltage Protection Ratings (VPRs):
 - 1. Equivalent to basis of design.
- D. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- E. Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
- F. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.

2.02 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

- A. Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.
- B. List and label as complying with UL 1449, Type 1 or Type 2.
- C. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.
- D. Surge Current Rating: Not less than 60 kA per mode/120 kA per phase.
- E. UL 1449 Nominal Discharge Current (I-n): 20 kA.
- F. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
- G. Diagnostics:
 - 1. Protection Status Monitoring: Provide indicator lights to report the protection status.

2. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.
- C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of the drawings and manufacturer's instructions.
- D. Verify system grounding and bonding is in accordance with Section 26 0526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide conductors with minimum ampacity as indicated on the drawings, as required by NFPA 70, and not less than manufacturer's recommended minimum conductor size.
- E. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.
- F. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 26 0526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.

END OF SECTION

SECTION 26 5600
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior luminaires.
- B. Poles and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0533.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. AASHTO LTS - Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signal; 2013 (Revised 2015).
- B. IEEE C2 - National Electrical Safety Code; 2017.
- C. IES LM-63 - IESNA Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).
- D. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.
- E. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015, with Errata (2017).
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- G. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2006.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- J. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.05 SUBMITTALS

- A. Product Data: For each specific product and component marked to indicate compliance with these requirements.
- B. Delegated Design Submittal: Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, reinforcement, and anchor bolts. Include analysis data signed and sealed by a New Mexico licensed and qualified professional engineer responsible for their preparation.

PART 2 PRODUCTS

2.01 LUMINAIRE PERFORMANCE

- A. Illumination Levels and Design Factors: Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points required. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be measured in accordance with the IESNA LRP-6-01 (IESNA Sports and Recreational Area Lighting).
- B. Hours of usage: Designs shall be based on the following hours of usage

Area of Lighting	Annual Usage Hours	Warranty Usage Hours
Softball Field(s)	300	10,000 Over 10 Years

C. Color Temperature: The lighting systems shall have a color temperature of 5700K +/- 200K and a CRI greater than 70.

D. Spill Light and Glare Control:

To minimize impact on adjacent properties, spill light and candela values must not exceed the following.

Spill	Average	Maximum
Property Line Horizontal Footcandles (increase)	.00 FC	.00 FC

E. Photometric Report:

A photometric report that shows aiming points of each luminaire shall be provided to demonstrate the capability of achieving the specified performance.

F. Wind Loads:

Wind loads to be calculated using ASCE 7-10.

G. Foundation Design:

The foundation design shall be based upon the Geotechnical Data prepared for the site.

2.02 LIFE-CYCLE COSTS

A. Manufacturer shall submit a 10-year cycle cost calculation as outlined in the required submittal information.

2.03 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings, or approved equal.

2.04 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- E. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.05 POLES

- A. All Poles:
 - 1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
 - 2. Structural Design Criteria:
 - a. Comply with AASHTO LTS.
 - b. Wind Load: Include effective projected area (EPA) of luminaire(s) and associated supports and accessories to be installed.
 - c. Dead Load: Include weight of proposed luminaire(s) and associated supports and accessories.
 - d. Lighting representative to provide structural design for pole base.
 - 3. Material: Steel, unless otherwise indicated.
 - 4. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.
- B. Metal Poles: Provide ground lug, accessible from handhole or base.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires in accordance with NECA/IESNA 501.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Install accessories furnished with each luminaire.
- G. Bond products and metal accessories to branch circuit equipment grounding conductor.
- H. Install lamps in each luminaire.

3.03 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.04 WARRANTY AND GUARANTEE

- A. 10-Year Warranty: Manufacturer shall supply a signed warranty covering the entire system for 10 years from the date of shipment.

END OF SECTION

PART 1- GENERAL

1.01 SUMMARY:

A. WORK INCLUDED:

1. The work of this section consists of constructing universally accessible crusher fines paving on a prepared subgrade.

B. RELATED WORK:

1. Section 32 22 16 Fine Grading

1.02 DEFINITIONS:

1.03 SUBMITTALS:

A. SUBMITTAL PROCEDURE: Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures

B. PRODUCT DATA: Submit sieve analysis of proposed material to ensure it meets grading requirements. Sieve analysis and color of crushed aggregate screenings shall be approved in writing by the Landscape Architect before any material is delivered to the project site.

C. SAMPLES: Submit sample of crushed aggregate screenings for approval to ensure color will be compatible with project site. Sample shall be sufficiently large to illustrate clearly the functional characteristics, and full range of color and texture of the material.

1.04 PROJECT CONDITIONS: Use lightweight hauling equipment. Exercise care in using equipment, avoiding damage to adjacent plant and tree growth, and adjacent site improvements.

PART 2 - PRODUCTS

2.01 CRUSHED AGGREGATE SCREENINGS:

A. Clean, hard, durable particles or fragments of 1/4" minus select crushed Santa Fe Brown crusher fines. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, 50 percent, by weight, of the material retained on a No. 4 sieve shall have one fractured face. Color to be approved by Landscape Architect.

B. 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.

C. The portion passing a No. 40 sieve shall have a maximum liquid limit of 25 and a maximum plasticity index of 7, as determined by AASHTO T89-81 and AASHTO T90-81, respectively.

D. The crushed aggregate screenings shall be free from clay lumps, vegetable matter, and deleterious material.

2.02 GRADING REQUIREMENTS:

**Percentage of Weight Passing a Square Mesh Sieve
AASHTO T11-82 and T27-82**

Sieve Designation	Percentage Passing	Sieve Designation	Passing
3/8-inch	100	No. 30	40-50
No. 4	95-100	No. 50	25-35
No. 8	75-80	No. 100	20-25
No. 16	55-65	No. 200	5-15

PART 3 – EXECUTION

- 3.01 SITE CLEARING: Refer to Section 02 41 00
- 3.02 GROUND SURFACE PREPARATION: Strip existing soil as needed within the designated crusher fines paving areas as shown on drawings to allow 4" lay of crusher fines paving.
- 3.03 SUBGRADE PREPARATION: Prior to placing crushed aggregate screenings, shape, fill, grade, and compact the subgrade.
- 3.04 PLACING CRUSHED AGGREGATE SCREENINGS: After pre-blending, place the crusher fines paving on prepared subgrade and rake smooth to desired grade and cross section. Place to avoid segregation, in one layer of 4 inches minimum thickness. Do not apply crusher fines paving deeper than 4 inches in one lift. Ex: For a 6 inch thickness, apply crusher fines paving in two 3 inch lifts.
- 3.05 WATERING: Water heavily to achieve full depth moisture penetration of the crusher fines paving. Watering is best accomplished using a spray nozzle set to a coarse spray; pressure should not disturb the leveled surface. Apply to achieve full depth moisture penetration without causing over-saturation of the mix. Test for depth of water penetration by random inspection of paving cores. After inspection, fill core holes with material removed, smooth and hand tamp to match adjoining trail surface grade. Let watered mix stand 6-24 hours until surface water is no longer present; the mix should then be moist but not wet.
- 3.06 COMPACTION: While the crusher fines paving is still thoroughly 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 curbs, benches, signposts, etc. Use a heavy (1 ton minimum) small rider, after having initially used the lawn roller, to obtain the desired final dense, smooth, uniform texture. Keep compacter 5 ft. away from newly planted trees. Do not use wackers or vibratory rollers.
- 3.07 INSPECTION:
- A. Finished surface shall be smooth, uniform and solid, with no evidence of chipping or cracking. Dried, compacted material shall be firm all the way through with no spongy areas. Loose material shall not be present on the surface initially. At the 11 month inspection, a minor amount of loose material is expected on the surface.
 - B. Any significant irregularities shall be smoothed out prior to final acceptance of the work. Smoothing shall be accomplished by rewetting/saturating rough areas thoroughly, and then rolling the surface again with a heavy roller (1000-1500 lbs powered walk-behind or small rider). Wackers are not recommended.

- C. Final thickness of completed paving shall not vary more than 1/2 inch from dimension indicated. Measurements may be taken by means of test holes taken at random in finished surface. Correct any variations in the thickness beyond the allowable 1/2 inch by repeating the procedures listed under Sections 3.04-3.06 above.
- D. Final width of completed paving shall not vary more than 1/2 inch from typical dimensions indicated. Measurements may be taken at random cross sections in the finished surface.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Chain link fences and gates as indicated.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit plans and details indicating extent of fences, locations of gates, and details of attachment and footings. Indicate means and methods for surface preparation and finishing.

1.03 QUALITY ASSURANCE

- A. Chain Link Fence Manufacturers Institute: CLFMI Product Manual.
- B. ASTM A123: Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A392: Specification for Zinc-Coated Steel Chain Link Fence Fabric. ASTM F567: Practice for Installation of Chain Link Fence.
- E. ASTM F626: Specification for Fence Fittings.
- F. ASTM F668: Specification for Poly(Vinyl Chloride) (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric.
- G. ASTM F900: Specification for Industrial and Commercial Swing Gates.
- H. ASTM F1083: Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- I. ASTM F1184: Specification for Industrial and Commercial Horizontal Slide Gates.
- J. ASTM F1553: Guide for Specifying Chain Link Fence.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete Materials and Properties: Comply with requirements of Section 03 30 00 - Cast-in-Place Concrete to provide normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3,000 psi, 4-inch slump, and one inch maximum size aggregate.
- B. Chain Link Fence Fabric: Conforming to ASTM A 392, Class C2 zinc coating, 2.00 ounces minimum per square foot of uncoated wire surface, hot-dipped galvanized after weaving, and top and bottom edges knuckled.
 - 1. Fabric for perimeter fencing and interior fencing shall be 9 gauge woven wire with 2 inch mesh, unless otherwise specified.
 - 2. For perimeter fences 16 feet high, the upper 8 feet of fabric may be 11 gauge.
 - 3. Fences 12 feet high or less shall be furnished with single width fabric.
 - 4. Fabric for fencing on top of handball court shall be 9 gauge wire minimum with 1 inch mesh.
 - 5. Fabric for fencing of tennis courts shall be full height, single width, 9 gauge by 1-3/4 inches mesh chain link fabric.
 - 6. Installed fence fabric shall be free from barbs, icicles, or other projections and installed fence fabric with such defects will be deemed defective Work.

- C. Posts, Top Rails, Brace Rails and Gate Frames: Standard weight, galvanized, welded or seamless steel pipe conforming to ASTM F 1083, with a minimum yield strength of 35,000 psi. Embed posts into footing 6 inches less than the depth of the footing unless noted otherwise on drawings.
- D. Post Caps: Malleable iron, ASTM F 626, , designed to fit snugly over posts with a minimum projection of 1-1/2 inches below top of posts. Post caps shall be manufactured with a curved top.
- E. Eye Tops: Malleable iron, ASTM F 626, , designed to fit over line posts, and for through passage of top rail.
- F. Expansion Sleeve Couplings for Top Rails: Steel, 6 inches long, designed to fit tightly on inside of rail, fitted with raised center.
- G. Rail Ends for Top Rails and Brace Rails: Malleable iron, ASTM F 626, , with holes to receive 3/8 inch bolts for securing to rail end bands.
- H. Tension Bands and Bands for Securing Rail Ends: Mild steel flats, at least 11 gauge x one inch, tension bands in gates shall be 11 gage by 1 inch. Bolts for use with tension bands and rail end bands shall be 3/8 inch by 1 1/2-inch.
- I. Tension Bars: Mild steel flats at least 3/16 inch by 3/4 inch.
- J. Tension Wire for Installation at Bottom of Fabric: 6 gage steel spring wire, conforming to requirements of AISI Steel Products Manual, Carbon Steel Wire, Section 16, merchant quality, galvanized, soft temper with Type I coating. Wavy type wire is not acceptable.
- K. Turnbuckles for installation with Tension Wires: Eye and hook type, drop forged steel, right and left hand threads, at least 3/8 inch screw diameter with at least 4 1/2-inches of take-up.
- L. Tie Wire: Aluminum ties 6 gauge for fastening fabric to posts, top rails and brace rails. At bottom tension wire 9 gauge galvanized hog rings shall be installed.
- M. Finish of Metal Parts: Post caps, couplings, rail ends, tension bands, tension bars, turnbuckles, rivets, bolts, and other metal parts and fittings shall be hot-dipped galvanized after fabrication, except bolts, which may be galvanized or cadmium-plated. Galvanizing shall conform to ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, and ASTM F 626 Specification for Fence Fittings.
- N. Paints for Refurbishing Existing Fence Posts, Rails, and Accessories: As required to provide the galvanized color of a new installation.
- O. Fence Guard: Poly-Cap Fence Guard, or approved equal. 1/4" thick UV resistant and weather treated corrugated polyurethane, 4-1/2" thick inside diameter, pre-slit to slide over fence top. Color; yellow. 18" UV treated tie wraps to be placed every 3'.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fences to heights indicated on Drawings.
- B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10 feet apart measured from center to center of posts. In curved fence sections having a radius of 50 feet or less, space posts not more than 5 feet - 6 inches apart. Install posts so that top of eye of post caps are level with top of fabric.
- C. Install angle or corner posts at each change in direction of 15 degrees or more, at change of 5 percent or more in grade of fencing, and at the beginning and end of curved fence sections.
- D. Install terminal posts at ends of runs of fencing. Install gateposts on both sides of driveway and pedestrian gates. For double-leaf gates, net opening between gate posts shall be gate size as indicated on Drawings, plus 3 1/2-inches; for single leaf gates, net opening shall be gate size plus 2 1/2-inches.
- E. Where a fence is to be installed on a curb, construct footings with top of footing level with the lower finish grade. Align posts, set plumb and true before placing footings. Remove splattered concrete from exposed pipe surfaces while concrete is still soft. In bituminous surfaced areas, install seal coat on top of concrete footings.

- F. Install fences with top rail. Install rails parallel with curb. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.
- G. Install fences over 10 feet in height, in addition to top rail, with a full length horizontal mid-rail set at mid-height of fence and rigidly secured to posts with rail end fittings and bands.
- H. In fences higher than 10 feet, install brace rails at angles, corners, and terminals at 1/4 and 3/4 of fence height. Provide one horizontal brace rail in panels adjacent to terminal, angle, corner, and gateposts, install at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in panels of curved sections having a radius of 50 feet or less. Brace rails are not required in fencing 4 feet or less in height.
- I. Provide a transom rail and fabric at top of pedestrian gate openings. Install transom rail 6 feet 8 inches above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with 1/4 inch mild steel rivets. Pin or rivet must go through rail and peen. Welding on rail ends is not permitted.
- J. Install bottom tension wire a minimum of 3 inches from grade for fencing, and provide a turnbuckle for each 150 feet of wire or fractional part thereof. Turnbuckles are not required in runs of 15 feet or less. Install ends of tension wires to posts in a manner to prevent slipping or loss of tension. Wrap should start from fence side of post. Turn end of wire around post tightly twisted at least three times around wire. At turnbuckles, wire through eye and tightly twist end at least three times around wire. Cut tail of bottom wire flush.
- K. Install fence fabric on outward facing side of posts, except for tennis courts. Install fence fabric with top edge projecting above top rail of fence.
- L. Install bottom of fence fabric to clear finish grades, except on bituminous surface install 3/4 inch above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fence.
- M. Tightly stretch fabric and at terminal, pull corner, angle, and gateposts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14 inches apart.
- N. Bands and Ties: Install bands and ties in accordance with following schedule:

15 bands on 16 feet fence	16 ties on 16 feet fence
11 bands on 12 feet fence	12 ties on 12 feet fence
7 bands on 8 feet fence	7 ties on 8 feet fence
6 bands on 6 feet fence	6 ties on 6 feet fence
4 bands on 4 feet fence	4 ties on 4 feet fence
- O. Fasten fabric to line posts with wire ties spaced not more than 16 inches apart. Where 6 gauge aluminum ties are furnished, hook the tie at both ends. Installation of hooked ties with links is not permitted.
- P. Fasten fabric to top rails, mid-rails, brace rails, with wire ties spaced not more than 18 inches apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, install hog rings spaced not more than 18 inches apart. Where 2 fabrics are furnished, lap the fabrics one mesh at mid-rail and tie both fabrics with 9 gauge wire or 6 gauge aluminum ties to midrails.
- Q. Grind all field welds smooth, clean off flux and spatter, damaged galvanizing removed, burrs and projections ground off, properly prepared, then heavily coated with galvanizing repair coating as specified in Section 05 5000; or equal product approved by Owner's Office of Environmental Health and Safety. Install coating in accordance with written recommendations of manufacturer.
- R. Fabrication of Gates:
 1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.
 2. Fabric: Install fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14 inches apart. Tension bars shall extend full height of gate. Install fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12 inches apart.

3. Latches: Weld gate latches and strikes to gate posts and frames. Welding shall be performed before gate frames are galvanized, or welds shall be finished as specified for field welds.
4. Hinges: Install and adjust hinges; burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install 3 hinges on each post for swing gates more than 16 feet wide.
5. Grind welds flush and smooth. Hot-dip galvanize fabricated parts after welding, or finish weld as specified for field welds.

3.02 TENNIS COURTS PERIMETER FENCING

- A. Perimeter fences for tennis courts shall not be less than 12 feet in height. Instead of providing bottom tension wire, provide with horizontal bottom rail. Remove bottom tension wire or redwood header in existing chain link fences and add bottom rail, if not existing. Install fabric on courtside of posts.

3.03 FENCING ON TOP OF HANDBALL COURT WALLS

- A. Posts, rails, chain link fabric and accessories required for a complete installation shall be as specified, except that chain link fabric shall be 9 gage wire minimum by 1 inch mesh.

3.04 INSTALLATION ON TOP OF CONCRETE WALLS

- A. Posts for fences on top of new concrete or concrete masonry walls shall be installed in 24 gauge galvanized iron inserts one inch larger than the outside post diameter. Wall thickness for such installation shall be 8 inches minimum. Depth of embedment of post shall not be less than 15 inches for fence height not exceeding 4 feet. Install post plumb, true, and fill joint space with non-shrink grout as specified in Section 05 50 00, finished flush with top of wall. Remove excess grout and clean posts.
- B. Fencing on Gravity Walls: Post of fence not exceeding 8 feet high shall have a minimum of 15 inches embedment in gravity walls with a top width of 10 inches minimum and side of 1H: 4V. Where the height of gravity wall from top to bottom, within 5 feet from each side of a post, is less than 22 inches, provide concrete fence post footings and embed posts in accordance with the schedule of posts and footings as set forth in this section.
- C. Do not install footings on existing walls without the review of the Architect and DSA.

3.05 REINSTALLED FENCING

- A. Where existing fencing is indicated to be reset or relocated, remove existing concrete footings from posts and legally dispose of off the Project site. Construct new concrete footings, as specified, in their designated location. Replace parts of fencing broken or damaged during removal and re-installation with new parts as specified to complete reinstallation. New materials shall closely match design of existing installation. Top rail will be required in reinstalled fencing, which does not have top rail in its existing condition. Install as specified for new installations.
- B. Existing fences shall be reset where finish pavement is raised or lowered more than 6 inches from existing grade. Remove and reinstall entire fence assembly as specified.

3.06 FENCING ADJUSTMENTS

- A. Where the finish grade is raised 6 inches or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric. Bottom of fence fabric shall be installed $\frac{3}{4}$ " above finish grade.
- B. Where the finish pavement is lowered 6 inches or less, demolish the fence footing flush with the finish grade and adjust the fabric and its attachments. Bottom of fence fabric shall be installed $\frac{3}{4}$ inches above finish grade.
- C. Post footings and fabrics that require readjustment after installation shall be entirely replaced.

3.07 INSTALLATION OF GATES

- A. Provide gates of the sizes indicated on Drawings. Allow clearance on gates of 1-1/2 inches at bottom and one inch at top. Construct gates installed in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.
- B. Sliding Gates and Swing Barricade Gates: Fabricate and install as indicated on Drawings. Wheel housing must be designed to fit tightly to roll track and prevent gate from rolling over objects. Unsupported cantilever type roll gates are not acceptable. Install gate stops in accordance with the drawings. Both top and track stops are required.

3.08 RE-FENCING

- A. Hardware Removal: Disassemble existing fence and all attachment hardware (bands, pipe, and wire) prior to preparation of posts for painting
- B. Fabric Removal: Do not remove more than what can be replaced during one day unless a barricade, providing equal security, will be installed in its place. If freestanding temporary fence is used, it must be clamped and wrap tied.
- C. Post and Rails: Bent posts, rails and accessories shall be replaced. Cut bent portion of posts and weld new sections of equal diameter and thickness. Install splice to inside of all welded section prior to welding. Previously repaired or welded posts shall be replaced as necessary.
- D. Painting:
 - 1. Preparation: Prepare exposed steel posts, rails and accessories thoroughly cleaned of rust, oil and foreign materials. Painted galvanized metal shall be stripped to bare metal before applying prime coat.
 - 2. Priming: Spot prime areas from which the original surface coating had been removed with a metal primer to match adjoining surfaces. Subsequently, install a prime coat to the entire surface to be painted.
 - 3. First Coat: Install first coat as recommended by the paint manufacturer. Furnish a color that is 10 percent to 15 percent lighter or darker than the finish coat.
 - 4. Second or Finish Coat: Install finish coat after the first coat has cured.
 - 5. Install paint in accordance with manufacturer's written recommendations.
 - 6. Protect adjacent structures, walls, concrete or asphalt from paint.

3.09 COMPLETION

- A. Completed fencing shall form continuous units between points indicated with required parts, accessories, and fittings provided and installed. Clean exposed metal surfaces of cement, grout and other foreign substances.
- B. Fill in holes left by removal of existing fence footings, except in areas where grading Work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

3.10 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.11 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section shall consist of furnishing and installing new fence and/or removing and salvaging existing fence and restoring the same in conformance with the lines and grades and requirements shown on the drawings. Wherever the materials to be removed are not in good condition, as judged by the Architect, or wherever the Contractor has damaged the materials during the process of removal, equal or better quality fencing materials than the existing shall be furnished and installed by the Contractor.
- B. Section Includes:
 - 1. Swing Gate – Single Leaf
 - 2. Ranch Fence
 - 3. Ranch Fence Pedestrian Gate
 - 4. Ranch Fence Vehicular Gate – Sliding Gate Hardware (Cantilever Style) and accessories
 - 5. Ranch Fence Vehicular Gate – Gate Operator
 - 6. Garden Fence
 - 7. Garden Fence Gate

1.02 SUBMITTALS

- A. Submittal Procedure: Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures
- B. Product Data: Submit manufacturer's data sheets for each product specified.
- C. Shop Drawings: Provide shop drawings for custom fabricated fence, gates, and gate hardware. Include plans, elevations, sections, details, and attachments to other work.
- D. Samples: For each material and color specified.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for decorative metallic-coated steel tubular gates, including finish, indicating compliance with referenced standard.

1.03 QUALITY ASSURANCE

- A. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for gates that must provide emergency access.
- B. Entrapment Protection Requirements: Comply with UL 325 Entrapment Protection Requirements for gate operator entrapment protection devices.
- C. Manufacturer: Provide products manufactured by a company with a minimum of 5 years successful experience manufacturing similar products.

1.04 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install fencing and gates prior to acceptance by Landscape Architect of area to receive such materials.
- B. Coordination: Coordinate with the work of other sections to insure the following sequence of construction.
 - 1. Fence and Gate Posts: Set anchors or sleeves in place and pour footings prior to installation of adjacent paving.
 - 2. Gate Operator: Provide conduit to gate operator footing; coordinate with electrical plans. Provide wireless connection to timer and operator for remote control.

3. Shop Fabricated Items: Install anchors, bolts and fittings in appropriate formwork prior to installation of adjacent paving or walls.

PART 2 – PRODUCTS

2.01 PRODUCTS

- A. Products are listed in this section to establish requirements for product type, characteristics, performance, and quality:

1. SWING GATE – SINGLE LEAF

Tractor Supply Company (or approved equal)
200 Powell Place
Brentwood, TN 37027
Customerservice@tractorsupply.com

Model: Utility Gate

Size: 12ft. long x 50 in. high

Color: Galvanized or RAL 9006 Metallic Silver

Quantity: 1

SWING GATE POSTS

Hinges: Match to Swing Gate hardware

Size: see detail

Color: Galvanized or RAL 9006 Metallic Silver

Quantity: 1

SWING GATE CANE BOLT

Size: 36" length, 7/8" diameter with keep

Color: Galvanized or RAL 9006 Metallic Silver

Quantity: 1

2. RANCH FENCE

See detail, or supply pre-manufactured fence for review and approval.

Gate Hardware: Raw steel or finish to match gate frame.

3. RANCH FENCE PEDESTRIAN GATE

See detail, or supply pre-manufactured fence for review and approval. Gate design to match fence.

Gate Hardware: Raw steel or finish to match gate frame.

Hinges: 5" Barrel Hinges, industrial weight, finish to match gate frame

Latch: Heavy Duty Drop Fork Latch Assembly; Post size: 2.5" O.D.; Gate frame size: 2" O.D.; Color: Raw steel or finish to match gate frame.

4. RANCH FENCE VEHICULAR GATE – SLIDING GATE HARDWARE (CANTILEVER STYLE)

Fratello Comunello sPA, distributed by DuraGates (or approved equal)

200 Powell Place

Brentwood, TN 37027

1.800.784.7444

www.duragates.com

Sliding Gate Hardware: MODEL CGS-350.8P, for gates ranging up to 1700 lbs, openings of 26.4 ft.

a. CGS-350.8P, medium carriage monobloc body.

- b. CGS-345P, medium galvanized track.
- c. CGS-347P, end wheel for track.
- d. CGS-346P, bottom end cup for track.
- e. CG-15P, adjustable wall mounting bracket.
- f. CG-30P, upper adjustable end cup.
- g. CG-348-M16, threaded tie rod for carriage.
- h. CG-05P, foundation plate.
- i. CGI-40, stainless steel tension bars.
- j. Guides: As applicable to project:
 - 1) 255-220, adjustable guiding plate for 1-1/4 to 2-3/8 inch frames.
 - 2) 255-350, adjustable guiding plate for 2-3/8 to 3-3/8 inch frames.
 - 3) CG-252, adjustable support roller.
 - 4) CG-254, monorail for CG-252.
 - 5) 253, 10 inch nylon roller for support, minimum 2 per gate.

5. RANCH FENCE VEHICULAR GATE – GATE OPERATOR

Usage Class: Class II – Commercial / General Access Vehicular Gate

Gate Operator: Liftmaster CSL24U vehicular slide gate opener, 24V electric motor

Power Supply: 120V/230V single phase, 24VDC 500mA output Accessory Power

Chain: #41 Chain, and Chain Attachment Hardware (Chain Bracket, Eye Bolts w/ Nuts)

Quantity: 1

Timer: 7 day time clock

Safety / Entrapment Protection Devices: Photoelectric Sensors / Reflectors, Safety Entrapment

Edge Sensor w/ LMWEKITU Monitored Wireless Edge Kit

Accessories: Vehicle Sensing Probe,

Exit Loop and Interrupt Loop: LOOPDETLM, Vehicle Loop Detector – 12 VDC Plug-In, Direct

Burial Loop RL4440 (final size TBD, use 6' x 16' loops for bidding purposes)

Wireless Operator: Internet Gateway 828LM (MyQ app)

6. GARDEN FENCE

See detail, or supply pre-manufactured fence for review and approval.

7. GARDEN FENCE GATE

See detail, or supply pre-manufactured fence for review and approval.

Gate Hardware: Raw steel or finish to match gate frame.

Latch: Heavy Duty Drop Fork Latch Assembly, lockable; Post size: Wall mount; Gate frame size: 2-7/8" O.D.; Color: Raw steel or finish to match gate frame.

Cane Bolt: 36" length, 7/8" diameter with keep; Galvanized or RAL 9006 Metallic Silver; Quantity: 1 per leaf.

2.02 STEEL AND IRON

- A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- C. Tubing: ASTM A 500, cold formed steel tubing.
- D. Bar Grating: NAAMM MBG 531.
- E. Bars: Hot-rolled steel strip, ASTM A 1011/A 1011M, Commercial Steel, Type B.
- F. Wire Rods: ASTM A 510 (ASTM A 510M).
- G. Galvanized-Steel Tubular Pickets: industrial and light-industrial (commercial) fences in ASTM F 2408.
- H. Galvanized-Steel Sheet: ASTM A 653/A 653M, structural quality, Grade 50 (Grade 340)

2.03 COATING MATERIALS

- A. See plans; Raw steel or Galvanized finish.

2.04 MISCELLANEOUS MATERIALS

- A. Concrete: Normal-weight concrete complying with requirements in section 03 30 00 Cast-in-Place Concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum aggregate size.
- B. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

2.05 GROUNDING MATERIALS

- A. Grounding Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
 - 1. Material above Finished Grade: Aluminum.
 - 2. Material on or below Finished Grade: Copper.
- B. Grounding Connectors and Grounding Rods: Comply with UL 467.

2.06 STEEL FINISHES

- A. Surface Preparation: Clean surfaces according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 1. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

PART 3 - EXECUTION

3.01 FENCE INSTALLATION

- A. Install fence and fence components per manufacturer's specifications.
- B. Line, Corner and Gate Posts shall be set in 36-inch deep holes and backfilled with concrete. A minimum of six (6) inches of concrete shall be provided between the bottom of the hole and the bottom of the post being set.
- B. Steel posts shall be set true to line and grade in concrete bases. The distances between posts shall be 8 feet, typical, or as indicated on the drawings.
- C. Wire mesh panels shall be placed on the roadway side of posts unless otherwise specified. The mesh shall be placed approximately one inch above the ground, and on a straight grade between posts by excavating high points of the ground. Filling depressions will be permitted only upon approval by the Owner.
- D. Fasten wire panels to the steel frame by spot welding panel to frame. Butt joint panels together at intermediate line posts. Spot weld both panels at junction to steel frame.

3.02 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section shall consist of furnishing and installing new fence and/or removing and salvaging existing fence and restoring the same in conformance with the lines and grades and requirements shown on the drawings. Wherever the materials to be removed are not in good condition, as judged by the Architect, or wherever the Contractor has damaged the materials during the process of removal, equal or better quality fencing materials than the existing shall be furnished and installed by the Contractor.
- B. Section Includes:
1. Post and Cable Fence
 2. Wood Privacy Fence – Steel Frame
 3. Wood Privacy Fence – Double Leaf Vehicular Gate
 4. Vine Trellis Fence

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M111M/M111, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. M133, Standard Specification for Preservatives and Pressure Treatment Processes for Timber.
 - c. M181, Standard Specification for Chain-Link Fence.
 - d. M232M/M232, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - e. M281, Standard Specification for Steel Fence Posts and Assemblies, Hot- Wrought.
 2. ASTM International (ASTM):
 - a. A116, Standard Specification for Metallic-Coated, Steel-Woven Wire Fence Fabric.
 - b. A121, Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
 - c. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - d. A491, Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
 - e. B211, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
 - f. F537, Standard Specification for Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials.
 3. Federal Specification (FED): FCGS-02-1, Fencing, Wire and Post, Metal (Chain-link Fence Posts, Top Rails and Braces).

1.03 SUBMITTALS

- A. Submittal Procedure: Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures
- C. Product Data: For each type of product indicated above.
- D. Samples: For each fence material and for each color specified.
- E. Hardware: Submit hardware list and cutsheets for each type for final approval.

- F. Shop Drawings: Submit shop drawings for post and cable fence, wood privacy fence and wood privacy fence double leaf vehicular gate with steel frame. Indicate plan layout, size and spacing of components, frame dimensions, bracing, accessories, fittings, anchorage, and post section.

1.04 QUALITY ASSURANCE

- A. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for gates that must provide emergency access.

1.05 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install fencing prior to acceptance by Landscape Architect of area to receive such materials.
- B. Coordination: Coordinate with the work of other sections to insure the following sequence of construction.
 - 1. Fence and Gate Posts: Set anchors or sleeves in place and pour footings prior to installation of adjacent paving.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All wood materials shall be treated wood, or western red cedar wood with a natural resistance to decay. Materials shall be free from loose knots, cracks and other imperfections which would weaken the material or otherwise cause them to be structurally unsuitable for the purpose intended.
- B. No additives, stains, paints or other chemicals may be used in manufacturing. Fencing shall not be sourced illegally or harvested without authorization from appropriate government agencies.
- C. All fasteners used for construction shall be stainless steel wood screws.
- D. Dual access (accessible and lockable from either side) latch and lock systems are required on all vehicular maintenance access gates.

2.02 MATERIALS

- A. Post + Cable Fence:
 - 1. See detail
 - 2. Posts: match existing, assumed to be 6-inch x 8-inch x 5-foot post, ACQ Pressure Treated Douglas Fir Timber, Standard Grade or Better, S4S finish.
- B. Vine Trellis Fence
 - 1. See detail

2.03 CEMENT:

- A. Concrete: Normal-weight concrete complying with requirements in Division 3 Section "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi (20 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum aggregate size.

PART 3 - EXECUTION

3.01 REMOVAL OF EXISTING FENCE

- A. All broken, warped, or out of plumb posts, rails, pickets and other fence components shall be removed and disposed of or salvaged by the Contractor to allow construction of the project as described on the drawings..

3.02 FENCE INSTALLATION

- A. General:
 - 1. Contractor shall perform such clearing and grubbing as may be necessary to construct or replace the fence to the required grade and alignment as shown on the Drawings.
 - 2. Follow all applicable blue stakes procedures.
 - 3. Fence alignment shall be located on Owner's property, unless agreed to in writing by adjacent private property owner.
 - 4. At locations where breaks in a run of fencing are required, appropriate adjustments in fence alignment and/or post spacing shall be made to satisfy requirements or conditions encountered.
 - 5. Install as per plans, details, and manufacturer's specifications.
- B. Posts shall be set true to line and grade. Posts shall be securely embedded into the ground to meet the proper alignment and elevations.
- C. The maximum distance between posts in any section shall not exceed eight (8) feet, unless otherwise indicated on the drawings. The top and bottom railings shall be securely fastened to the posts with stainless steel nails or other acceptable means. Changes in line of 30 degrees or more shall be considered as corners.
- D. Fence corner posts, end posts, gate posts, and every sixth line post shall be placed in 1' diameter concrete footing. Posts and rails shall be held in proper positions by secure bracing until such time as the concrete has set sufficiently to hold the posts. Materials shall not be installed on posts, or stress placed on bracing until the concrete has set sufficiently to withstand the stress. The complete fence shall be plumb and in straight alignment as shown on the drawings or as directed by the Landscape Architect.
- E. Fence slats shall be placed on the roadway side of posts unless otherwise specified. The slats shall be placed approximately 2" above the ground and on a straight grade between posts by excavating high points of the ground. Filling depressions will be permitted only upon approval of the Architect. The slats shall be sound and free from all major decay or defects which would weaken or otherwise cause them unsuitable for fence slats. Fastening to top, bottom, and other railings shall be done with two stainless steel wood screws at each juncture.

3.03 GATE INSTALLATION

- A. General:
 - 1. Gate location shall be approved by Landscape Architect prior to installation.
 - 2. Install gates plumb, level, and secure for full opening without interference.
 - 3. Install ground-set items in concrete for anchorage as recommended by the fence manufacturer. Adjust hardware for smooth operation.
 - 4. Install as per plans, details, and manufacturer's specifications.
- B. Once gate is installed, coordinate with Owner's Representative on lock installation..

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included: Provide site furnishings, and install complete, including footings, fittings and materials, as shown, and as specified.

1.02 REFERENCES

- A. ACI - American Concrete Institute Manual of Concrete Practice.
- B. ASTM – American Society for Testing and Materials

1.03 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures
- B. Product Data: Submit product data and manufacturer's current printed specifications and catalog cutsheets of the following:
 - 1. Picnic Table Set
 - 2. Picnic Table Set - Accessible
 - 3. Bench
 - 4. Trash / Recycling Receptacle
 - 5. Dugout Rack
 - 6. Cleat Cleaner
 - 7. Bases / Pitching Rubber / Home Plate
 - 8. Dugout Bench
 - 9. Bleacher Sets
 - 10. Flagpole and Accessories
 - 11. Stock Tank
 - 12. Dog Waste Bag Dispenser
- C. Shop Drawings:
 - 1. Show plans, elevations, with dimensions, materials, details of inserts, joints and reinforcements and connections to all adjoining work.
- D. Samples:
 - 1. Color and finish for each type of furnishing.
- E. Contract Closeout Submittals:
 - 1. Operations and Maintenance Data:
 - a. Picnic Table Set
 - b. Picnic Table Set - Accessible
 - c. Bench
 - d. Trash / Recycling Receptacle
 - e. Dugout Rack
 - f. Cleat Cleaner
 - g. Bases / Pitching Rubber / Home Plate
 - h. Dugout Bench
 - i. Flagpole and Accessories
 - j. Stock Tank

k. Dog Waste Bag Dispenser

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Show not less than five (5) years successful and continuous experience in work of the type(s) shown on the Drawings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Furnish materials in manufacturer's unopened, original packaging, bearing original labels showing quantity, description and name of manufacturer. Verify that materials and components are adequately padded and securely bound in such a manner that no damage occurs to the product during delivery and unloading at the site.
- B. Storage: Damaged materials will be rejected. Remove damaged materials from the job site immediately, and pay cost of replacement. Determination of damage shall be the sole authority of the Owner.
- C. Handling: Lift materials using lifting inserts provided by manufacturer. Protect materials and finish from damage during handling and installation.
- D. Painted Finishes: Provide non-scratching, non-staining, firmly-bound covering for shop-painted finishes until installed and accepted.
- E. Wood and Precast Concrete: Protect from stains.

1.06 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install site furnishings prior to acceptance by Landscape Architect of area to receive such materials.
- B. Coordination: Coordinate with the work of other sections to insure the following sequence of construction.
1. Site Furnishings set over concrete slab: set frames, anchors or sleeves in place and pour footings prior to installation of adjacent finish paving. Coordinate joint layout with posts.
 2. Site Furnishings set in graded surface: set frames, anchors or sleeves in place in coordination with final grades.

1.07 MAINTENANCE

- A. Maintenance Service:
1. General: Immediately remove stains to materials or surrounding site improvements. Do not use cleaning solvents harmful to site materials. Do not permit cleaning agents to contaminate planted areas.
- B. Extra Materials:
1. General: Provide items necessary to re-tighten, clean up, restore or replace all items as required to ensure continued use of specified products.
 2. Painted Finishes: Provide two (2) cans of each primer and finish coat for use in touch-up. Clearly label cans with batch mixture numbers required to duplicate painted finishes.

PART 2- PRODUCTS

2.01 MATERIALS (for bidding purposes only; substitutions may be submitted for consideration)

- A. PICNIC TABLE SET
Belson Outdoors, INC. (or approved equal)
111 North River Road
North Aurora, IL 60542
Phone (800) 323-5664
Fax (603) 897-0573
sales@belson.com

Model: R6-IP
Length: 6 ft.
Color: Brown | Plastisol
Frame: Brown | Powder Coated
Material: Expanded metal surface coated with Plastisol, steel frame
Mounting: In-Ground Mount
Quantity: Refer to Drawings

Model: R8-IP
Length: 8 ft.
Color: Brown | Plastisol
Frame: Brown | Powder Coated
Material: Expanded metal surface coated with Plastisol, steel frame
Mounting: In-Ground Mount
Quantity: Refer to Drawings

- B. PICNIC TABLE SET ACCESSIBLE
Belson Outdoors, INC. (or approved equal)
111 North River Road
North Aurora, IL 60542
Phone (800) 323-5664
Fax (603) 897-0573
sales@belson.com

Model: R8H-IP
Length: 8 ft.
Color: Brown | Plastisol
Frame: Brown | Powder Coated
Material: Expanded metal surface coated with Plastisol, steel frame
Mounting: In-Ground Mount
Quantity: Refer to Drawings

- A. BENCH
Creative Pipe, Inc. / SCH Enterprises LLC
79405 Hwy 111 Ste 9 PMB 466
La Quinta, CA 92253
Phone (503) 364-1353
sales@creativepipe.com
operations @schenterprisesllc.org

Model: Alpine Bench w/ Back, APBB-RB-6-E-P-0
Length: 6 ft.
Seat Material: Round Bar / Tube
Finish: Polyester Powder Coated
Color: Silver
Mounting: Embed Mount
Quantity: 2

Model: Alpine Bench w/ Back and 2 Armrests, APBB-RB-2-E-P-2
Length: 2 ft.
Seat Material: Round Bar / Tube
Finish: Polyester Powder Coated
Color: Brown
Mounting: Embed Mount
Quantity: 4

- C. TRASH / RECYCLING RECEPTACLE
Belson Outdoors, INC. (or approved equal)
111 North River Road
North Aurora, IL 60542
Phone (800) 323-5664
Fax (603) 897-0573
sales@belson.com

Model: R32TR
Size: 30" H x 23-1/4" Dia.
Capacity: 32 gallons
Finish: Brown | Polyethylene
Liner: R32L Rigid plastic liner, Black
Mounting: RIP, In-Ground Post Mounting Kit, Brown
Quantity: 8
Mounting: RSP, Surface Post Mounting Kit, Brown
Quantity: 2
Lid: R32FC Flat Top Cover with 8" Opening
Lid Color: Brown | Polyethylene
Quantity: 15

- B. DUGOUT RACK
On Deck Sports (or approved equal)
88 Spark St.
Brockton, MA 02302
Phone (800) 365-6171
info@ondecksports.com

Model: CE1012, Baseball Dugout Organizer Rack
Length: 48 1/4
Width: 39"
Material: Steel
Color: Silver
Mounting: Wall Mounted
Quantity: 5

- C. CLEAT CLEANER
J+D Manufacturing (or approved equal)
6200 Hwy 12 E
Eau Claire, WI 54701
Fax: (888 972-4454
Phone: (800) 998-2398
- Brand: Kick Away
Model: KAHD1, Heavy Duty Commercial Model Boot Cleaner
Frame: Steel
Brush: Poly bristles, poly brush mount
Mount: drill holes in metal frame, fasten to concrete slab with concrete screws
Quantity: 4
- D. BASES / PITCHING RUBBER / HOME PLATE
Jaypro Sports (or approved equal)
976 Hartford Turnpike
Wateford, CT 06385
Phone (800) 243-0533
Fax (800) 988-3363
- Bases: Balco Style Bases
Model: BB-600
Size: 15"x15"x3"
Mounting: Inset anchor
Material: Heavy-duty vinyl
Color: white
Quantity: 1 set of 3 bases
- Pitching Rubber: 18" Removable Pitching Rubber
Model: PR-418
Size: 18" long (youth size)
Mounting: Inset anchor
Material: Heavy-duty molded rubber
Color: white
Quantity: 2
- Home Plate: Bury-All Home Plate
Model: HP-100
Mounting: Inset anchor
Material: Heavy-duty molded rubber
Color: white
Quantity: 2
- E. DUGOUT BENCH
Jaypro Sports (or approved equal)
976 Hartford Turnpike
Wateford, CT 06385
Phone (800) 243-0533
Fax (800) 988-3363
- Model: PB-20PI

Size: 15'x10" with back rest
Mounting: Inset anchor
Material: Steel legs, non-skid aluminum planks
Color: aluminum
Quantity: 2

- F. BLEACHER SETS
LA Steel Craft (or approved equal)
PO Box 90365
Pasadena, CA 91103
Phone (626) 798-7401
Fax (626) 798-1482

Product: 3 row bleacher set
Model: BL0315SA
Length: 15'
Size: 3 Row
Material: Aluminum seats and aluminum footboards
Color: Aluminum
Mounting: Surface
Quantity: 2

Product: 4 row bleacher set
Model: BL0421SA
Length: 21'
Size: 4 Row
Material: Aluminum seats and aluminum footboards
Color: Aluminum
Mounting: Surface
Quantity: 2

Product: 5 row bleacher set with guardrail
Model: BL0521SA
Length: 21'
Size: 5 Row
Material: Aluminum seats and aluminum footboards
Color: Aluminum
Mounting: Surface
Quantity: 1

- G. FLAGPOLE + ACCESSORIES
United States Flag Store (or approved equal)
Online Stores, LLC
1000 Westinghouse Drive, Suite 1
New Stanton, PA 15672
Phone (877) 734-2458
www.united-states-flag.com

Model: Special Budget Series 30 ft. Flagpole – ECS30
SKU: CPECS30S
Finish: Satin
Mounting: In-Ground Mount

Quantity: 1
Flag: American, Super Tough Brand USA 4'x6', Nylon Flag
SKU: USA46N_OS
Quantity: 1
Flag: POW MIA 3'x5', Nylon Flag
SKU: MILPOW35N
Quantity: 1
Flag: New Mexico 3'x5', Nylon Flag
SKU: SNM35N
Quantity: 1

- H. STOCK TANK
Tractor Supply Company
200 Powell Place
Brentwood, TN 37027
www.tractorsupply.com
email: customerservice@tractorsupply.com

Model: CountyLine Extra Large Galvanized Round End Stock Tank (or approved equal)
Size: 8ft. diameter x 2 ft. tall
Color: Galvanized
Quantity: 1

- I. DOG WASTE BAG DISPENSER
Dogipot (or approved equal)
2100 Principal Row, Suite 405
Orlando, FL 32837
Phone (800) 364-7681
Fax (407) 888-8526
info@dogipot.com

Product: Aluminum Dogipot Junior Bag Dispenser
Model: 1002-2
Size: 15.5"Hx9.4W"x3.25"D
Capacity: 400 bags
Finish: Powder coated forest green aluminum
Mounting: Post mounted
Quantity: 1

PART 3- EXECUTION

3.01 EXAMINATION

- A. Locations: Verify that site furnishings can be installed at locations as shown on Drawings.
- B. Conditions: Verify that no defects or errors exist in the work of other sections which would lead to defective installation or latent defects in workmanship and function of items in this section. Notify architect of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Protection:

1. Protect adjacent planting and site improvements to prevent damage during installation.
- B. Concrete Pads and Footings:
 1. Layout: Accurately lay out pads and footings as called for in the Drawings.
 2. Installation: Excavate form as required and fill for pads and footings as specified in Site Concrete - Section.

3.03 INSTALLATION

- A. Execution: Install as per manufacturer's specifications. Install elements level, plumb, square, accurately aligned, correctly located, and without warp unless otherwise directed by the Owner. Pitch finish grade beneath items so as not to accumulate water.
- B. Safeguarding: Secure site elements from vandalism and removal. Install equipment with tamperproof hardware, spot-weld bolts, or secure with other means acceptable to the Architect.
- C. Repair: Repair minor damages to finish in accordance with instructions and as approved by Architect. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.04 CLEANING

- A. Clean site furnishings in accordance with manufacturer's instructions. Do not use harsh cleaning materials that would damage finish.
- B. Remove temporary protective coverings.

3.05 FIELD QUALITY CONTROL

- A. Test moving parts and controls for conformance to manufacturer's operating specifications.

3.06 DEMONSTRATION

- A. Demonstrate the operation and maintenance of equipment to the Owner. Submit final copy of maintenance manuals at this time of demonstration. For manuals, see Submittals.

3.07 PROTECTION

- A. Protect installed site furnishings from damage during construction.
- B. Wrappings: Do not remove protective wrappings from furnishings until instructed by Landscape Architect. Remove trash and debris after completion.

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

Work of this Section generally includes provisions for the installation of an underground landscape irrigation system including the following:

- A. Static pressure verification and coordination of irrigation system installation with landscape material installation.
- B. Trenching, stockpiling excavation materials, refilling and compacting trenches.
- C. Complete irrigation system including but not limited to piping, backflow preventer assemblies, valves, fittings, heads, controllers and wiring, and final adjustments to insure complete coverage.
- D. Water connections.
- E. Replacement of unsatisfactory materials.
- F. Clean-up, Consultant Reviews, and Project Acceptance.
- G. Tests.

1.02 REFERENCES

- A. Perform Work in accordance with requirements of Conditions of the Contract and Division 01 - General requirements as well as provisions of all applicable laws, codes, ordinances, rules, and regulations.
- B. Conform to requirements of reference information listed below except where more stringent requirements are shown or specified in Contract Documents.
 - 1. American Society for Testing and Materials (ASTM) - Specifications and Test Methods specifically referenced in this Section.
 - 2. Underwriters Laboratories (UL) - UL Wires and Cables.
 - 3. National Sanitation Foundation (NSF) – Piping and Backflow prevention.
 - 4. American Water Works Association - Piping and Backflow prevention.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications - Installer shall have had considerable experience and demonstrate ability in the installation of irrigation system(s) of specific type(s) in a neat, orderly, and responsible manner in accordance with recognized standards of workmanship. To demonstrate ability and experience necessary for this Project, and financial stability, submit if requested by Consultant, prior to contract award the following:
 - 1. List of 3 projects completed in the last 2 years of similar complexity to this Project. Description of projects shall include:
 - a. Name of project.
 - b. Location.
 - c. Owner.
 - d. Brief description of work and project budget.
- B. Special Requirements:
 - 1. Work involving substantial plumbing for installation of copper piping, backflow preventer(s), and related work shall be executed by licensed and bonded plumber(s). Secure a permit at least 48 hours prior to start of installation.

2. Tolerances - Specified depths of mains and laterals and pitch of pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment, refilling, compaction, and repair of finish grade treatment.
 3. Coordination with Other Contractors - Protect, maintain, and coordinate Work with Work under other Section.
 4. Damage To Other Improvements - Contractor shall replace or repair damage to grading, soil preparation, seeding, sodding, or planting done under other Sections during Work associated with installation of irrigation system at no additional cost to Owner.
- C. Pre-Construction Conference - Contractor shall schedule and conduct a conference to review in detail quality control and construction requirements for equipment, materials, and systems used to perform the Work. Conference shall be scheduled not less than 10 days prior to commencement of Work. All parties required to be in attendance shall be notified no later than 7 days prior to date of conference. Contractor shall notify qualified representatives of each party concerned with that portion of Work to attend conference, including but not limited to Architect, Consultant, Contractor's Superintendent, and Installer.
1. Minutes of conference shall be recorded and distributed by Contractor to all parties in attendance within five days of conference.
- 1.04 SUBMITTALS
- A. Prepare and make submittals in accordance with conditions of the Contract and Division 1 Specification Sections.
 - B. Materials List - Submit five copies if submitting in hard-copy format or one full electronic set of a complete materials list indicating manufacturer, model number, and description of all materials and equipment to be used. Show appropriate dimensions and adequate detail to accurately portray intent of construction via cut sheets and/or shop drawings, as appropriate based on plans, details, and specification information contained within.
 - C. Record Drawings (As-Builts):
 1. At onset of irrigation installation secure Autocadd files of original irrigation design from Owner. At the end of every day, revise as-built prints for work accomplished that day in red ink. As-built field prints shall be brought up-to-date at the close of the working day every Friday by a qualified draftsman. A print of record plan(s) shall be available at Project Site. Indicate zoning changes on weekly as-built drawings. Indicate non-pressure piping changes on as-built. Upon completion of Project, but prior to scheduling of substantial acceptance walk-through, submit for review a final set of as-built mylars and an Autocadd disk copy. Dimensions, from two permanent points of reference (building corners, sidewalk, road intersections or permanent structures), location of following items:
 - a. Connection to existing water lines.
 - b. Routing of sprinkler pressure lines (dimension maximum 100 feet along routing).
 - c. Sprinkler control valves.
 - d. Quick coupling valves.
 - e. Manual drains and stop and waste valves.
 - f. Drip line blow-out stubs.
 - g. Control wire routing if not with pressure mainline.
 - h. Gate valves.
 - i. Control wire and communication cable splices
 - j. Water meters
 - k. Locations of all sleeving including size, quantity and depth of sleeve
 - l. Flow sensors
 - m. Pressure regulating valves
 2. Owner's Representative will not certify any pay request submitted by the Contractor if the as-built drawings are not current, and processing of pay request will not occur until as-builts are up-dated.

- D. Operation Instructions - Submit 3 written operating instructions including winterization procedures and start-up, with cut sheets of products, and coordinate controller/watering operation instruction with Owner maintenance personnel.
 - 1. Controller Charts:
 - a. Do not prepare charts until Consultant has reviewed record (as-built) drawings.
 - b. Provide one controller chart for each automatic controller installed.
 - i. Chart may be reproduction of record drawing, if scale permits fitting of controller door. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
 - ii. Charts shall be blue line print of actual "as-built" system, showing area covered by that controller.
 - c. Identify area of coverage of each remote control valve, using a distinctly different pastel color drawing over entire area of coverage.
 - d. Following review of charts by Consultant, they shall be hermetically sealed between two layers of 20-mm thick plastic sheet
 - e. Charts shall be completed and reviewed prior to final review of irrigation system.
- E. Provide documentation of construction and demolition waste debris recycling / salvage rates. See Section 01 74 19 - Construction Waste Management and Disposal

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with General Conditions and Division 1 Section "Product Requirements".
- B. Deliver, unload, store, and handle materials, packaging, bundling, products in dry, weatherproof, condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism. Deliver in original unopened packaging containers prominently displaying manufacturer's name, volume, quantity, contents, instructions, and conformance to local, state, and federal law. Remove and replace cracked, broken, or contaminated items or elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or jobsite damage.
- C. Handling of PVC Pipe - Exercise care in handling, loading and storing, of PVC pipe. All PVC pipe shall be transported in a vehicle that allows length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be replaced with new piping.

1.06 JOBSITE CONDITIONS

- A. Protection of Property:
 - 1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work of this Section. In the event damage does occur, all damage to inanimate items shall be completely repaired or replaced to satisfaction of Owner, and all injury to living plants shall be repaired by Owner. All costs of such repairs shall be charged to and paid by Contractor.
 - 2. Protect buildings, walks, walls, and other property from damage. Flare and barricade open ditches. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to Owner. Restore disturbed areas to original condition.
- B. Existing Trees:
 - 1. All trenching or other Work under limb spread of any and all evergreens or low branching deciduous material shall be done by hand or by other methods so as to prevent damage to limbs or branches.
 - 2. Where it is necessary to excavate adjacent to existing trees use all possible care to avoid injury to trees and tree roots. Excavation, in areas where 2 inch and larger roots occur, shall be done by hand. Roots 2 inches or larger in diameter, except directly in the path of pipe of conduit, shall be tunneled under and shall be heavily wrapped with burlap to prevent scarring or excessive drying. Where a trenching machine is operated close to trees having roots smaller than 2 inches in diameter, wall of trench adjacent to tree shall be hand trimmed, making clean cuts through roots. Trenches adjacent to

trees shall be closed within 24 hours, and when this is not possible, side of trench adjacent to tree shall be kept shaded with moistened burlap or canvas.

- C. Protection and Repair of Underground Lines:
 - 1. Request proper utility company to stake exact location (including depth) of all underground electric, gas, or telephone lines. Take whatever precautions are necessary to protect these underground lines from damage. If damage does occur, Utility Owner shall repair all damage. Contractor shall pay all costs of such repairs unless other arrangements have been made.
 - 2. Request Owner, in writing, to locate all private utilities (i.e., electrical service to outside lighting) before proceeding with excavation. If, after such request and necessary staking, private utilities that were not staked are encountered and damaged by Installer, Owner shall repair them at no cost to Installer. If Contractor damages staked or located utilities, they shall be repaired by Utility Owner at Contractor's expense unless other arrangements have been made.
- D. Replacement of Paving and Curbs - Where trenches and lines cross existing roadways, paths, curbing, etc., damage to these shall be kept to a minimum and shall be restored to original condition.

1.07 WARRANTY/GUARANTY

- A. Manufacturer shall warrant materials against defects for a period of one year from date of Substantial Completion. Installer(s) shall guaranty workmanship for similar period.
- B. Settling of backfilled trenches that may occur during guaranty period shall be repaired at no expense to Owner, including complete restoration of damaged property.
- C. Expenses due to vandalism before substantial completion shall be borne by Contractor.
- D. Owner will maintain turf and planting areas during warranty period, so as not to hamper proper operation of irrigation system.

1.08 MAINTENANCE

- A. Furnish the following maintenance items to Owner prior to final Acceptance:
 - 1. Two Sets of special tools required for removing, disassembling, and adjusting each type of sprinkler head and valve supplied on this Project.
 - 2. One eight foot valve key for operation of stop and waste valve.
 - 3. Two six foot valve keys for operation of gate valves.
 - 4. Two keys for each automatic controller.
 - 5. Two quick coupler keys and two matching hose swivels for each type of quick coupling valve installed.
 - 6. Two aluminum drain valve keys of sufficient length for operation of drain valves.
 - 7. Remote
 - 8. Pad lock and keys for each yard hydrant.
- B. Winterization - include cost in bid for winterizing complete system at conclusion of sprinkling season (in which system received final acceptance) within 3 days notification by the Owner. System shall be voided of water using compressed air or similar method reviewed by Consultant. Reopen, operate, and adjust system malfunctions accordingly during April of following season within 3 days of notification by Owner.

1.09 EXTRA STOCK - In addition to installed system furnish the following items to Owner:

- A. 100' roll in-line emitter tubing of each type used.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General Piping:

1. Pressure Supply Line (from point of connection through backflow prevention unit) - Type "K" Hard Copper (3/4" – 2 1/2"), Cross-linked high density polyethylene (PEX), and ductile iron (3" and larger).
 2. Pressure Supply Lines (downstream of backflow prevention units) –Class 200 PVC BE (1" - 2 1/2") and Class 200 PVC RT (3" and larger), as noted on plans and schedule.
 3. Non-pressure Lines - Class 200 PVC BE, as noted on plans.
 4. Sleeving - Class 160 PVC, as noted on plans and schedule.
 5. Drip Tubing - Toro Dura-Pol EHD 1645 3/4" with .050 inch wall thickness.
 6. Emitter Tubing - As recommended by emitter manufacturer.
- B. Copper Pipe and Fittings:
1. Copper Pipe - Type K, hard tempered.
 2. Fittings - Wrought copper, solder joint type.
 3. Joints - Soldered with solder, 45% silver, 15% copper, 16% zinc, and 24% cadmium and solidus at 1125~F and liquids at 1145~F.
- C. Brass Pipe and Fittings:
1. Brass Pipe - 85% red brass, ANSI Schedule 40 screwed pipe.
 2. Fittings - Medium brass, screwed 125-pound class.
- D. Ductile Iron Pipe and Fittings:
1. Ductile Iron Pipe – Centrifugal cast ductile iron in metal molds for water pipe in accordance with ANSI C151 and AWWA A21.51 with asphaltic exterior coating and interior lining and coating in accordance with ANSI C151 and AWWA A21.
 2. Fittings – Mechanical joint as supplied by the pipe manufacturer and rated for working pressures of 350 psi.
 3. Gaskets – Furnish in accordance with ANSI C111 and AWWA A21.11.
- E. Plastic Pipe and Fittings:
1. Identification Markings:
 - a. Identify all pipe with following indelible markings:
 - i. Manufacturer's name.
 - ii. Nominal pipe size.
 - iii. Schedule of class.
 - iv. Pressure rating.
 - v. NSF (National Sanitation Foundation) seal of approval.
 - vi. Date of extrusion.
 2. Solvent Weld Pipe - Manufactured from virgin polyvinyl chloride (PVC) compound in accordance with ASTM D2241 and ASTM D1784; cell classification 12454-B, Type 1, Grade 1.
 - a. Fittings - Standard Weight, Schedule 40, injection molded PVC; complying with ASTM D1784 and D2466, cell classification 12454-B.
 - i. Threads - Injection molded type (where required).
 - ii. Tees and ells - Side gated.
 - b. Threaded Nipples - ASTM D2464, Schedule 80 with molded threads.
 - c. Teflon Tape – All PVC male threaded fittings and nipples, excluding marlex fittings, shall receive wrapping of Teflon tape applied to threaded surfaces per pipe manufacturer's recommendations.
 - d. Joint Cement and Primer - Type as recommended by manufacturer of pipe and fittings.
 3. Gasketed End Pipe - Manufactured from virgin Polyvinyl Chloride compound in accordance with ASTM D2241 and ASTM D1784; cell classification 1254-B, Type 1, Grade 1.
 - a. Fittings and Services Tees (3" and larger) - Ductile iron, grade 70-55-05 in accordance with ASTM A-536. Fittings shall have deep bell push-on joints with gaskets meeting ASTM F-477.
 - b. Gaskets - Factory installed in pipe and fittings, having a metal or plastic support within gasket or a plastic retainer ring for gasket.
 - c. Lubricant - As recommended by manufacturer of pipe fittings.

4. Flexible Plastic Pipe - Manufactured from virgin polyethylene in accordance with ASTM D2239, with a hydrostatic design stress of 630 psi and designated as PE 2306.
 - a. Fittings – Insert type manufactured in accordance with ASTM D2609; PVC Type 1 cell classification 12454-B.
 - b. Clamps - All stainless steel worm gear screw clamps. Use 2 clamps per joint on 1-1/2 inch and 2 inch fittings.
- F. Drip, Sub-Surface Irrigation Systems and Bubblers:
1. Drip Tubing - Manufactured of flexible vinyl chloride compound conforming to ASTM D1248, Type 1, Class C, Category 4, P14 and ASTM D3350 for PE 122111C.
 2. Fittings - Type and diameter recommended by tubing manufacturer.
 3. Drip Valve Assembly - Type and size shown on Drawings.
 - a. Wye Strainer - Plastic construction with 150 mesh nylon screen and 1/2 inch blowout assembly.
 - b. Control Valve - 2 way, solenoid pilot operated type made of synthetic, non-corrosive material; diaphragm activated and slow closing. Include freely pivoted seat seal; retained (mounted) without attachment to diaphragm.
 - c. Pressure Reducing Valve - Plastic construction as detailed.
 4. Emitters - Single port, pressure compensating, press on type.
 5. Sub-Surface tubing - Size and type shown on Drawings; installed as detailed.
 - a. Dripperline Tubing – Nominal sized one-half inch (1/2") low density, ultra-violet-resistant linear polyethylene tubing with internal pressure-compensating, continuous self-cleaning, integral drippers at specified intervals and with specified discharge rates. Emitter spacing and discharge specified on Drawings.
 - b. Headers and footers – polyethylene or PVC pipe as shown on Drawings.
 - c. Fittings - Type and diameter recommended by tubing manufacturer.
 - d. Drip Valve Assembly - Type and size shown on Drawings.
 - i. Wye Strainer - Plastic construction with 150 mesh nylon screen and 1/2 inch blowout assembly.
 - ii. Control Valve - 2 way, solenoid pilot operated type made of synthetic, non-corrosive material; diaphragm activated and slow closing. Include freely pivoted seat seal; retained (mounted) without attachment to diaphragm.
 - iii. Pressure Reducing Valve - Plastic construction as detailed.
 - e. Soil staples – install on all on-surface installations, spaced 3-5" on center.
- G. Gate Valves:
1. Gate Valves for 3/4 inch through 2-1/2 Inch Pipe - Brass construction; solid wedge, IPS threads, and non-rising stem with wheel operating handle.
 2. Gate Valves for 3 Inch and Larger Pipe - Iron body, brass or bronze mounted AWWA gate valves with a clear waterway equal to full nominal diameter of valve; rubber gasket or mechanical joint-type only. Valves shall be able to withstand a continuous working pressure of 200 psi and be equipped with a square operating nut and resilient wedge. Provide pipe restraints on gate valves 3 inches or larger as detailed.
- H. Quick Coupling Valves - Brass two-piece body designed for working pressure of 125 PSI; operable with quick coupler. Equip quick coupler with locking rubber cover.
- I. Valve Boxes:
1. Gate Valves, Quick Coupling Valves, Drain Valves, Drip Line Blow-out Stubs, and Wire Splice or Stub Box - Carson Brooks #910-10, box w/ Bolt Down Cover as detailed.
 2. 1 inch through 2 inch Control Valves, Master Valves, Pressure Regulating Valves and Communication Cable Splice box, Sub-meters - Carson Brooks #1419-12 box, w/ Bolt Down Cover as detailed.
 3. Drip Valve Assemblies and Flow Sensors - Carson Brooks #1220-12 box w/ Bolt Down, Carson Brooks #1730-12 box, as detailed.

- J. Electrical Control Wiring:
 - 1. Low Voltage:
 - a. Electrical Control Wire - AWG UFUL approved No. 14 direct burial copper wire or larger, if required to operate system as designed.
 - b. Electrical Common Wire - AWG UFUL approved No. 14 direct burial copper wire or larger, if required to operate system as designed.
 - c. Wire Colors:
 - i. Control Wires - Red.
 - ii. Common Wires - White.
 - iii. Master Valve Wires - Blue.
 - iv. Drawing Spare Control Wires - Black.
 - v. Drawing Spare Common Wires - Yellow.
 - vi. Maintenance Spare Control Wires - Green.
 - vii. Maintenance Spare Common Wires - Brown.
 - d. If multiple controllers are utilized, and wire paths of different controllers cross each other, both common and control wires from each controller shall be different colors approved by Consultant.
 - e. Control Wire connections and splices shall be made with 3M DBY direct bury splice.
 - 2. High Voltage - Type required by local codes and ordinances, of proper size to accommodate needs of equipment serviced.
- K. Automatic Controller - Size and type shown on Drawings; mounted as detailed.
- L. Electric Control Valves - Size and type shown on Drawings having manual flow adjustment, solenoids, and manual bleed nut.
- M. Backflow Preventer - Size and type indicated on Drawings; Brass or iron construction with 150 psi working pressure.
- N. Yard Hydrant – Frost-free and with padlock. Size and type indicated on Drawings.
- O. Irrigation Sub-meter - Size and type indicated on Drawings.

PART 3 - EXECUTION

3.01 SITE CONDITIONS, LANDSCAPE PLAN REVIEW AND COORDINATION

- A. Contractor will be held responsible for coordination between landscape and irrigation system installation. Landscape material locations shown on the Landscape Plan shall take precedence over the irrigation system equipment locations. If irrigation equipment is installed in conflict with the landscape material locations shown on the Landscape Plan, the Contractor will be required to relocate the irrigation equipment, as necessary, at Contractor's expense.
- B. Contractor is responsible to notify Consultant of any field conditions that vary from the conditions shown on the Irrigation Construction Documents. If Contractor fails to notify Consultant of these conditions, Contractor will be held responsible for all costs associated with system adjustments required due to the change in field conditions.
- C. Comply with the requirements of Section 31 25 00, TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN for preparation and protection of the site.

3.02 STATIC PRESSURE VERIFICATION

- A. Contractor shall field verify the static pressure at the project site, prior to commencing work or ordering irrigation materials, and submit findings, in writing, to Consultant. If Contractor fails to verify static water pressure prior to commencing work or ordering irrigation materials, Contractor shall assume responsibility

for all costs required to make system operational and the costs required to replace any damaged landscape material. Damage shall include all required material costs, design costs and plant replacement costs.

3.03 INSPECTION

- A. Examine areas and conditions under which Work of this Section is to be performed. Do not proceed with Work until unsatisfactory conditions have been corrected.
- B. Grading operations, with the exception of final grading, shall be completed and approved by Owner before staking or installation of any irrigation system begins.
- C. Underground Utilities shall be installed prior to installation of irrigation system. If irrigation installation takes place prior to utility installation, Contractor shall notify Owner of this condition in writing prior to commencement of irrigation installation.

3.04 PREPARATION:

- A. Staking shall Occur as Follows:
 - 1. Mark, with powdered lime, routing of pressure supply line and flag heads for first few zones. Contact Consultant 48 hours in advance and request review of staking. Proposed locations of all trees shall be field staked by Contractor and approved by Owner/Landscape Architect prior to Consultant review of irrigation staking. Consultant will advise installer as to the amount of staking to be prepared. Consultant will review staking and direct changes if required. Review does not relieve installer from coverage problems due to improper placement of heads after staking.
 - 2. Contractor shall contact Consultant if field spacing varies by +/- 10% of the spacing shown on the irrigation plans. If Contractor fails to notify Consultant of variances exceeding 10%, Contractor assumes full responsibility for the costs associated with any required system modifications deemed necessary by the Consultant or Owner.
 - 3. If Project has significant topography, freeform planting beds, or other amenities, which could require alteration of irrigation equipment layout as deemed necessary by Consultant, do not install irrigation equipment in these areas until Consultant has reviewed equipment staking.
- B. Install sleeving under asphalt paving and concrete walks, prior to concreting and paving operations, to accommodate piping and wiring. Compact backfill around sleeves to 95% Modified Proctor Density within 2% of optimum moisture content in accordance with STM D1557.
- C. Trenching - Trench excavation shall follow, as much as possible, layout shown on Drawing. Dig trenches straight and support pipe continuously on bottom of trench. Trench bottom shall be clean and smooth with all rock and organic debris removed.
 - 1. Clearances:
 - a. Piping 3 Inches and Larger - Make trenches of sufficient width (14 inches minimum) to properly assemble and position pipe in trench. Minimum clearance of piping 3 inches or larger shall be 5 inches horizontally on both sides of the trench.
 - b. Piping Smaller than 3 Inches - Trenches shall have a minimum width of 7 inches.
 - c. Line Clearance - Provide not less than 6 inches of clearance between each line and not less than 12 inches of clearance between lines of other trades.
 - 2. Pipe and Wire Depth:
 - a. Pressure Supply Piping – 24 inches from top of pipe minimum or as noted on plans.
 - b. PVC Sleeving – To match depth of sleeved material.
 - c. Non-pressure Piping (rotor) - 18 inches from top of pipe.
 - d. Non-pressure Piping (pop-up) - 14 inches from top of pipe.
 - e. Control Wiring/Communication Cable - Side of pressure main or at 18 inch depth if installed in a separate trench with no mainline piping.
 - f. Drip Tubing - 12 inches from top of pipe.
 - g. Emitter Tubing (Micro-tubing) - 8 inches from top of pipe.
 - h. Subsurface – 4 inches from top of pipe or as noted on plans.

3. Boring will be permitted only where pipe must pass under obstruction(s) which cannot be removed. In backfilling bore, final density of backfill shall match that of surrounding soil. It is acceptable to use sleeves of suitable diameter installed first by jacking or boring, and pipe laid through sleeves. Observe same precautions as though pipe were installed in open trench.
 4. Vibratory Plow - Non-pressure piping may be installed through use of vibratory plow method if consultant determines soil conditions are satisfactory for this method of installation. Vibratory plowing does not relieve installer of minimum pipe depths.
- 3.05 INSTALLATION - Locate other equipment as near as possible to locations designated. Consultant shall review deviations prior to installation.
- A. PVC Piping - Snake pipe in trench as much as possible to allow for expansion and contraction. Do not install pipe when air temperature is below 40 degrees F. Place manual drain valves at low points and dead ends of pressure supply piping to insure complete drainage of system. When pipe installation is not in progress, or at end of each day, close pipe ends with tight plug or cap. Perform Work in accordance with good practices prevailing in piping trades.
 1. Solvent Weld PVC Pipe - Lay pipe and make all plastic to plastic joints in accordance with manufacturer's recommendations.
 2. Flexible Plastic (Polyethylene) Pipe - Lay pipe and assemble fittings following manufacturer's recommendations.
 - B. Drip Tubing:
 1. Make all fitting connections as per manufacturer's recommendations.
 2. Use only manufacturer provided or recommended hole punch when making penetrations in drip tubing for insert fittings. Use of any other hole punch shall be cause for immediate removal and replacement of all installed drip tubing.
 3. Install drip line blow-out stubs at all dead ends of drip tubing.
 - C. Control Wiring:
 1. Low Voltage Wiring:
 - a. Install in conduit, as indicated on plans.
 - b. Bury control wiring between controller and electric valves in pressure supply line trenches, strung as close as possible to main pipe lines with such wires to be consistently located below and to one side of pipe, or in separate trenches.
 - c. Bundle all 24 volt wires at 10 foot intervals and lay with pressure supply line pipe to one side of the trench.
 - d. Provide an expansion loop at every pressure pipe angle fitting, every electric control valve location (in valve box), and every 500 feet. Form expansion loop by wrapping wire at least 8 times around a 3/4 inch pipe and withdrawing pipe.
 - e. Make all splices and E.C.V. connections using 3M DBY connectors or similar dry splice method.
 - f. Install all control wire splices not occurring at control valve in a separate splice valve box.
 - g. Install one control wire for each control valve.
 - h. Maintenance spare wires - In addition to spare wires labeled on drawings, extend two spare #14 AWG UFUL control wires and one spare #14 AWG UFUL common wire from controller pedestal to the end of each and every leg of mainline. Label maintenance spare wires at controller and wire stub box.
 2. High Voltage Wiring for Automatic Controller:
 - a. Provide 120 volt power connection to automatic controller (from Solar Powered Supply System).
 - b. All electric work shall conform to local codes, ordinances, and authorities having jurisdiction. All high voltage electrical work shall be performed by licensed electrician.
 - D. Automatic Controller:
 1. Install controller in accordance with manufacturer's instructions as detailed and where shown on Drawings.

2. Connect remote control valves to controller in numerical sequence as shown on Drawings.
 3. Owner shall approve final location of controller prior to installation.
 4. Connect remote control valves to controller in numerical sequence as shown on Drawings.
 5. All above ground conduit shall be rigid galvanized with appropriate fittings. All below ground conduit shall be schedule 40 PVC.
- E. Electric Control Valves - Install cross-handle four inches below finished grade where shown on Drawings as detailed. When grouped together, allow minimum of 12 inches between valve box sides. Install each remote control valve in a separate valve box. Install valve box flush with grade or when present flush with surfacing material (rock mulch). When parallel to roadway, sidewalk or other permanent element or structure, control valve and box to be installed perpendicular to element or structure, spaced equally.
- F. Quick Coupling Valves - Install quick couplers on swing-joint assemblies as indicated on construction details; plumb and flush to grade. Angled nipple relative to pressure supply line shall be no more than 45 degrees and no less than 10 degrees.
- G. Drip and Sub-Surface Valve Assemblies - Install valve assembly as detailed.
- H. Drip Emitters - Stake all surface emitters as detailed and staked with acceptable tubing stakes.
- I. Drain Valves - Install one manual drain valve on pressure supply line directly downstream of backflow preventer and at all low points in pressure supply line as detailed. Provide a three cubic foot drainage sump for drain valve as detailed.
- J. Valve Boxes:
1. Install one valve box for each type of valve installed as detailed. Valve box extensions are not acceptable except for master valves and flow sensors. Install gravel sump after compaction of all trenches. Place final portion of gravel inside valve box after valve box is backfilled and compacted.
 2. Brand controller letter and station number on lid of each valve box. Letter and number size shall be no smaller than 1 inch and no greater in size than 1 1/2 inches. Depth of branding shall be no more than 1/8 inch into valve box lid.
 3. Concrete polymer boxes shall be labeled with branded inserts per manufacturer's recommendations.
- K. Gate Valves - Install where shown on Drawings as detailed.
- L. Backflow Preventer - Install as detailed at location designated on Drawings.
- M. Backfilling - Do not begin backfilling operations until required system tests have been completed. Backfill shall not be done in freezing weather except with review by Consultant. Leave trenches slightly mounded to allow for settlement after backfilling is completed. Trenches shall be finish graded prior to walk-through of system by Consultant.
1. Materials - Excavated material is generally considered satisfactory for backfill purposes. Backfill material shall be free of rubbish, vegetable matter, frozen materials, and stones larger than 1 inch in maximum dimension. Do not mix subsoil with topsoil. Material not suitable for backfill shall be hauled away. Contractor shall be responsible for providing suitable backfill if excavated material is unacceptable or not sufficient to meet backfill, compaction, and final grade requirements.
 2. Do not leave trenches open for a period of more than 48 hours. Open excavations shall be protected in accordance with OSHA regulations.
 3. Compact backfill to 90% maximum density, determined in accordance with ASTM D155-7 utilizing the following methods:
 - a. Mechanical tamping.
 - b. Puddling or ponding. Puddling or ponding and/or jetting is prohibited within 20'-0" of building or foundation walls.
- N. Piping Under Paving:
1. Provide for a minimum cover of 18 inches between the top of the pipe and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphaltic concrete or concrete paving.

2. Piping located under areas where asphalt or concrete paving will be installed shall be bedded with sand (a layer 6" below pipe and 6" above pipe).
 3. Compact backfill material in 6" lifts at 90% maximum density determined in accordance with ASTM D1557 using manual or mechanical tamping devices.
 4. Set in place, cap, and pressure test all piping under paving, in presence of Owner prior to backfilling and paving operations.
 5. Piping under existing walks or concrete pavement shall be done by jacking, boring, or hydraulic driving, but where cutting or breaking of walks and/or concrete is necessary, it shall be done and replaced at not cost to Owner. Obtain permission to cut or break walks and/or concrete from Owner.
- O. Water Supply and Point of Connection - Water supply shall be extended as shown from water supply lines.
1. Install one sub-meter at the irrigation connection to well water supply line, mounted as detailed.
 2. Install one sub-meter at the location shown on plan prior to valves supplying Orchard, Yard Hydrants and Riparian Areas, mounted as detailed.
- 3.06 FIELD QUALITY CONTROL:
- A. Flushing - After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads, quick coupler assemblies, and hose valves, thoroughly flush piping system under full head of water pressure from dead end fittings. Maintain flushing for 5 minutes through furthestmost valves. Cap risers after flushing.
- B. Pressure Testing - Conduct test in presence of Consultant. Arrange for presence of Consultant 48 hours in advance of testing. Supply force pump and all other test equipment. Compressed air shall not be used for pressure testing system.
1. After backfilling, and installation of all control valves, fill pressure supply line with water, and pressurize to 40 PSI over the designated static pressure or 120 PSI, whichever is greater, for a period of 2 hours.
 2. Leakage, Pressure Loss - Test is acceptable if no loss of pressure is evident during the test period.
 3. Leaks - Detect and repair leaks.
 4. Retest system until test pressure can be maintained for duration of test.
 5. Before final acceptance, pressure supply line shall remain under pressure for a period of 48 hours.
 6. Pressure test shall be scheduled and passed prior to scheduling of Substantial Completion Walk-through.
- C. Walk-Through for Substantial Completion:
1. Arrange for Consultant's presence 48 hours in advance of walk-through.
 2. Entire system shall be completely installed and operational prior to scheduling of walk-through.
 3. Operate each zone in its entirety for Consultant at time of walk-through and additionally, open all valve boxes if directed.
 4. Generate a list of items to be corrected prior to Final Completion.
 5. Furnish all materials and perform all work required to correct all inadequacies of coverage due to deviations from Contract Documents.
 6. During walk-through, expose all drip emitters under operations for observation by Consultant to demonstrate that they are performing and installed as designed, prior to placing of all mulch material. Schedule separate walk-through if necessary.
 7. Supply Consultant with prints of irrigation as-builts prior to scheduling substantial completion walk-through.
- D. Walk-Through for Final Completion:
1. Arrange for Consultant's presence 48 hours in advance of walk-through.
 2. Show evidence to Consultant that Owner has received all accessories, charts, record drawings, and equipment as required before Final Completion walk-through is scheduled.
 3. Operate each zone, in its entirety for Consultant at time of walk-through to insure correction of all incomplete items.

4. Items deemed not acceptable by Consultant shall be reworked to complete satisfaction of Consultant.
 5. If after request to Consultant for walk-through for Final Completion of irrigation system, Consultant finds items during walk-through which have not been properly adjusted, reworked, or replaced as indicated on list of incomplete items from previous walk-through, Contractor shall be charged for all subsequent walk-throughs. Funds will be withheld from final payment and/or retainage to Contractor, in amount equal to additional time and expenses required by Consultant to conduct and document further walk-throughs as deemed necessary to insure compliance with Contract Documents.
- 3.07 ADJUSTING - Upon completion of installation, fine-tune entire system by adjusting patterns and break-up pins, and setting pressure reducing valves at proper and similar pressure to provide optimum and efficient coverage. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible. Heads of same type shall be operating at same pressure +/- 10%.
- A. If it is determined that irrigation adjustments will provide proper coverage, and improved water distribution as determined by Consultant, contractor shall make such adjustments prior to Final Acceptance, as directed, at no additional cost to Owner. Adjustments may also include changes in nozzle sizes, degrees of arc, and control valve throttling.
 - B. All sprinkler heads shall be set perpendicular to finish grade unless otherwise noted on Construction Plans or directed by Consultant.
 - C. Areas which do not conform to designated operation requirements due to unauthorized changes or poor installation practices shall be immediately corrected at no additional cost to the Owner.
- 3.08 CLEANING - Maintain continuous cleaning operation throughout duration of work. Dispose of, off-site at no additional cost to Owner, all trash or debris generated by installation of irrigation system.
- A. Comply with the requirements of DIVISION 1, General Requirements, and Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for recycling and salvage of debris and waste.
 - B. Comply with the requirements of Section 31 25 00, TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN for preparation and protection of the site.

END OF SECTION

PART 1- GENERAL

1.01 DESCRIPTION OF WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.
- B. Related Work Specified Elsewhere:
 - 1. Section 32 91 13 - Soil Preparation
- C. The work of this section includes furnishing all trees, shrubs and other materials necessary to complete the landscape planting in accordance with the specifications and drawings contained in the Contract Documents. This shall include all labor, equipment and performance of operations including planting, mulching, fertilizing, watering, cleanup of planting areas and other related work as specified herein.

1.02 REFERENCE STANDARDS

- A. American Standards for Nursery Stock (ANSI A 300,) American Association of Nurserymen, Washington, D.C.
- B. ANSI A 300, ANSI Z 133.1 and ANSI Z60.1 - 2012
- C. Hortus III, L.H. Bailey Hortorium and Staff, MacMillian Co., New York, 1976.
- D. Manual of Woody Landscape Plants, M.A. Dirr, Stipes Publishing Co., Champaign, Illinois, 1995.
- E. Standardized Plant Names, Second Edition
- F. MSMT603 New Mexico Standard Method of Tests (SHA).

1.03 QUALITY ASSURANCE

- A. Contractor Qualifications: All work specified herein shall be performed by a landscape contractor with a minimum of five (5) years of experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.
- B. Source Quality Control:
 - 1. Compliance with Laws. All plant materials shall comply with State and Federal Laws, including the New Mexico Plant Protection Act, with respect to inspection for disease infestation.
 - 2. Plant Quality Standards: All plant material shall have been grown or dug and burlapped meet to standards set by American Association of Nurserymen and ANSI A 300.
 - 3. Tagging of Trees. The Contractor shall submit to the Owner, at least one week in advance of tagging date, an itemized list of trees along with a notice as to where and when the nursery inspection of trees shall may be made. The accepted trees will be tagged by the Owner for delivery to the site.
 - 4. Plant Inspection: Inspection of all plant materials will be made for size, vigor, representativeness of species and variety, injury, condition of ball and roots, or latent defects. Inspection at delivery does not preclude the possibility of rejection of material after installation.

5. Substitutions. Substitutions of any plant materials requires the written approval of the Owner prior to ordering plants. Requests for substitutions must be submitted with any cost or quantity adjustments for approval.
6. Analysis and Standards: All packaged standard products shall have manufacturer's certified analysis. For other materials, provide analysis if required in these specifications. Analysis is to be by recognized laboratory and made in accordance with methods established by the Association of Official Agricultural Chemists.
7. Tagging or Labeling of Plant Materials. All plant materials shall be true to species, variety and legibly tagged with origin, name and size of material. These tags shall be durable labels marked in weather resistant ink and securely attached to each plant of a single species, variety and size identification. They will remain on plants through final inspection.

1.04 SUBMITTALS

- A. Submittal Procedure: Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures.
- B. Qualifications of Landscape Contractor. Submit Contractor's qualifications showing experience, quality, and capabilities as noted in Quality Assurance.
- C. Plant Sources. Submit for approval by the Owner the nursery or sources for the plant materials to be used in the project.
- D. Plant Photos. Submit photographic samples of representative trees from the plant sources. Photos shall include a scaled ruler or yardstick in the photo. The photos shall demonstrate the quality, size, and health of trees to be used in the project.
- E. Samples. Submit one (1) cubic foot sample of each type of mulch specified on the Drawings to the Owner for approval.
- F. Product Data/Sources: Submit two copies of product names, literature and application rates for fertilizer, antidessicant, and amendments.
- G. Maintenance Materials: Submit two copies of typewritten instructions bound in three-ring binder of recommended landscape maintenance procedures to be followed by the Owner for one full year. Submit prior to expiration of required maintenance periods.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery/ Storage of Materials
 1. Delivery of Shipment to Site. The Contractor shall promptly notify the Owner in advance of the time and manner of delivery of plant materials. The Contractor shall furnish, at the time of notice, an itemized list, in duplicate, of the actual quantities of plant materials in each delivery, in order to expedite the required inspection at the point of delivery. Plants rejected at this inspection any time prior to planting shall be removed immediately from the planting area. When shipment is made, all plant materials shall be packed to provide made in a closed vehicle or plants shall be completely covered to prevent drying or other wind damage. Particular care should be exercised in digging, wrapping and binding of plants to insure safe loading and shipment. Mushroomed or cracked rootballs shall be unacceptable for planting.

2. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.
- B. Handling Materials:
1. Trunks, branches, and root balls shall not be damaged during lifting and planting operations.
 2. Handle container-grown stock only in containers.

1.06 JOB CONDITIONS

- A. Existing Conditions:
1. General: Proceed with and complete landscape work as rapidly as portions of site become available.
 2. Determine the acceptability of each planting site and subgrade prior to the start of planting work.
 3. Utilities: Locate all existing underground utilities in the construction area as accurately as is possible. Perform work in a manner which will avoid damage to underground utilities. Hand excavate as required. Any damage to the utilities shall be repaired by the Contractor at his own expense to the satisfaction of the Owner.
 4. Grade Stakes: Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
 5. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions or obstructions, notify the Owner before planting.
- B. Protection/ Sequencing/ Scheduling:
1. Protect all existing items to remain.
 2. Ensure proper timing of each phase of work in relationship to the normal planting season for each type of planting work.
 3. Coordinate planting with the required maintenance period.
 4. Coordination with seeding and sodding: Plant trees and shrubs after final grades are established and prior to seeding and sodding, unless otherwise accepted by the Owner. If planting of trees and shrubs occurs after seeding and sodding work, protect such areas and promptly repair damage resulting from planting operations.

1.07 GUARANTEE/WARRANTY

- A. Warranty trees, shrubs and ground covers through maintenance period and until final acceptance.
- B. Replace dead or unhealthy trees and shrubs at the end of warranty period.
- C. Only one replacement per plant will be required during the warranty period, except for losses of original or replacement material due to failure to comply with the specification requirements.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS

- A. Plant Materials. All plants shall be as specified on the Planting Plans and shall be healthy, vigorous and representative of the species and variety. They shall have normal, well developed branch and root systems. All plants shall be free of mechanical injury, free of sun or frost damage, free from

insects, insect eggs and without disfiguring knots or other objectionable defects. All plant materials shall be selected for quality of the specimen. Plant material shall be nursery-grown.

- B. Growing Conditions. Plants shall have been grown under climatic conditions similar to project locality for at least two (2) years.
- C. Pruning. Plants shall not be pruned prior to or after delivery unless authorized by the Owner and must be done under the supervision of a qualified arborist or horticulturist.
- D. Size. All plants shall equal or exceed minimum measurements specified on the plans. Grading of plant material shall be in accordance with the codes and standards of AAN. Any undergrade plants shall be removed and replaced prior to provisional acceptance.
- E. Measurement. Caliper measurements shall be taken six (6) inches above natural ground line on the trunk.
- F. Tree Orientation Marking. All trees prior to digging in the field shall be marked to indicate the north side of tree trunk. Mark is to be temporary and done in manner not deleterious to the long term health and growth of the tree.
- G. Nomenclature. Nomenclature shall conform with Standardized Plant Names, Second Edition. Names not present in this listing shall conform to accepted botanical nomenclature in the nursery trade.

2.02 TREES

- A. Deciduous Trees: All deciduous trees, except aspen, and New Mexican privet, shall have been container or nursery grown (not collected or plantation grown) from an approved nursery. Trees noted to be boxed shall be grown in box for a period of one year minimum and two years maximum. Any rootbound material shall not be accepted. Boxed or containerized trees shall be handled by container only. All trees shall be first-class representatives of their species; well-shaped and full. Tree trunks shall be straight and plumb unless otherwise specified. The Owner reserves the right to reject any trees not meeting these criteria. Balled and burlapped material will be rejected if wrapped with plastic burlap or plastic twine. All balled & burlapped material shall have been properly root pruned.
- B. Evergreen Trees. Evergreen trees, except for locally native pines, shall be grade XX or better and nursery grown. Evergreen trees shall be straight, evenly canopied, full and shapely for the species, unless specified as a character tree. Balled and burlapped material shall be tightly and neatly wrapped around the rootball. Field dug material shall have rootballs one size larger than that required for nursery grown stock of the same size. AAN standards shall be used for ball sizes. Nursery grown material shall have been root pruned prior to digging.

2.03 SHRUBS AND GROUND COVERS

- A. Container Stock: Plants designated as "Container" grown in various sizes and type containers in the plant list shall be of a size and stage of development normal in the nursery industry for the size container in which they are specified. They shall have been grown in their containers long enough to have developed good, round root systems capable of holding the soil intact after removal from

the container, but not so long as to have become root bound. Any root-bound material will not be accepted.

- B. Ground Cover: Provide well rooted, established ground cover in removable containers or integral peat pots, with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size specified.

2.04 SOIL AMENDMENTS

- A. Fertilizer. Standard products manufactured and complying with state and U.S. federal fertilizing laws. Exact fertilizer to be used shall be adjusted based upon the soils test analysis on the existing and imported soils, but for bidding purposes Grow Power Plus at manufacturer's recommended rates shall be applied to all plants.
- B. Soil Additives/ Plant Stimulants. Soil additives such as Ironite and Super Phosphate shall be applied if needed as a result of the soils test analysis. The plant stimulant, Superthrive, shall be applied to all plants at five (5) times the rate recommended by the manufacture.
- C. Compost. Compost material shall be as noted in Section 32 91 13 Soil Preparation.

2.05 MISCELLANEOUS MATERIALS

- A. Mulch/Cobble Stones. Install in areas as noted on the plans per detail.
 - 1. Angular Cobble shall be 4" – 8" diameter angular Mountain Air Brown cobble or approved equal to match crusher fines color. Acceptable product for bidding purposes: "Mountainair Brown 4"-8" cobble": JPR Gravel, 204 Industrial Park Loop, Rio Rancho, NM 87124, (505) 892-8869; or approved equal.
 - 2. Round Cobble shall be 2" – 4" diameter Grey Round cobble or approved equal. Acceptable product for bidding purposes: "Grey Round 2"-4" cobble": Buildology, 3601 Pan American NE, Albuquerque, NM 87107, (505) 344-6626; or approved equal.
- B. Boulders: Install as noted on the plans. See plan for quantity.
 - 1. 24"-30" tall x 18"-24" wide x various length (between 3'-7') monolithic sandstone boulders. Color: beige / oakwood. Finish: rough hewn. Acceptable sources for bidding purposes: Los Pinas Landscape, Judy Beck and Daniel Pina, 1724 Camino de la Vuelta, Santa Fe, NM 87501, (505) 577-0087 / (505) 577-0550; New Mexico Travertine, Danny Olsen, 3700 Camino del Llano, Belen, NM 87002, (505) 864-6300; or approved equal.
- C. Anti-Desiccant: Emulsion-type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's containers and mix in accordance with manufacturer's instructions. Acceptable Product: "Wilt-Pruf."
- D. Staking Materials: Required only when indicated on the Drawings. Staking material shall be as specified on the Drawings.
- E. Wood Stump / Log: Required only when indicated on the Drawings. Stump and logs shall be as specified on the Drawings.

2.06 WATER

- A. Water for maintaining plants shall be clean and free from pollutants that would be harmful to plant growth or contaminate the environment.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Plant Material Locations: Tree and shrub locations as shown on the planting plan are approximate only. Contractor is to place all plant material locations as shown on the planting plan, and under the direction of the Owner adjust the position and orientation of trees and shrubs as required. Final positions of all plant material are subject to the approval of the Owner.
- B. Preparation Ground Surface: Areas to be planted or mulched are to be free of rock/stones greater than one inch across, trash and other debris prior to beginning planting or mulching. Subgrades for planted and mulched areas are to be approved by the Owner prior to beginning planting or mulching.

3.02 INSTALLATION

- A. Planting General.
 - 1. Soil amendments shall be as noted in Section 32 91 13 Soil Preparation.
 - 2. Plants shall not be planted deeper than the original ground line.
- B. Trees/ Individual Locations: Excavate tree pits so that top of rootball will be above adjacent soil grade.
 - 1. Tree pit excavations shall be three times as wide as the rootball in diameter and shall be no deeper than the maximum depth of the rootball.
 - 2. Prior to setting the tree flood the tree pit and allow all water to percolate in to soil.
 - 3. Set rootball plumb in center of pit and orient tree north marking to face site north.
 - 4. Remove burlap and wire from top half of root ball.
 - 5. Unless otherwise directed on the Drawings, backfill with excavated soil in 6" tamped layers. Do not add compost to tree backfill.
 - 6. Apply fertilizer tablets and other soil additives evenly around the perimeter of each tree rootball at a depth half way between the top and middle of the rootball.
 - 7. Flood with water after two-thirds backfilled. After water is absorbed, continue backfilling and tamping to grade, leaving no voids or air pockets. Water again after placing final layer of backfill.
 - 8. Form a water well around each tree if noted on the Drawings as specified at each type of tree. Fill the watering well with mulch as specified.
- C. Shrub planting/ Individual Locations:
 - 1. Shrub pit excavation shall be three times larger than width of rootball and shall only be as deep as the maximum depth of the rootball.
 - 2. Prior to setting the plant, flood the pit and allow all water to percolate in to soil.
 - 3. Set shrub rootball plumb in center of pit.
 - 4. Backfill with two parts native soil and one part compost, unless other wise noted in Section 32 91 13 Soil Preparation.
 - 5. Apply fertilizer tablets and other soil additives when shrub pit is two-thirds backfilled.

6. Continue backfilling to finish grade, create watering well, and thoroughly water.
- D. Planting Beds/ Mass Planting Areas:
1. Grade existing soil to proper depth to meet finish grades for area. Grading shall allow for compost, soil additives, and mulch depths.
 2. Spread compost at rates noted Section 32 91 13 Soil Preparation.
 3. Till compost to a minimum depth of twelve inches (12) throughout the planting bed. Till in two directions each at right angles to each other.
 4. Spread soil additives and fertilizer as noted on the plans, and till 6" into compost amended soils. Till in two directions each at right angles to each other.
 5. Rake and remove all rocks over 1 inch size, trash, debris or other deleterious material from the top three inches of the prepared bed.
 6. Soak the amended area with water. Let the area dry. Fill any large depressions or settlement.
 7. Set out plant materials designated for the planting area. If a formal arrangement is shown on the plan, align and measure plants in a uniform triangular pattern; or as shown on the Drawings; or as directed by the Owner.
 8. Excavate pits large enough to set each plant. Backfill with excavated planter soil.
 9. Water area thoroughly after planting. Fill depressions and level high spots. Fine rake bed.
- E. Apply anti-desiccant to leafed out deciduous trees and shrubs, and broadleaf evergreens.
- F. Mulch: Spread a uniform layer of specified mulch as noted on the Drawings. If not indicated on drawings, for bid purposes, assume four (4) inch layer of tan gravel. Any watering wells and planting areas to receive mulch shall be raked smooth, firm, and graded as required. Planted areas shall be approved by the Owner prior to mulch installation.
- G. Staking and Guying: If required on the Drawing, plants shall be guyed and staked as shown on the Drawings. If a manufactured tree staking system is shown in the drawings, install the system as per the manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

- A. Pruning: Pruning shall only be done under direct supervision of the Owner and in accordance with ANSI Z 133.1 and ANSI Z60.1 - 2004. Remove dead and broken branches. Prune deciduous trees and shrubs as approved by the Owner Retain typical growth habit of individual plants. Make cuts with sharp instruments to branch collar. Do not pole or remove the leader from the trees. Remove trimmings from site.

3.04 PROTECTION AND CLEANING

- A. During the installation and maintenance periods, protect planted areas against erosion and trespass. Any damaged planting shall be replaced by the Contractor at no cost to the Owner.
- B. All walks and pavements shall be swept or washed clean upon completion of work in each section. Upon completion of all planting work, clean the portion of the project site used for storing planting materials and equipment of all debris, extra materials and equipment. All such materials and equipment shall be entirely removed from the project site.

3.05 MAINTENANCE PERIOD

- A. Begin maintenance of all plants immediately after planting.

- B. Maintain trees, shrubs and other plants until final acceptance of all contract work.
- C. Maintenance Activities: Maintenance shall include measures necessary to establish and maintain plants in vigorous and healthy growing condition:
 - 1. Plants shall be watered, fertilized, and maintained by the Contractor until physical completion of all the contract work.
 - 2. Water shall be applied to all plants by hand until the underground irrigation system is in place and operational.
 - 3. Cultivate and weed beds every week during maintenance period. If herbicides are used for weed control, apply in accordance with the manufacturer's instructions. Remedy any damage resulting from use of herbicides.
 - 4. Pruning including removal of dead or broken branches and treatment of prune wounds.
 - 5. Maintain all trees in vertically plumb position
 - 6. Disease and insect control.
 - 7. Maintenance of turn buckles and stakes.
 - 8. Maintain watering wells.
 - 9. Replace dead or dying plant material with plants of the same kind and size as specified in the plant list.

The Owner shall inspect maintenance work to verify that maintenance work has been satisfactorily undertaken and continued. The Contractor shall make all corrective measures, as directed by the Owner, prior to release of maintenance responsibilities. All maintenance work as outlined herein is incidental to each planting item, and no additional payment will be made for maintenance operations.

Final inspection and acceptance of landscape work will be made by the Owner upon notice by the Contractor of physical completion of all the contract work.

NOTE:

Maintenance Manual Submittal: Prior to Final Inspection, the Contractor shall submit a plant maintenance manual which is acceptable to the Owner.

END OF SECTION

PART 1- GENERAL

1.01 SUMMARY

Work to be done includes all labor, materials, transportation, equipment and services required to complete the soil preparation. Execute labor to achieve soil preparation, complete, as shown and as specified planting as indicated on the Construction Drawings, and as specified herein. Work includes, but is not necessarily limited to the following items: soil amendments, and mulches.

1.02 RELATED WORK

The following items of related work are specified and included in other sections of the specifications:

A. Section 32 90 00 - Planting

1.03 REFERENCES

The following standards will apply to the work of this Section:

A. MSA: Methods of Soil Analysis

B. ASTM: American Society for Testing and Materials

1.04 SUBMITTALS

A. Submit samples and detailed technical data of products proposed for use for Owner's approval according to Section 01 33 00 Submittal Procedures

B. Product data: Manufacturers' catalog cuts and current printed specifications of the following:

1. Back-to-Earth
Composted cotton burr
Back to Earth Resources
3071 Hwy 86
Tulia TX 79088
800/441-2498
Fax: 806/627-4277

C. Samples:

1. Compost, one (1) cubic foot
2. Mulches, one (1) cubic foot each
3. Imported soil, one (1) cubic foot

D. Testing Results:

1. Existing native soils: samples to be taken in two locations approved by Landscape Architect.
2. Imported Soils

E. Soil Amendments:

1. Proposed soil amendments, for each type of plant material within each type of soil, adjusted to the results of the soils tests.

F. Certifications:

1. Certify strict compliance with accepted soil mixes and amendments, including rate of application

1.05 QUALITY ASSURANCE

- A. Testing Agency: Approved by the Owner and paid for by the Contractor.
- B. General: Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in air or that clods will not break readily. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and planting.
- C. The work of this Section shall be performed by a Contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five (5) years experience.
- D. The Contractor shall examine all areas of work and surfaces before proceeding with any work of this section. Any defects such as incorrect grading and inadequate drainage shall be reported to the Owner prior to beginning work.
- E. The Contractor shall secure Blue Stakes permit number for the project to certify notification of all utilities. The Contractor shall not commence work until Blue Stakes has responded.
- F. It is the intent of this specification that all material herein specified and shown on the construction documents shall be of the highest quality available and meeting the requirements specified.
- G. All work shall be performed in accordance with the best standards of practice relating to the trade.
- H. The Contractor shall comply with all rules, licensing, regulations, laws and ordinance of the City, County and State, and other authorities having jurisdiction over this project site.

1.06 DEFINITIONS

- A. Existing soil: Area of undisturbed native soil where no rough grading is to be done. No soil is to be placed. Only surface cultivation and soil amending are included in this Section.
- B. Subgrade: Soil level resulting from the rough grading work under another Section. Cultivation of subgrade areas prior to amending is included in this section.
- C. Imported Soil: Imported soil stockpiled for spreading over prepared subgrade. Soil imported and stockpiled under this Section, shall be spread and amended as work under this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Imported Soil:
 1. Quantity: The approximate quantity of imported soil will not be known until demolition and rough grading have been completed under earthwork. It is assumed no imported soil will be needed.

2. Composition: Fertile, friable, well-drained soil, of uniform quality, free of stones over 1 in. diameter, sticks, oils, chemicals, plaster, concrete and any other materials deleterious to healthy plant growth.
3. Analysis: Obtain an agricultural suitability analysis of the proposed soil from an accepted, accredited Testing Agency at Contractor's cost.
4. Test Results: Request Testing Agency to send one (1) copy of test results direct to the Owner and one (1) copy to the Owner. Imported soil shall be amended per soils analysis report.

2.02 SOIL MIXES

- A. Plant backfill mix: Shall consist of four (4) inch depth of compost tilled in twelve (12) inches into the soil.

2.03 ACCESSORIES

- A. Water: Contractor to supply as available until turn over of project to Owner. Transport may be required.

PART 3 – EXECUTION

3.01 SOIL MOISTURE CONTENT

- A. General: Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in air or clods will not break readily. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and planting.
- B. Range: Maintain within 2 percent above or below optimum moisture content during the work.

3.02 CLEARING AND CULTIVATION

- A. Clearing: Clear planting areas of stones 2 in. diameter and larger, weeds, debris and other extraneous materials prior to soil preparation work.
- B. Cultivation of Imported Soil:
 1. Cultivation: Till or loosen soil to receive planting to a depth of twelve (12) inches immediately prior to applying soil amendments.
- C. Cultivation of Subgrade:
 1. Verification:
 - a. Verify that subgrades for installation of soil have been established under rough grading. Do not spread soil prior to acceptance of subgrade work.
 - b. Depth: Verify that subgrades are within required subgrade tolerances.
 2. Cultivation: Rip or cultivate subgrade in planting areas to a depth of twelve (12) inches immediately prior to spreading imported amended soils.

3.03 SPREADING OF AMENDED IMPORTED SOIL

- A. General: Spread amended imported soil over accepted subgrade prior to incorporating amendments.
- B. Restrictions: Do not commence spreading of amended imported soil prior to acceptance of subsoil cultivation above. Do not place soil under muddy or frozen conditions.
- C. Soil Depth: Refer to finish grade and planting details per the Drawings.

3.04 SOIL AMENDMENT

- A. Amending of Soil: Follow recommendations of soil tests
 - 1. Preparation: Do not commence amending of imported soil prior to acceptance of final subgrades. Do not work soils under muddy or frozen conditions.
 - 2. Soil Amendments: Incorporate by tilling amendment into the top (12) inches of imported soil in all planting areas.

3.05 FIELD QUALITY CONTROL

- A. Tests: Right is reserved to take samples of soil mixes prepared soil for testing for conformity to Specifications.
- B. Rejected Materials: Remove off site at Contractor's cost. Pay cost of testing of materials, not meeting Specifications.

3.06 CLEAN-UP

- A. After completion of all soil preparation operations and before acceptance of the work, the Contractor shall remove all debris, rubbish, etc. from the site in a legal manner. The premises shall be left clean, presentable, and satisfactory.

END OF SECTION

1.01 SUMMARY

Work to be done includes all labor, materials, transportation, equipment and services required to complete the soil preparation. Execute labor to achieve soil preparation, complete, as shown and as specified planting as indicated

PART 1 - GENERAL**1.01 DESCRIPTION**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Related Work Specified Elsewhere:
 - 1. Section 32 90 00 Planting
 - 2. Scope: Prepare all areas indicated on the Drawings for grass seeding according to the specifications and drawings contained in the Contract Documents, including: furnishing and installing all seed, fertilizer, organic soil amendments and related maintenance.

1.02 QUALITY ASSURANCE

- A. Contractor Qualifications: All work specified herein shall be performed by a licensed landscape contractor experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.

1.03 APPLICABLE STANDARDS

- A. All grass seed shall be certified by state of origin. The certification authority for the state of New Mexico is the New Mexico Crop Improvement Association.

1.04 SUBMITTALS

- A. Product Data:
 - 1. Proposed source of all native grass seed which shall indicate the location from which the seed was harvested, prior to ordering seed.
 - 2. Submit type and source of soil amendment and fertilizer for approval prior to ordering soil amendment.
- B. Seed Tags: Seed bag tags and weights per bag and copies of invoices identified by project name.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Keep fertilizer and seeds in dry storage away from contaminants.

1.06 JOB CONDITIONS

- A. Sequencing, Scheduling: Schedule to seed after installation and approval of the complete irrigation system in the area.

1.07 WARRANTY

- A. Warranty seeded areas through specified maintenance period, as outlined in Paragraph 3.04, Maintenance.
B. Where native grass is installed in areas without an irrigation system, no warranty shall be required after the date of final acceptance of all the contract work.

PART 2 - MATERIALS

2.00 SEED MIX

- A. All native grass seed shall be obtained from sources in New Mexico unless proof is provided that a particular seed is unavailable within the state. Fescue seed shall be obtained from approved producers.
B. Contractor shall furnish certification showing origin of all seed and pure live seed (P.L.S.) content as determined by a certified authority. Pure live seed shall be the product of percent purity time's percent germination. Each bag of seed shall be tagged and sealed by the seed dealer in accordance with the State Department of Agriculture or other local certification authority within the state of origin. The tag or label shall indicate analysis of seed and date of analysis, which shall not be more than 9 months prior to delivery date. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety.
C. Native Grass Reseeding: The seed mixes shall be as follows:

a. Seed Mix (Irrigated / Non-Irrigated):

Seed available at Curtis and Curtis Seed and Supply, 4500 N. Prince St, Clovis, NM 88101. Phone: (575) 762-4759 and Granite Seed Company, 490 E. 76th Ave., Unit A, Denver, CO 80229. Phone: (888) 577-5650; or approved equal.

Table with 3 columns: Common Name, Botanical Name, Mix. Rows include Alkali Muhly, Scratchgrass; Alkali Sacaton; Inland Saltgrass; Switchgrass, Blackwell.

Quantity: 12,200 SF (approx.)

Add wildflower seeds to seed mix and distribute in irrigated locations

at the specified rates:

Common Yarrow	<i>Achillea millefolium</i>	2 oz / 5000 sf
Golden Rod	<i>Solidago virgaurea</i>	3 oz / 5000 sf
Prairie Sage	<i>Salvia azurea</i>	25 oz / 5000 sf
Showy Milkweed	<i>Asclepias speciosa</i>	15 oz / 5000 sf
Silky Phacelia	<i>Phacelia sericea</i>	5 oz / 5000 sf
Upright Beardtongue	<i>Penstemon virgatus</i>	32 oz / 5000 sf
Whipple's Penstemon	<i>Penstemon whippleanus</i>	32 oz / 5000 sf

Quantity: 3,100 SF (approx.)

D. Orchard Seed Mix: The seed mix shall be as follows:

b. Orchard Seed Mix:

Seed available at Plants of the Southwest, 3095 Agua Fria St., Santa Fe, NM 87507
Phone: (505) 438-8888: or approved equal. Seed mix rate: 1.0 lbs/1000 SF

Common Name	Botanical Name	Mix
<i>Sainfoin</i>	<i>Onobrychis viciifolia</i>	15%
<i>Hairy Vetch</i>	<i>Vicia villosa</i>	15%
<i>Buckwheat</i>	<i>Fagopyrum esculentum</i>	15%
<i>Daikon Radish</i>	<i>Raphanus sativus</i>	15%
<i>Red Medium Clover</i>	<i>Trillium pretense</i>	7.5%
<i>Field Peas</i>	<i>Pisum sativum</i>	15%
<i>Oats</i>	<i>Avena sativa</i>	15%
<i>Wild Flowers</i>	<i>varies</i>	2.5%

Seed to be added to Orchard Seed mix at the following rate:

Common Name	Botanical Name	Mix
<i>Arugula</i>	<i>Eruca sativa</i>	1.00 lbs/ac

Quantity: 12,800 SF (approx.)

2.01 COMPOST

A. Compost material shall be manufactured from quality materials, be free from impurities, uniform in composition, meet recognized standards for effectiveness and be suitable for application with approved equipment.

B. The compost for seeding shall be as follows:

a. Sustane Concentrated Compost 2-6-3

Compost by Sustane; 310 Holiday Avenue, Cannon Falls, MN 55009

Phone: (800) -352-9245, or approved equal. Compost application rate: 4000 lbs/AC

2.02 FERTILIZER

- A. Fertilizer shall be manufactured from quality materials, be free from impurities, uniform in composition, meet recognized standards for effectiveness and be free flowing and suitable for application with approved equipment.
- B. Fertilizer shall be delivered to the site in bags or other containers, each clearly labeled, conforming to applicable state laws, bearing the grade and trade name of the producer.
- C. Application: Care shall be taken when spreading fertilizer that there are no gaps during application. The fertilizer shall be applied under favorable conditions and by such approved methods as will ensure maximum uniformity of distribution.
- D. Fertilizer: Exact fertilizer mix may be altered to reflect results of soil analysis, but for purposes of bidding the following fertilizer shall be used in the following applications at time of grassing:
 - a. Lawn and Garden All-In-One Fertilizer
Fertilizer by Helena Chemical Company; PO Box 629 Mesquite, NM
Phone: (505) 233-3171, or approved equal. Fertilizer application rate: per soils test.

2.03 MULCH AND TACKIFIER

- E. The tackifier shall be a colloidal polysaccharide or wood fiber tackifier. The tackifier shall be homogeneous within the unit package. It shall have no growth or germination inhibiting factors and be nontoxic. It shall be dry mixed with the fertilizer and soil conditioner at a rate of 1 bale per 1,000 sf.

PART 3 - EXECUTION

3.00 PREPARATION

- A. Preparation of Subgrade: Clear existing soil free of roots, plants, sod, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.
- B. Preparation for Seeding:
 1. The extent of seed bed preparation shall not exceed the area on which the entire seeding operation can be accomplished to such prepared seed bed within a 24 hour period, unless otherwise directed by the Landscape Architect.
 2. All areas to be seeded shall be brought to an even grade and shaped to drain. Areas to be seeded shall be graded to meet finished grades, and be uniformly compacted to prevent uneven settlement after seed installation and watering.
 3. Spread fertilizer at rate specified and rake into top two inches of soil.
 4. Fine rake and remove stones over 1/2" in any dimension, sticks, roots, rubbish and any other extraneous matter brought to surface by the rotilling process. Drag to even grade, and compact to ninety (90) percent modified proctor.

5. Water area to be seeded thoroughly. Apply a minimum of two inches of water throughout area. Allow area to dry.
 6. Regrade as necessary to insure drainage and to meet proposed grades. Correct any differential settlement.
- C. Harvested Topsoil Reapplication:
1. Before spreading topsoil ensure that all necessary erosion and sediment control practices are in place and functioning properly. These practices must be maintained until the site is permanently stabilized.
 2. Maintain grades on the areas to receive topsoil according to the approved plan and do not alter them by adding topsoil.
 3. Immediately prior to spreading the topsoil, loosen the subgrade by disking or scarifying to a depth of at least 4 inches to ensure bonding of the topsoil and the subsoil. If no amendments have been incorporated, loosen the soil to a depth of at least 6 inches before spreading the topsoil.
 4. Uniformly distribute topsoil to a minimum compacted depth of 2 inches on 3:1 slopes and 4 inches on flatter slopes. Topsoil shall not be spread while it is frozen or muddy or when the subsoil is frozen or muddy. Do not apply topsoil to slopes greater than 2:1 to prevent slippage.
 5. If topsoil is stockpiled prior to final placement, the top 1 foot of the stockpile material should be mixed with the remainder of the stockpile to ensure that living organisms are distributed throughout the topsoil material at the time of final placement.
- D. Moisten prepared areas before seeding if soil is dry. Do not create muddy soil conditions.
- E. Approval of Seed Bed Preparation: Seed bed preparation is to be approved by the Landscape Architect immediately prior to the seeding operations, and after all seed bed preparation is complete.

3.01 SEEDING

- A. General:
1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
 2. Sow not less than the quantity of seed specified or scheduled.
- B. Seeding Dates: Shall be accomplished between June 15th and September 1st unless specific permission in writing is issued by the Landscape Architect to allow seeding before or after these dates.
- C. Seeding Rate and Mix: As per Paragraph 2.00.C.
- D. Compost Application Rate: As per Paragraph 2.01.B.

E. Broadcast Seeding:

1. Where indicated on the plans, the seed and compost shall be blended and mechanically broadcast by use of hydraulic equipment, or by hydroseeder. When seeding is done with a slurry blower, the highest pressure and smallest nozzle opening, which will accommodate the seed, shall be used.
2. Immediately following the seeding operation, the seed bed shall be lightly raked or loosened with a chain harrow to provide approximately 1/2" cover or soil over most of the seed.
3. Contractor's vehicles and other equipment are prohibited from traveling over the seeded areas.

3.02 MULCH / TACKIFER

- A. Immediately following the hydroseeding operation, seeded areas on slopes less than 2:1 shall receive mulch/tackifier at the even rate of 1/2" depth throughout the seeded area.
- B. Spread mulch to achieve an even coverage.
- C. All areas receiving insufficient coverage in the opinion of the Architect shall receive additional mulch/tackifer.

3.03 RESEEDING

- A. Void areas greater than one square foot, or repetitive voids smaller than one square foot which amount to more than 10% of any area that occur within 60 days after installation shall be reseeded.

3.04 MAINTENANCE

- A. Begin maintenance immediately after planting.
- B. Maintain seeded grass for not less than the period stated below, and longer as required to establish an acceptable grass stand.
 1. Maintenance shall continue through the first mowing, or until the entire landscape project is accepted, and until the end of the maintenance period. Maintenance period shall be not less than sixty (60) days after substantial completion, unless otherwise approved by the Landscape Architect.
 2. Maintain seeded areas by watering fertilizing, weeding, mowing, trimming and other operations such as rolling, regrading and replanting as required to establish an acceptable grass stands, free of weeds and eroded or bare areas. Irrigate by means of the underground automatic irrigation system where irrigation is available, as often as necessary to promote healthy grass growth, and until a thick, even stand of grass has been obtained.

3.05 CLEANUP AND PROTECTION

- A. During the work, keep all pavements clean and work area in an orderly condition.
- B. Protect existing elements from damage due to seeding operations, operations by other contractors, other trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged work to the satisfaction of the Owner at no cost to the Owner.
- C. Preservation of Existing Vegetation: The Contractor shall preserve and protect all existing vegetation adjacent to areas being seeded and which do not unreasonably interfere with construction procedures. The contractor shall replace or restore, at his own expense, all vegetation that may be destroyed or damaged which has not been protected or preserved as specified herein.

3.06 OBSERVATION AND ACCEPTANCE

- A. When work is completed, including maintenance, the Landscape Architect will, upon request, make an observation to determine acceptability.
- B. All seed must be well-rooted into sub grade and any bare spots, low areas or dead native grass must be repaired or reseeded to the satisfaction of the Owner prior to acceptance. Final acceptance of all grass areas shall be when a minimum of 80% germination is evidenced and approved by the Landscape Architect and all areas have been seeded for a minimum of twenty eight (28) days.
- C. When observed work does not comply with requirements, reseed rejected work and continue specified maintenance until re-observed by Landscape Architect and found to be acceptable.
- D. The owner shall begin grass establishment operations upon acceptance of grassing operations by the Landscape Architect.

END OF SECTION