SECTION 014500
QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures to measure and report the quality and performance of construction.

B. Related Sections:
   1. Refer to the General Conditions for general requirements, and technical specifications for specific testing requirements and methods.
   2. Section 013300 - Submittal Procedures.

1.2 REFERENCES

A. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ASTM E329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.3 QUALIFICATIONS OF TESTING AGENCY

A. "Approved independent testing laboratory" shall mean an independent testing agency acceptable to the Owner and the Architect and possessing the professional qualifications and equipment to perform the specified tests and to evaluate and report the results.

1.4 QUALITY ASSURANCE

A. Comply with requirements of ASTM E329 and ASTM D3740.

B. Laboratory shall maintain a full-time registered Engineer on staff to review services.

C. Laboratory authorized to operate in State in which Project is located.

D. Testing equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 TESTING AND SPECIAL TESTING

A. Unless otherwise provided in the specifications, provide all materials, samples, mock-ups or assemblies for all tests specified in various sections of specifications, or as directed by the Architect, and pay shipping costs of such samples to laboratory or other testing location and facility.
   1. Unless specified otherwise, all tests shall be made by an approved independent testing laboratory and reports provided to Architect.

B. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criteria are specified.

C. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods, current at the date of the Contract Documents.

3.2 PAYMENT FOR TESTS

A. Except for the types of tests specified as being paid for by the Owner, the cost of other tests shall be paid by the Contractor. Tests to be paid for by the Owner will be paid directly to the testing laboratory by the Owner.

B. The Owner will not pay for tests to determine if a proposed material will initially meet the specified requirements, which will include but not be limited to, analysis of paving aggregate, paving mix designs, and similar tests.

C. In general, it is intended the Owner will pay for those field tests to determine the quality of materials and quality of installation at site. The following is the list of the type of tests the Owner will pay for, where tests are specified or later determined as necessary:

- concrete compressive strength
- concrete air entrainment
- soil compaction
- paving samples

3.3 TESTS TO DEMONSTRATE QUALIFICATION

A. In addition to tests specified, should the Contractor propose a product, material, method or assembly that is of unknown or questionable quality to the Architect, the Architect may require and order suitable tests to establish a basis for acceptance or rejection.

1. Such tests will be paid for by the Contractor, or by the Subcontractor requesting approval. "Standard" test reports on "similar" material will not be acceptable.

B. The Owner and Architect reserve the right to require certification or other proof that the material, assembly, equipment, system or other product furnished or proposed to be furnished, for this Project is in compliance with any test or standard called for.

1. The certificate shall be signed by a representative of the independent testing laboratory.

C. Any tests required to qualify the Contractor or any workmen for any phase of the work, and any test of a method, system or equipment that may be required by specification or law to qualify the item for use, shall be made or taken without additional reimbursement.

D. If exploratory work is required to determine the cause of defects, the cost of such work shall be borne by the Contractor responsible for such work if the work is found, in the judgement of the Architect to be defective.

1. If the Contractor responsible for the work is adjudged by the Architect to be not at fault, exploratory testing will be paid by the Owner.

3.4 INSPECTIONS

A. Should the specifications, Architect's instruction, laws, ordinances or any public authority require any work to be inspected or approved, give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency, it must be uncovered for examination at Contractor's expense.

3.5 CERTIFICATES

A. Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the specification shall be signed by an authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the Architect.

3.6 RETEST RESPONSIBILITY

A. Where results of required inspections, tests or similar prove unsatisfactory and do not indicate compliance of related work with requirements of the contract documents, then retests are responsibility of Contractor, regardless of whether original test was Contractor's responsibility.

B. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work.

END OF SECTION

SECTION 015100
TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements for temporary utilities used on the site during construction, including the following:
      a. Water service and distribution.
      b. Temporary electric power and light.
      c. Temporary heat.
      d. Ventilation
      e. Telephone service.

B. Related Sections:
   1. Section 015200 - Construction Facilities.

1.2 SUBMITTALS

A. Temporary Utilities: Submit reports to Architect of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Schedules: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit schedule indicating planned implementation and termination of each temporary utility.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
   1. Building code requirements.
   2. Health and safety regulations.
   3. Utility company regulations.
   4. Police, fire department and rescue squad rules
   5. Environmental protection regulations.

B. 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 Temporary Electrical Facilities.
   1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with normal application of trade regulations and union jurisdictions.
   2. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At earliest possible time when acceptable to Owner, change over from use of temporary service to use of permanent service.
   1. Temporary Use of Permanent Facilities: Assume responsibility for operation, maintenance, and protection of permanent facility during use as a construction facility prior to Owner's acceptance, regardless of previously assigned responsibilities.

B. Condition of Use: Keep temporary services clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services as the Work progresses. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on site.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. General: Provide new equipment. Undamaged, previously used equipment in serviceable condition may be used.

B. Water-Hoses: Provide 3/4 inch heavy-duty abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Water Backflow Prevention: Provide approved backflow prevention equipment for all site water connections.

D. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110-to 120-V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

E. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

F. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

G. Heating Units and Ventilation: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

PART 3 EXECUTION

3.1 WATER SERVICE

A. Install water service and distribution piping of sizes and pressure adequate for construction until permanent water service is in use.
   1. Sterilization: Sterilize temporary water piping prior to use.
   2. Install backflow prevention equipment at site water connections.
   3. Protect temporary water connections from freezing. Construct temporary enclosure for this purpose.

B. Permanent Service: Mechanical subcontractor shall run water service to building area, including adequate insulation or buried service and provide meter.
   1. Pay for water for construction at Project until building is accepted or occupied by Owner. Upon occupancy Owner will assume payment of water costs and provide free of charge to Contractor, providing privilege is not abused.

3.2 ELECTRIC POWER SERVICE

A. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.

1. Contractor, and each subcontractor, will provide their own temporary wiring, cords, outlets, lamps, and connections. Installation, service, wiring and devices shall be safe, substantially supported and adequately connected.
2. Demand shall not exceed service and damage resulting from misuse, faulty equipment or overloading shall be paid for by persons responsible.
3. Wiring to job offices shall be responsibility of Contractor and each subcontractor, including for fixtures and bulbs.

B. Energy costs and services for testing of equipment as well as for welders, grinders, pipe threaders and similar heavy loads requiring power greater than services specified shall be provided and paid for by Contractor or subcontractors requiring such service; they shall arrange their own service and meters.
   1. Subcontractor performing work at other than normal working hours shall reimburse Contractor for the light and power used.

C. Non-Building Service: Provide service from utility's transformer, including poles, wiring, disconnect switches and outlets at each subservice location and other work or items to these sub-service locations, except meter.
   1. Pay meter charge and cost of energy. Allocate use of service, except service to offices shall not be limited.
   2. Contractor and each subcontractor must provide their own portable cords for hand tools and lighting from sub-service locations.

D. Building Service: Electrical subcontractor installs permanent primary and secondary systems after various units or parts are enclosed to use light and power through permanent service.
   1. Pay meter charge and for energy used.

E. Service after Occupancy: Contractor will have meter read in presence of Owner and arrange with Owner to assume billing from utility. Owner will pay for energy costs and assume responsibility for bulbs upon occupancy.

3.3 TELEPHONE

A. Provide and pay for telephone and fax in job office. Provide and pay for separate phone in Architect's office, except Architect's long distance calls will be paid for by Architect. Cost of other than local calls shall be paid for by persons incurring such expense.
   1. Should subcontractors require separate phones, they shall pay for their own.

END OF SECTION

SECTION 015200
CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements for facilities used on site during construction.

B. Related Sections:
   1. Section 015100 - Temporary Utilities.

1.2 SUBMITTALS

A. Schedules and Layouts: Submit schedule of construction facilities required and layout of site offices and storage enclosures.

1.3 QUALITY ASSURANCE

A. Standards:
   1. NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations,"
   2. ANSI A10 Series standards for "Safety Requirements for Construction and Demolition,"
   3. NECA Electrical Design Library "Temporary Electrical Facilities."

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used.

B. Lumber and Plywood: Comply with Section 061000 - Rough Carpentry, for requirements.
   1. UL labeled, lumber and plywood for framing, sheathing and siding.
   2. Exterior type, Grade BB high density concrete form overlay plywood for signs and directory boards.

C. Roofing Materials: UL Class A standard weight asphalt shingles or UL Class C mineral surfaced roll roofing on Job-built temporary shops and sheds.

D. Paint: Comply with Section 099000 – Painting, for requirements.
   1. Provide exterior grade alkyd gloss enamel over exterior primer for sign panels and applied graphics.

E. Fire-rated Partitions for Temporary Enclosure: Provide rated gypsum board wall construction meeting requirements of local jurisdiction for use as temporary enclosure.

F. Tarpaulins: Waterproof, fire-resistant, UL-labeled tarpaulins with flame spread rating of 15 or less. Provide translucent, nylon-reinforced laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins certified as conforming to the test results of test method 2 contained in NFPA 701, entitled Standard Method of fire Tests for Flame Propagation of Textiles and Films unless local jurisdiction accepts test method 1 of NFPA 701 or requires other materials.

G. Open-Mesh Fencing: 0.12 inch (3mm) thick galvanized 2 inch (50mm) chainlink fabric fencing 6 feet (2m) high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2 inches (64mm) I.D. for corner posts.

PART 3 EXECUTION

3.1 OFFICES

A. Maintain office at site suitable for storing of records and for conferences. Office may be prefabricated or mobile unit with lockable entrance, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
   1. Maintain copy of Contract Documents, shop drawings, correspondence, Architect's directions.
   2. Maintain neat housekeeping. Keep separate bound files, kept neat and up-to-date. Only shop drawings accepted by Architect shall be kept on file.

B. Owner has limited meeting room space. Office on site will be utilized for contractor meeting area.
   1. Owner's Representative will require separate individual full time office at site with appropriate sign containing name, title, telephone number, and other appropriate data.
   2. Equip Owner office (trailer) with the following: separate lockable office housing desk and chair, 2 files, telephone, fax and computer with printer, copy machine, etc. and general area with folding table with 8 folding chairs and a built-in plan table and independent rollable plan rack.

C. When Project (bid package) is to an appropriate stage of completion, remove offices and relocate offices inside building.

3.2 SANITARY FACILITIES

A. Provide adequate number of temporary toilets during construction for use of all trades. Toilets shall be flushing or portable self-contained type, well maintained and be screened from view. Provide units properly vented and fully enclosed with glass-fiber reinforced polyester shell or similar nonabsorbent material.
   1. Maintain adequate supply of tissue.
   2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

B. As soon as possible after enclosure, install temporary water closets and lavatories at toilet rooms in building.
   1. Maintain these rooms and provide tissue and paper towels.

C. Remove temporary fixtures and install permanent fixtures and restore room to "like new" condition prior to Substantial Completion of any phase.

3.3 STORAGE AND ENCLOSURES

A. Contractor and each Subcontractor must provide storage and enclosures to protect and preserve materials stored at and off site. Materials such as wood, metal, cement, masonry materials, equipment, conduit and similar materials, shall not be piled directly on ground.
   1. Coverings shall be durable, watertight (fully cover sides as well as top) substantial and well anchored to prevent blowing away.
   2. Provide shed type of enclosures for easily damaged and small items. Replace protection which becomes damaged immediately.

B. Without exception, fan units and other equipment with bearings or similar working parts shall be set on supports above the ground and snow; enclose with substantial and well secured waterproof protection.

C. Neatly construct and maintain storage facilities, including protective covering. Immediately replace loose or inadequate coverings.

D. Neatly fabricate durable temporary enclosures of the building, and maintain in good condition.

E. When storage or enclosure facilities are no longer required, remove from site.

3.4 SIGNS

A. Job Sign: Provide one custom job sign as follows:
   1. Size: 4'-0" high by 8'-0" long
   2. Construction and Configuration: Single face sign constructed of pressure treated 3/4 inch thick exterior grade, plywood sheathing and 4 inch by 4 inch pressure treated wood framing as required.
   3. Sign Graphics: Refer to the following template example for general scope and layout.
   4. Consult the Architect for project specific information to be added on the sign. Contractor shall incorporate this information on signage artwork and provide proposed final artwork for Architect's approval before sign fabrication.
   5. Provide temporary illumination. Locate as directed by Architect.

B. Office Signs: Signs on temporary job site offices may be used to identify offices.

C. If Architect furnishes a site, locate as directed by Architect.

D. No other signs are permitted, including signs on structure.

E. Upon completion of Work remove signs. Return sign provided by Architect to Architect.

3.5 BARRIERS

A. Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways as required by governing authorities for public rights-of-way and to public access to existing building.

C. Provide barriers around trees and plants designated to remain

D. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

3.6 ENCLOSURE FENCE

A. Install enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire site or portion determined sufficient to accommodate construction operations.
   1. Provide open-mesh, chain link fencing with posts set in a compacted mixture of gravel and earth.

3.7 PARKING

A. Contractor is responsible to provide and maintain roads in and around construction site as reasonably required to accommodate construction activities. When no longer needed as a temporary roadway, remove temporary surfacing and restore subbase to conditions required by Contract Documents for permanent development.

B. Where required, resurface roads damaged by construction and restore to original or better condition.

C. Parking for construction personnel is not provided. Parking on site is limited. Owner and Contractor will assign parking spaces on site for Contractor vehicles. Other vehicles may be parked on site at direction of Owner, provided space is available and vehicles are identified.
   1. Required temporary parking for delivery of materials shall be as directed by Owner.

3.8 ROUTING

A. For removal of debris and delivery of new materials to the site, coordinate with Owner or Owner's Representative.

3.9 MASONRY CUTTING AND MORTAR MIXING AREA

A. Location shall be reviewed with and approved by Owner or Owner's Representative.

3.10 FIRE SAFETY DEVICES

A. General: Refer to Section 011100 for general requirements and for Fire and Safety Director.

B. Fire Extinguishers: Except for units in individual Contractors' offices, provide and maintain adequate and proper fire extinguishing devices in and about construction area, available for use by workers.
   1. Devices shall not be units to be later installed in Project.
   2. Provide appropriate devices for class of the potential hazard (e.g. oil, electrical) at those areas where unusual hazards may exist, including in mechanical rooms.
   3. As construction proceeds, or materials which create a hazard are moved onto various floors, extinguishing devices shall be available on each floor.
   4. Number and distribution of devices shall be adequate for effective fire control, to satisfaction of Fire Safety Director and Owner.

C. Fire Hydrants: Area fire hydrants must be accessible. Fences and construction work must be arranged and accomplished to provide immediate access to hydrants.

END OF SECTION

COUNTY OF RIVERSIDE
(PROJECT NAME OR TITLE)

COUNTY BOARD
OF SUPERVISORS

John J. Benoit, Supervisor
4th District

Marion Ashley, Supervisor
5th District

Bob Buster, Supervisor
1st District

John Tavaglione, Supervisor
2nd District

Jeff Stone, Supervisor
3rd District

Insert rendering of completed project here

PROJECT
DEVELOPMENT TEAM

Bill Luna
County Executive Officer

Robert Field
Assistant County Executive Officer EDA

Insert "Project" Department Name
Insert "Project" Dept Head Name
Insert "Project" Dept Title

Insert General Contractor Name
General Contractor

Insert Project Architect Name
Project Architect

Insert Dept Logo here

COUNTY OF RIVERSIDE
EDA
ECONOMIC DEVELOPMENT AGENCY

***Please note: the "project" Board of Supervisor must be listed first and then each supervisor must be listed below in district order. For example, a project that is in district 4 would list John J. Benoit first, then District 5 but then start the series again with District 1 (see example above).
The font type must be Arial
The sign should be approximately 4' long and 8' wide

Revision Date: 1-27-10

SECTION 015620
CONSTRUCTION NOISE CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Methods and procedures to protect building occupants and surrounding area from excessive noise associated with construction work, and are referred to as the Noise Control Policy.

B. Related Sections:
   1. Section 015615 - Airborne Contaminants Control.

1.2 DEFINITION

A. A-Weighting: A standard frequency weighting which is commonly employed to measure the loudness or "noisiness" of sounds. A-weighting filters the microphone signal in a manner which correlates better with the sensation of the human ear.

B. A-weighting is required by regulation promulgated by the U.S. EPA, the California Department of Aeronautics, CalTrans, and others. A 10 dB increase in sound level is perceived by people to be twice as loud. All noise data herein are A-weighted. Usually the unit of A-weighted sound level is written as dBA.

1.3 QUALITY ASSURANCE

A. References:
   1. San Francisco Noise Ordinance which prohibits the operation of equipment that emits noise in excess of 85 dBA when measured at a distance of 100 feet.

B. Enforcement:
   1. Monitor noise levels through measurements to establish levels in excess of 85 dBA at 50 feet, and implementing additional mitigation procedures based on recommendations of acoustical consultant.

1.4 SCHEDULING

A. Schedule construction work generating severe levels of noise in advance, and set times as required and determined acceptable by Owner.

PART 2 PRODUCTS

2.1 CONSTRUCTION NOISE ASSESSMENT

A. Construction Noise levels at a distance of 50 feet for each phase of construction are shown below. Data are based on data for similar construction activities and published data.

NOISE LEVELS GENERATED BY CONSTRUCTION ACTIVITIES AT 50 FEET.

Excavation:	L_{eq} (dBA)	LL_{max} (dBA).
Earthmoving	90	95-100.
Excavation.	90	95-100
Grading.	80	85-90

Foundation:		
Earth Drilling	90	95-100.
Erection:		
Concrete Pouring	85	90-95.
Framing with impact wrenches.	95	100-105
Framing without impact wrenches	85	90-95.
Pre-Construction	90	95- .

PART 3 EXECUTION

3.1 MITIGATION

A. Attempt to implement the following construction noise mitigation measures on this Project:
   1. Equip internal combustion engine-driven construction equipment with good condition best available mufflers. Use quiet electric-powered compressors and generators.
   2. Use welded rather than T.C. bolted steel connections when possible to minimize use of impact wrenches.
   3. Erect barriers around noise generating operations.
   4. Turn off engines and compressors when not in operation; no idling.
   5. Limit noise generating construction activities to times between 7:30 am and 3:30 pm.
   6. Avoid blasting activities. Use ball and crane demolition techniques.
   7. Define truck routes to confine noisy trucks to streets that currently have the heaviest traffic. Develop a truck staging area away from acoustically sensitive areas.
   8. Use and electric-powered tower crane instead of a diesel-powered truck crane.
   9. Use steel structural frames in lieu of concrete structural frames to yield a much shorter assembly time.
   10. Pre-cut metal decks and metal studs off site to minimize on-site sawing.
   11. For excavation, use drilled soldier piles with wood lagging instead of sheet pile driving techniques where possible. Avoid impact pile driving.
   12. Retain an acoustical consultant to provide assistance with developing additional noise attenuation techniques where needed.
   13. Chemically demolish concrete where possible.
   14. Avoid hammer drilling; use coring bits, instead. Avoid using power-actuated fasteners; use concrete screws, instead. Avoid sand blasting.
   15. Avoid sheet metal debris chutes; use plastic chutes, instead.

B. Contractor is responsible for site supervision of potential sources of noise (e.g., material delivery, shouting, debris box pick-up and delivery) for all trades. Maintain awareness among trades of noise sensitivity of Project.

3.2 FIELD QUALITY CONTROL

A. Enforcement of Noise Control Policy:
   1. Measurements will be taken on an unscheduled basis to document noise levels.
   2. Information will be noted and transmitted to Contractor.
   3. A record of noise violations will be maintained.

END OF SECTION

SECTION 015719
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Erosion and Sediment Control.
   2. Pollution Control.
   3. Waste Control.

B. Related Sections:
   1. Section 015615 - Airborne Contaminants Control.
   2. Section 015620 - Noise Control.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sediment.

B. Minimize amount of bare soil at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent run off from site.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

3.2 POLLUTION CONTROL

A. The use of noxious or toxic materials for all applications in alterations or work in buildings occupied by Owner's personnel shall be done after proper notification to Owner's Representative, to the people in that building and applied on the weekends or other unoccupied days.

B. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. When applicable, post, maintain, and remove signs stating that "noxious or toxic " materials are in use as part of the construction work.

3.3 WASTE CONTROL

A. All waste materials resulting from the process of clearing and construction shall be disposed of as follows:
   1. All refuse and debris, combustible and incombustible, resulting from the processes of construction, shall be removed from the Owner's property as described in Section 015615 - Airborne Contaminant Control. The Contractor must not use any refuse container belonging to the Owner.
   2. Solvents: Solvents, oils and any other material which may be harmful to plant life shall be disposed of in containers and removed from the site in accordance with applicable state and federal laws pertaining to hazardous materials. At completion of work, any contaminated soil shall be removed and replaced with good soil by Contractor at no expense to the Owner. Immediately notify Owner's Representative of any oil or other hazardous material spill.
   3. All material and equipment removed as part of this Project is the property of the Owner, unless specifically designated otherwise, and shall be delivered to a location at the existing building as directed by the Owner where selective sorting may be accomplished and the remaining debris shall be disposed of by the Contractor at the Contractor's expense.

END OF SECTION

SECTION 016210
PRODUCT OPTIONS AND SUBSTITUTION REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures, requirements and limitations for considering substitutions.
   2. Criteria for selecting product options and substitutions.

1.2 SUBMITTALS

A. Submit requests for substitution in writing to Architect at least 10 calendar days prior to bid date and hour. Requests received after this time will not be considered.

B. Clearly define and describe proposed substitute product including following items:
   1. Fully completed Section 016211 - Substitution Request Form.
   2. Manufacturer's printed information supporting claim that proposed product meets specified requirements. Provide following as applicable:
      a. Literature Specifications Drawings Cut Sheets Performance data List of reference projects of similar size, value and complexity Model numbers Other information necessary to completely describe item.
   3. Provide a point by point comparison between key features of specified Basis of Design item and proposed substitution.
   4. Provide submitted materials marked with Article and Paragraph references from Specification using highlighter, marker and flags on pages to facilitate review and show that substitution meets specified requirements.
   5. Provide a letter indicating requestor has reviewed Contract Documents and examined site (if needed) and that proposed substitution meets specified requirements.

C. Accepted substitutions will be published in writing. No information or indication of acceptance will be provided by means other than written Addendum during bidding or Architect's written construction administration document following bidding. Refer to "Limitations on Substitutions after Bids or During Construction" in this Section.

D. Bid and construct according to Contract Documents unless approval of substitution is provided in writing.

E. Architect is not obligated to state reasons for rejecting substitution.

1.3 DEFINITIONS

A. "Product" means material, equipment, assembly, system, manufacturer, brand, trade name, element, item or similar as applicable.
   1. Provide new products free from defects and deficiencies unless otherwise noted.
   2. Provide components and accessories necessary for a complete system by same manufacturer unless otherwise specified.

B. Terms such as "approved substitute", "equal to", "accepted by", "approved by", or other synonymous terms mean that acceptance of proposed product is subject to approval by Architect after submittal requirements are met. Architect's decision is final and binding.

C. Available Manufacturers: See below.

D. Except where "no substitutions", "same as existing" or "match existing" are noted, term "or approved substitute" is implied throughout, subject to prior approval conditions specified including where the term "Available Manufacturers" is included.

PART 2 MATERIALS

2.1 PRODUCTS

A. Architect and Owner reserve right to accept or reject proposed product. Should a proposed product be unable to meet requirements to satisfaction of Architect, product shall not be used. No additional compensation will be allowed for required Work resulting from use of product accepted by Addendum.

B. Use only one brand, manufacturer, source or type for like products unless otherwise approved or specified. Contractor is obligated to do so unless otherwise approved in writing.

C. Provide pricing based on products listed in Contract Documents. Contract award is based on use of specified products or substitutions approved prior to bidding or pricing.
   1. By execution of Contract, Contractor agrees and understands Work will be accomplished with products specified or accepted by substitution.

D. Basis of Design Products:
   1. Reference to "Basis of Design" and a named specific product or manufacturer is intended to establish criteria for use of that product and manufacturer based on that products published information whether or not those criteria are explicitly stated in Specifications.
   2. Criteria may establish higher performance requirement than specified reference or performance standards. Such reference is intended to establish minimum level of quality, standard of design, function, appearance, type, strength, durability, construction, efficiency, sound level, finish, appearance, availability, service and similar characteristics determined necessary for Project.
   3. Specification criteria including basis of design products are considered as a whole.
   4. Other products or manufacturers listed meet features, performance, appearance and other criteria established by that product or manufacturer even if product must be customized to meet those criteria.
   5. When other products are listed in a Section those products may be used if they meet entire specification criteria including criteria implied by product listed as basis of design. Meeting some requirements but not meeting criteria established by basis of design product does not qualify as meeting specified requirements.
   6. Products or manufacturers accepted for substitution will be acceptable provided they fully comply with requirements and match basic and essential criteria of product used for basis of specification or design, including level of fabrication quality, as determined by Architect.

E. Reference Standards for Products:
   1. When references to Federal Specification, ASTM Standard, American National Standards Institute (ANSI) or similar association standards are listed for product quality, provide an acceptable affidavit certifying that proposed substitution for this Project meets with same standard.
   2. Submit supporting test data to substantiate compliance.

F. Substitute products shall:
   1. Be available in same range of colors, textures, dimensions, gauges, types, and finishes as specified product.
   2. Be equal to specified item in strength, durability, efficiency, serviceability, ease and cost of maintenance.
   3. Be compatible with building design.
   4. Not necessitate design modifications.
   5. Not impose additional work or require changes in work of Prime Contractor, or other Subcontractor, vendor, or materials supplier.
   6. Not add cost to Owner.
   7. Be similar in essential fabrication features.

G. Contractor, supplier or manufacturer providing accepted substitute product shall bear cost of required modifications to spaces, services, utilities and other features as result of accepting substitute products, including but not limited to:

1. Larger capacity mechanical or electrical service, devices or utilities resulting from acceptance of product for bidding purposes.
2. Modification to pipes, conduits, ducts, and controls for conveying, distributing, and controlling those services or utilities.
3. Modification to insulation, wrappings, coatings, or other integral features of lines or items conveying those lines.

H. Timely Placement of Product Orders: Place product orders in a timely manner, within ten days after acceptance of submitted list of materials.

2.2 LIMITATIONS ON SUBSTITUTIONS AFTER BIDS OR DURING CONSTRUCTION

A. Intent is to limit unnecessary substitutions after bids. Changes will not be allowed to accepted list of products, except when specified or accepted product subsequently is determined as not meeting requirements of Contract Documents or product becomes unavailable, and then only under following conditions:
   1. Orders were placed in timely manner as required after list of materials is accepted. No excuse or proposed substitution will be considered for products due to unavailability unless proof is submitted that firm orders were placed in a timely manner.
   2. Reason for unavailability is beyond control of Contractor: prolonged strikes or lockouts which will delay Project to an extent unacceptable to Owner, bankruptcy, discontinuance of a product, delays or Acts of God or other similar reasons.
   3. Request for substitution is submitted in writing within 10 days after date Contractor becomes aware product does not comply with specifications or has become unavailable, accompanied by supporting evidence.
   4. No extra cost to Owner.
   5. Substitution does not compromise design intent or quality required.
   6. Substitute product is acceptable to Owner and Architect.
   7. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   8. Requested substitution does not require revisions to Contract Documents.
   9. Requested substitution is consistent with the Contract Documents and will produce intended and indicated results.
   10. Substitution request is fully documented and properly submitted.
   11. Requested substitution will not adversely affect Contractor's Construction Schedule.
   12. Requested substitution has received necessary approvals of authorities having jurisdiction.
   13. Requested substitution is compatible with other portions of Work.
   14. Requested substitution has been coordinated with other portions of Work.
   15. Requested substitution provides specified warranty.
   16. If requested substitution involves more than one trade, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to installers involved.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 016211
SUBSTITUTION REQUEST FORM

To: **Hammel, Green and Abrahamson, Inc.**
1880 century Park East #608
Los Angeles, CA 90067
Attention: Joseph Madda

Project: RCRMC Site Development Package No. 1

HGA Comm. No.: 2838-002-00 **Date Received:**_____

Specification Section Number and paragraph:_____

Drawing and details affected:_____

Proposed Substitution:_____
Manufacturer:_____
Product (model, pattern, etc.):_____

WHY IS SUBSTITUTION BEING SUBMITTED? (Select one of the following):
- ☐ Pre-Bid Substitution (Prior Approval) Bid Date:
- ☐ Specified product is not available. Explain.
- ☐ Cost savings to Owner. Indicate comparative cost analysis.
- ☐ Other: Explain.

EFFECTS OF PROPOSED SUBSTITUTION: Answer the following questions and attach explanations.

Does substitution affect dimensions indicated on Drawings?
☐NO ☐YES, explain:

Does substitution affect Work of other Sections?
☐NO ☐YES, explain:

Does substitution require modifications to design, changes to Drawings, or revisions to specifications to be incorporated into the Project?
☐NO ☐YES, explain:

Attach list of at least 3 projects where proposed substitution has been used within past 12 months; include name, address, and telephone number of Owner and Architect.

CONTRACTOR'S / BIDDER'S REPRESENTATION
Undersigned accepts responsibility for coordination of proposed substitution and accepts all additional costs resulting from the incorporation of proposed substitution into the Project per Section 016210.

SUBMITTED BY:

_____

_____

Fax No: _____

For Architect's use:
☐ Accepted ☐ Not Accepted
☐ No Action Required
☐ Submission: Incomplete
☐ Too Late
Reviewed by/date:_____
Comments:_____

Subcontractor's signature and date:_____

Contractor's signature and date:_____

SECTION 017324
ANCHORAGE AND SLEEVING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:
   1. General Procedural Requirements.
   2. Installation of proper anchorage devices to securely fasten hang, mount, anchor, and support all work.
   3. Rough-in and installation of Equipment.

B. Related Sections
   1. Section 017329 - Cutting and Patching.

1.2 TESTING

A. Under supervision of an independent testing laboratory paid by for by the Owner, 5 percent of anchors shall be field loaded above anticipated loads to insure their adequacy.
   1. Drilled-in expansion anchors, which have the same hole size as the bolt size, such as "Kwik-Bolt" or "Wej-It" or "Thunderstud" by Universal Fastenings will be permitted provided:
      a. There is no spalling around the holes,
      b. The holes are neatly drilled and approved test reports indicate adequate shear and pullout strength with ample safety factor.

PART 2 - PRODUCTS

2.1 TYPES OF ANCHORAGE AND SLEEVING DEVICES

A. New Materials: As specified in individual Sections, or as herein specified.

B. Existing Materials: Match existing products and work for anchoring and sleeving unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine substrate and conditions under which anchorage and sleeving work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Methods and devices, as well as location, may be subject to Owner Representative's approval and shall not impair, violate or alter structure, water integrity or aesthetic value of the Work. Sleeve existing pipes indicated.

B. In general, provide bolts and shields for anchorage to solid materials, toggle bolts into hollow construction or through bolts and washers where necessary, unless otherwise shown or specified.

C. Provide sleeves for all pipes, ducts and similar features that pass through walls, slabs, concrete joists, beams or girders, concrete columns or concrete bridging, whether specifically indicated or not.

D. Provide adequate backing for all fastenings and supports to prevent deflection or undue stresses. For concrete, anchorage devices shall generally be cast in, not drilled in later, unless otherwise specified in individual section of work.

3.3 ANCHORS

A. Furnish and install proper anchorage devices to securely fasten, hang, mount, anchor, and support work substantially.

B. Wood plugs into solid materials, toggle bolting to lath and plaster, or bolting into shields at hollow units will not be acceptable.

C. Shot and Drilled Anchors: At concrete, shot or drilled-in anchor devices will be permitted where casting in may be difficult to coordinate, provided they will not damage the concrete or cause any spalling around the anchor.

D. Shot anchors will not be permitted in bottoms of joists, in post-tensioned slabs where cable location is unknown, in slabs 4 inches or less in thickness, nor where spalling may result.

E. Any shot anchors at concrete joists shall be at the side of the joist, above centerline, located to avoid reinforcing steel. Verify shot anchors at composite decking with the Owner's Representative.

3.4 SLEEVES

A. Sleeves shall be of new material, cut square, reamed. Sheet metal sleeves may be used only where specifically approved.
   1. At all concrete penetrations, sleeves shall be uncoated or galvanized pipe, not less than Schedule 40 steel pipe.
   2. At exposed or concealed masonry walls, sleeves shall be the same as for concrete penetrations.

B. Unless otherwise called for, sleeves passing through walls, slabs, beams, bridging, columns, shall be 1/2 inch greater in inside diameter than external diameter of pipe passing through sleeves, or the insulation diameter.
   1. Pipe insulation shall be continuous through the sleeves.

C. Unless otherwise called for, sleeves through walls shall extend full thickness of wall and be cut flush with finished surface; sleeves through exterior building walls, above or below grade, shall extend full thickness of wall and be cut flush with finished surfaces; sleeves through floor slabs for exposed piping shall extend not less than 1/2 inch above finished floor.

D. Sleeve Spacing: Where sleeves occur in rows or clusters, a minimum of 4 inches of concrete shall be left between sleeves and if the normal spacing of reinforcing bars cannot be maintained, or are interrupted because of sleeve size or cluster location, extra reinforcing shall be provided by the Contractor as directed by the Owner's Representative. In no case shall sleeves impair the structural capability of the Work.

E. Sleeves at Core Drilled Holes: The sleeves shall provide a good fit to core drilled hole and shall be set in place with a full coating of epoxy adhesive to insure remaining in place and a good seal between the hole and the sleeve. Do not core drill post-tensioned slabs.

F. Sealing of Sleeves: As pipe, conduit or other feature is installed through a sleeve, it shall be wedged to keep in the center of the sleeve, with wedges held 1" back from end of sleeve. Pipe, conduit or other features through walls or other vertical surfaces, shall be caulked at the top in all cases, and at the bottom where exposed in a finished space.

3.5 EQUIPMENT LAYOUTS, ROUGH-IN AND INSTALLATION

A. Unless specifically noted, equipment shall be installed in accordance with the manufacturer's recommendations and instructions.

B. Full layout data and rough-in data is to be provided by the Contractor or subcontractor supplying the equipment, to others requiring the data, in sufficient time to facilitate proper and accurate rough-in.
   1. For existing equipment of the Owner, the Contractor must examine the equipment and determine the rough-in data. For equipment to be purchased by the Owner, the Owner will arrange to have the data furnished to the Contractor.
   2. If rough-in details are not available at the time service systems are being installed, the final rough in shall be postponed until the data is available. At all times prior to roughing-in for equipment by Owner, consult with the Owner to verify the status of rough-in data.

C. Floor Sleeves: For waste and other services passing through the floor, if rough-in data is available, it is the intent that the rough-in sleeves generally, shall be installed prior to pouring the floors.
   1. With the permission of the Owner's Representative, core drilling for other holes (even if data is available) may be done to facilitate job progress or to more accurately locate the holes, with such core drilling done without additional reimbursement.
   2. If layout information for rough-in sleeving for equipment provided under the construction Contract is not available at the time sleeving through the floor must be accomplished, core drilling later shall be employed, at no additional reimbursement.

D. Core Drilled Holes: At core drilled holes, the specified sleeves will generally be required, unless otherwise indicated. Where omission of a sleeve is approved, the hole shall be drilled approximately one inch larger than the outside diameter of the insulation, where insulated. When the pipe is installed, hold down centering wedges one inch minimum below the floor line. The opening shall be sealed.

END OF SECTION

SECTION 017329
CUTTING AND PATCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cutting, demolition, removal work, patching and restoration of work as necessary to accomplish and complete all work under the Contract, including any relocation or reuse of existing materials, equipment, systems, or other work, as well as the disposition of salvaged materials or debris.
   2. This Section applies to all work under the Contract, including general construction, mechanical and electrical work.

B. Related Sections:
   1. Refer to Sections 011100 and 015100 for special requirements, protection, constraints, timing of work, scheduling of work, enclosures and similar requirements relating to this Section.
   2. Section 024119 – Selective Demolition.

1.2 DESCRIPTION

A. Drawings generally indicate the extent of demolition, removals, relocations and cutting. The drawings shall not be construed as indicating all required work, nor indicating all conditions or details which might be encountered to accomplish the work of this Contract.
   1. The Contractor and subcontractors must examine the spaces themselves to determine the actual conditions and requirements. All removals, demolition, cutting, restoration, new installations and other work shall be accomplished to transform the existing spaces and conditions to the new conditions required under the Contract, as well as to accomplish all tie-in work of new to existing.

B. It is the intent that unless specifically shown on the general construction type drawings (i.e., architectural and structural) and schedules, or is inherent in the work to be accomplished under the general construction work of the area, that the mechanical and electrical subcontractors shall perform the demolition, cutting, removals, relocations, patching and restoration as will be required to accomplish the work under their subcontracts.
   1. All work shown or indicated on the general construction drawings and schedules shall be accomplished by the General Contractor.

C. Except for general demolition of entire areas it is the intent that at each area, or space, the Contractor and each subcontractor must make the removals, perform cutting or demolition and accomplish relocations of work normal to their trades (i.e., Mechanical Subcontractor removes or relocates piping, ductwork and similar; Electrical Subcontractor removes or relocates panelboards, conduit, lighting and similar).
   1. At areas of general demolition of the entire spaces, the Mechanical and Electrical shall make removals or work normal to their trades or may be called for, for reuse or relocation, make any relocations and cut-off, terminate, cap or otherwise discontinue services that will be abandoned or removed in the space. The General Contractor must then demolish or remove all abandoned or unwanted electrical or mechanical materials, items or elements in the area.

1.3 SUBMITTALS

A. Schedule: Submit schedule indicating proposed sequence of operations for demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
   1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

2. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed new addition.

1.4 QUALITY ASSURANCE

A. Skilled Mechanics: Accomplish all work of cutting, removal, demolition, relocation, patching and other restoration by using only mechanics skilled in the trade. If necessary, sublet the work to skilled contractors or subcontractors.

B. Safety: The Contractor is fully responsible for the safety of the existing buildings and personnel, as well as new construction as a result of work, procedures, operations or activities of this Contract.

C. Structural Work: Where the work of removals, demolition, cutting and similar work involves structural consideration, extreme care shall be exercised to avoid damage and preserve the safety of the structure and all personnel.
   1. Particular care must be taken where the demolition or removals occur adjacent to occupied areas. Utilize (employing if necessary) competent and qualified technical assistance to develop safe methods and techniques to accomplish the work, including for temporary shoring and supports, methods of removal and other considerations.
   2. All permanent or temporary supports shall be so designed and placed by considering all loads and shall be carried down to sound bearing.

D. Hazardous Substances: Where the work of removals, demolition, cutting and similar work involves possible hazardous substances and/or harmful physical agents, such as asbestos fibers, or polychlorinated biphenyl (PCB), extreme care shall be exercised to avoid damage and preserve the safety of all personnel. Contractor must stop the work and notify the Owner and Architect, in accordance with provisions of AIA General Conditions Article 10.1.

E. Remove resilient sheet vinyl and tile and cutback asphaltic adhesives in accordance with Resilient Floor Covering Institute (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings", July 1990.

1.5 COORDINATION

A. Coordination: Coordinate all work of this Section with all subcontractors so the work will progress without interruption and minimum delays. The Contractor must also coordinate and schedule the work with the Owner where possible disturbance may occur and where relocations or other potential disruptions of the Owner's functions and services may occur. All work affecting the Owner's functions and services shall be performed at times acceptable to the Owner.

PART 2 DISPOSITION OF MATERIALS

2.1 UNSALVABLE MATERIALS

A. Remove unsalvable materials in a manner that will avoid damage to materials or equipment which will remain. Completely remove and legally dispose away from the site.

2.2 SALVABLE MATERIALS TO BE RE-USED IN THE WORK

A. Salvable materials and items designated for reuse or relocation shall be removed by the applicable trades and relocated to the new location. If the new location is not ready to receive the relocated item, it shall be stored and protected from damage until incorporated into the new work or remodeled area. If the Owner is unable to forego the use of any existing items at the normal time for relocation until other facilities are available to the Owner, make all preparations for the item and delay relocation until a time approved by the Owner.

B. Carefully remove, salvage, clean and preserve materials, equipment and other items indicated to be reused, or which will be needed for reuse to match existing work. Exercise extreme care in removals to prevent damage or to make materials unsuitable to reuse. For materials shown or called for to be reused and which are damaged, replace with equivalent and matching work.

C. Where brick from existing building is required for patching, exercise care in removing brick from existing building to preserve for reuse. Do not reuse broken brick. After removal clean all mortar from all sides of brick, carefully stockpile and protect to insure brick is available for reuse. Stockpile off site, if space is not available at site, and cover or otherwise protect from soil or damage. Stockpile on suitable platform (not on earth).

2.3 SALVABLE MATERIALS TO BE STORED BY THE OWNER

A. The Owner will mark or tag existing materials, equipment or other items Owner wishes to retain. Salvable materials and items designated or marked to remain the property of the Owner shall be carefully removed by the applicable trades, protected from damage and stored adjacent to the removal area as directed.

B. Consult the Owner for any salvage the Owner may wish to retain and the salvageability of all items. Carefully remove and salvage any materials the Owner wishes to retain. Remove finish hardware from the item or material taken out of the building and turn over to Owner. Cleaning or restoration of the Owner's salvage materials is not required.

C. Removal from the area and the site to the Owner's storage will be by the Owner.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering, inspect conditions affecting performance of work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 TEMPORARY PROTECTION

A. Provide temporary bracing, shoring, needling and support during demolition, cutting, remodeling and related new construction as necessary for the execution of the Work and the protection of persons and property. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, with loads properly distributed, including to lower levels and sound bearing, if necessary.

B. Provide protective coverings and enclosures necessary to prevent damage to existing spaces and materials to remain. Protect openings in exterior walls and roofs so as to prevent damage from water and the elements and prevent excessive heat loss from the existing buildings. Coordinate work and removals at exterior, including roof, by scheduling and performing to maintain watertight installation. Seal areas left temporarily unfinished to prevent damage to existing roof or other materials and furnishings of existing building.

C. Provide dustproof temporary enclosures (including above ceilings) separating areas under demolition and remodeling from the remainder of the building as well as temporary filters at duct work. Provide temporary hinged doors in temporary enclosures where necessary. Temporary and permanent doors shall be completely sealed with tape or other suitable material during demolition work and shall remain sealed until dust has settled.

D. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.3 DEMOLITION AND CUTTING

A. Demolish and remove existing construction as shown, indicated or required to be removed to accomplish the Work. Where new Work is to be installed in or adjacent to existing construction or existing work is to be replaced, remove or cut the existing construction as necessary to complete the Work of the Project.

B. Execute work with care. Existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced as a result of the Work and is unsuitable for use intended shall be removed and replaced at no additional cost to the Owner.

C. Debris from upper levels shall be transported to ground in covered chute or other approved means. No free-fall debris removal is permitted. Moisten debris with spray where practical. Take all precautions to minimize dust.

D. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in such a manner so as to prevent spread of dust. Do not store or permit debris storage at site. Do not burn debris, rubbish or waste at the site. Keep adjacent areas unencumbered and clean. Keep walks and similar areas broom clean.

3.4 PATCHING, REMODELING, REPLACEMENTS AND RESTORATION

A. Patch or otherwise restore disturbed existing construction as indicated on the drawings and schedules, or as otherwise required to restore the work and surfaces. Patching or restoration shall be carried to natural breaks (i.e., corners) wherever possible. Where existing construction is removed, cut or otherwise disturbed by Work of the Project, patch defective and incomplete surfaces. Repair any damage to existing construction which is to remain.

B. Patching work shall be done by skilled mechanics experienced in the particular type of work involved. Patching work shall conform to the standards of the Specifications where applicable and where not specified, work shall conform to the highest standards of the trade.

C. Patch existing construction to match existing work (unless otherwise called for) except provide new materials and accomplish as for new work. Examine existing surfaces to be patched before proceeding with the work. Report all conditions where existing materials, colors and finishes cannot be matched to the Architect and Owner, and do not proceed until instructions have been given.

D. Existing construction that has been damaged as a result of the Work shall be repaired to an extent and as required to match adjacent existing undamaged construction.

E. Thoroughly clean and prepare all surfaces to receive new finish or covering. Completely remove dirt, dust, grease, oil, paint, loose materials and soil. Clean, etch where necessary, and place surfaces in most suitable condition for the finish.

3.5 ADJUSTMENTS

A. Where partitions are removed, patch floors, walls, and ceilings, with finish materials to match existing.
   1. Where removal of partitions results in adjacent spaces becoming one, rework floors and ceilings to provide smooth planes without breaks, steps, or bulkheads.
   2. Where extreme change of plane of two inches or more occurs, request instructions from Architect as to method of making transition.

B. Trim and refinish existing doors as necessary to clear new floors.

3.6 MECHANICAL AND ELECTRICAL WORK EXPOSED

A. Where unknown mechanical piping, ductwork or electrical conduit is exposed during removal of partitions, walls or floors and ceilings, the removal or rerouting shall be accomplished by the Mechanical or Electrical Subcontractor as applicable. Locate mechanical and electrical work where directed and connect to maintain all functions in proper operation. Abandoned piping may be left in place where it is concealed in floors or walls, providing that it is disconnected from its source and capped. There shall be no "dead end" water, sewer, gas, or vent piping existing in the completed work.

B. Accomplish removals, capping or otherwise terminating services which are abandoned or need to be abandoned, and rerouting of mechanical and electrical work without additional cost to the Owner, whether shown or noted on drawings or otherwise encountered.

3.7 WORK AT EXISTING ROOF

A. Verify with the Owner to ascertain the existence of an existing roof bond or guarantee. Cutting and patching of existing building roof shall be performed with compatible materials using methods so as not to invalidate any current bond or guarantee. Cutting of all openings through roof shall be done by manufacturer's licensed or approved roofing contractor. Arrange with the manufacturer who furnished the roof bond or with the roofer who provided the roof guarantee for an examination of the complete work and provide two copies of an acknowledgement and/or approval to the Owner indicating that such bond or guarantee (if any) will remain in effect.

B. Spud off gravel about 4 feet back from roof penetration at areas indicated on roof plan and/or details at existing roof construction. Remove and patch materials to extent indicated. Feather roofing plies back, down to existing insulation; remove cut or damaged insulation and provide new insulation where required. New felts shall overlap each other and stagger back onto existing roof at successive plies. Provide at least four (4) plies. Flood coat new roof membranes and regravel where required.

C. At existing membrane roof system, cut and patch membrane and insulation as required at penetrations. Remove and patch materials to extent indicated. Remove cut or damaged insulation and provide new insulation where required. Regravel where required.

3.8 WORK OF EACH CONTRACT

A. The Contractor and each subcontractor must carefully review the Contract Documents including those primarily for other trades with respect to the coordination of the demolition, removal and remodeling work and perform such removals normal to their trades as may be shown, noted or otherwise required. Cutting and patching incidental to demolition, removal and/or remodeling of general construction work shall be construed as the work of the General Contractor when shown or indicated on the general construction drawings or schedules or specifically noted or called for on documents primarily for other trades as being accomplished by the General Contractor. Other subcontractors (mechanical or electrical) are responsible for such other cutting, demolition, patching, replacement and restoration as may be required to accomplish their part of the Work.

3.9 PAINTING

A. Each major subcontractor (mechanical, electrical) shall be responsible for painting or repainting of patched or remodeled areas where they has performed work, except for those areas shown or required to be remodeled under the general construction drawings, specifications or schedules, in which case, the new, patched and remodeled paintable surfaces shall be repainted by the General Contractor. It is the intent that the mechanical and electrical subcontractors are responsible to paint or repaint surfaces at locations where demolition, cutting and patching has been accomplished only for their work.

B. Painting, including preparation, materials, workmanship and number of coats shall comply with Section 099000 - Painting. Painting of surfaces patched shall extend to natural breaks, such as corners, as approved by the Architect and Owner.

3.10 FLOOR PREPARATION (EXISTING SLABS)

A. Prepare existing concrete slabs for the installation of various floor finish materials, i.e., VCT, ceramic and quarry tile, carpet (glue-down), concrete topping.

B. Roughen surfaces which are glossy or which have loose surface material or curing sealers by sanding, scarifying or acid etching as required. Remove surface material that is not compatible with adhesive. Clean thoroughly to remove all oil, dirt, sealer materials and dust.

3.11 CLEANING

A. Perform periodic and final cleaning as specified in Section 017700 - Closeout Procedures.
   1. Clean Owner-occupied areas daily.
   2. Clean spillage, overspray, and heavy collection of dust in Owner- occupied areas immediately.

B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use by Owner.

END OF SECTION

SECTION 017420
CONSTRUCTION WASTE DISPOSAL AND RECYCLING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes: This Section includes required recycling and recovery of the following waste materials and applies to listed waste materials produced during the Work:
   1. Concrete and Masonry: Clean concrete, brick, rock, and masonry.
   2. Metals: Metal scrap including iron, steel, copper, brass, and aluminum including piping, fasteners, wiring, ductwork and sheet metal goods.
   3. Untreated Wood: Unpainted, untreated dimensional lumber, timber beams, engineered wood products, plywood, oriented strand board, Masonite, particleboard, wood shipping pallets, and crates.
   4. Gypsum Wallboard Scrap: Excess drywall construction materials including cuttings, other scrap, and excess materials.
   5. Paper and Cardboard: Discarded office refuse including unwanted files, correspondence, etc. Clean, corrugated cardboard used for packaging, etc.

B. Non-Recyclable Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.
   1. Mixed Solid Waste: Solid waste commonly collected as a municipal service, exclusive of waste materials listed above.

1.2 DEFINITIONS

A. Waste Materials are defined as large and small pieces of listed materials which are excess to contract requirements and generally include materials to be recycled and/or recovered from existing construction and items of trimmings, cuttings and damaged goods resulting from new installations, which cannot be effectively used in the Work.

B. Recycling is defined as the process of collecting and preparing recyclable materials and reusing them in their original form or in manufacturing processes that do not cause the destruction of recyclable materials and reusing them in their original form or in manufacturing processes that do not cause the destruction of recyclable materials in a manner that precludes further use.

C. Recovery is defined as any process that reclaims materials, substances, energy, or other products contained within or derived from waste on-site. It includes waste-to-energy, composting, and other processes.

1.3 SUBMITTALS

A. Construction Waste Management Plan: Before start of construction, submit a construction waste management plan for approval of Contracting Officer's Representative indicating how Contractor proposes to collect, segregate, recycle, and recover at least 75% of construction wastes and debris generated by the Work. Submit documentation indicating compliance with regulations specified under "Quality Assurance" article below. Include a list of recycling facilities to which indicated recyclable materials will be sent for recycling. Identify materials that are not recyclable or otherwise recoverable that must be disposed of in a landfill or other means acceptable under governing State of Minnesota and local regulations. List permitted landfills and/or other disposal means to be employed. Indicate instances where compliance with requirements of this specification does not appear to be possible and request resolution from the Contracting Officer through the Contracting Officer's Representative.

B. Delivery Receipts: Provide to the Construction Quality Manager delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers within 48 hours of delivery that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable requirements of the State of Minnesota and applicable local ordinances and regulations concerning management of construction, demolition, land clearing, inert, and yard trash debris and subsequent modifications and amendments to same.

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by the State of Minnesota, and by local authorities where applicable.

C. Pre-Construction Waste Management Conference: Prior to beginning work at the site, schedule and conduct a conference to review the Construction Waste Management Plan and discuss procedures, schedules and specific requirements for waste materials recycling and disposal. Discuss coordination and interface between Contractor and other construction activities. Identify and resolve problems of compliance with requirements. Record minutes of the meeting, identifying conclusions reached and matters requiring further resolution. Maintain waste management as an agenda item at future construction meetings.
   1. Attendees: Contractor and related Contractor personnel associated with work of this section, including personnel in charge of the waste management program; Construction Quality Manager; Architect; material suppliers where appropriate; and such additional Owner personnel as Owner deems appropriate.
   2. Plan Revision: Make revisions to Construction Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit revised plan to Architect for approval.

D. Implementation: Designate an on-site party responsible for instructing workers and implementing Construction Waste Management Plan. Distribute copies of Construction Waste Management Plan to job site foreman and each subcontractor. Include waste management and recycling in worker orientation. Provide on-site instruction on appropriate separation, handling, recycling, and recovery methods to be used by all parties at the appropriate stages of the work at the site. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.5 STORAGE AND HANDLING

A. Site Storage: Remove materials for recycling and recovery from the work location to approved containers or storage area as required. Failure to remove waste materials will be considered cause for withholding payment and termination of Contract.

B. Position containers for recyclable and recoverable waste materials at a designated location on the Project Site. If materials are sorted on site, provide separate collection containers or storage areas for not less than the following materials:
   1. Concrete and masonry.
   2. Metals.
   3. Untreated lumber.
   4. Gypsum wallboard scrap. (edit to suit project)
   5. Paper and cardboard.

C. Change-out loaded containers for empty containers as demand requires.

D. Handling: Deposit indicated recyclable, and recoverable materials in storage areas or containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

E. If the contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers. In such case, request resolution by the Construction Quality Manager for disposal of the contaminated material. Directions from the Construction Quality Manager do not relieve the Contractor of responsibility for compliance with all legal and regulatory requirements for disposal, nor shall such directions cause a request for modification of the Contract.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Transport recyclable and recoverable waste materials from the Work Area to containers and carefully deposit in the containers without excess noise and interference with other activities, to minimize noise and dust.

1. Do not place recyclable waste materials on the ground adjacent to a container.

B. Existing Conditions: Coordinate with "Instructions to Bidders" and "Supplementary Conditions".

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WASTE MANAGEMENT

A. General: Implement waste management procedures in accordance with approved Construction Waste Management Plan. Maintain procedure throughout the life of this Contract.

B. Source Separation On- or Off-Site: Either separate, store, protect, and handle at the project site all identified recyclable and recoverable waste products to prevent contamination of materials and maximize recycleability and recoverability of materials. Or mix all identified recyclable and recoverable waste products for separation off-site.

C. Arrange for the regular collection, transport from the site, and delivery to respective approved recycling centers of indicated recyclable waste materials. Maintain records accessible to the Architect for verification of construction waste materials recycling and recovery.

D. Delivery Receipts: Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of materials. Keep and maintain records of deliveries to recycling facilities and pickups of waste materials at the site by others as specified above.

3.2 RECYCLABLE WASTE MATERIALS HANDLING

A. General: the following paragraphs supplement handling requirements for various materials identified for classification and recycling listed in Part 1 "Summary" article above.

B. Concrete and Masonry: Free of metals, woods and other contaminates. If possible during demolition, crush existing concrete and concrete masonry units on-site into aggregate size. Store crushed material on-site in clean area to avoid contamination from other materials or building processes. Reuse on-site crushed material for fill, for stabilizing soils, or as base and subbase materials. If crushing on site is impractical, store material during demolition processes on site in clean, uncontaminated area. Transport concrete and masonry materials to a certified concrete recycler as needed.

C. Metals: Cut items to lengths and sizes to fit within the container provided when necessary. Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged metal roofing or duct work), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up. Coordinate special arrangements with the Construction Quality Manager.

D. Untreated Wood: Salvaged wood materials to be free of metals, concrete, gypsum wallboard, insulation, and other contaminating materials. Stack dimensional wood into like piles. For example, store 2 x 4s with other 2 x 4s, and 2 x 6s with other 2 x 6s. Also, if quantity is sufficient, separate piles into lengths of 4-foot increments. Reuse lumber on site as studs, backing, blocking or other uses where appropriate. Stack non-dimensional wood in piles for possible reuse on-site or transport off-site. Depending on size of lumber, recycle or chip wood for plant mulch. If wood materials cannot be used on site, transport to a certified wood recycler or reuse center.

E. Gypsum Wallboard Scrap: Separate gypsum wallboard from other wastes. Dispose of waste gypsum wallboard off-site at a gypsum reclamation or recycling facility, or on-site as a soil amendment.

1. For on-site application as a soil amendment, incorporate waste gypsum wallboard in landscape areas under construction, at a rate of 50 pounds per 1000 square feet, or approximately one ton per acre.
    a. Material must be unpainted gypsum wallboard from new construction, ground to reduce material to a fine particle size (70% passing a 100-mesh screen), and must be fully incorporated into the soil surface.

F. Paper and Cardboard: Classify and handle waste paper goods as follows:

1. Bond Paper: General office quality paper used for specifications, correspondence, copiers, PC laser printers, and FAX machines. Collect in separate container at each workstation and deposit loose in appropriate recycle container as required.
2. Newsprint: Newspapers and tabloid style advertising (slick finish magazines and advertising materials are not typically recyclable). Collect in single location and deposit as required in appropriate recycle container.
3. Diazo Prints (drawings): Set up single location for collection. Roll together to minimize space. Deposit as required in appropriate recycle container.
4. Cardboard and paperboard cartons and boxes: Knock-down, fold flat, and deposit in appropriate recycle container.

G. Other Items: Where recyclability classification of any given waste material is unclear, verify with the Construction Quality Manager.

END OF SECTION

Construction Waste Recycling Economics Worksheet

Option 1: Using a Commercial Hauler

Cost of Recycling/Recovery

	Disposal			Handling Costs					
Material	Tons or Cubic Yards	Revenue or Tip Fee (1)	Subtotal	No. of Loads	Hauling Fee per Load	Container Rental Day/Wk/Mo	No. of Days/ Wks/Mos	Subtotal	Total Cost
Totals									

(1) If paid a revenue for the material, enter it as a negative number.

Cost of Landfilling

	Disposal			Handling Costs					
Material	Tons or Cubic Yards	Revenue or Tip Fee (1)	Subtotal	No. of Loads	Hauling Fee per Load	Container Rental Day/Wk/Mo	No. of Days/ Wks/Mos	Subtotal	Total Cost
Non-Recyclable Waste									

Option 2: Self Hauling Materials

Cost of Recycling/Recovery

	Disposal			Handling Costs				
Material	Tons or Cubic Yards	Revenue or Tip Fee (1)	Subtotal	No. of Loads	Hours per Load	Truck Costs per Hour Incl. Labor	Subtotal	Total Cost
Totals								

(1) If paid a revenue for the material, enter it as a negative number.

Cost of Landfilling

	Disposal			Handling Costs				
Material	Tons or Cubic Yards	Revenue or Tip Fee (1)	Subtotal	No. of Loads	Hours per Load	Truck Costs per Hour incl. Labor	Subtotal	Total Cost
Non-Recyclable Waste								

Total Cost for Recycling/Recovery and Landfilling of Materials	

SECTION 017700
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout procedures.
   2. Systems and equipment testing.
   3. Instructions to Owner.
   4. Clean-up.

B. Related Sections:
   1. Section 013100 – Project Management and Coordination.
   2. Section 013216 – Construction Progress Schedule.
   3. Section 015100 – Temporary Utilities.
   4. Section 015200 – Construction Facilities.
   5. Section 017800 – Closeout Submittals.

1.2 SUBSTANTIAL COMPLETION AND OWNER OCCUPANCY

A. Owner has urgent need to occupy Project to commence its intended use.

B. Plan an efficient, orderly and coordinated completion process including organizing, scheduling and coordinating the following:
   1. Work of contractor's own forces.
   2. Work of subcontractors.
   3. Establish firm commitments for on-time completion
   4. Owner's needs for accommodations and time to occupy project during closeout per schedule of Substantial Completion and final completion specified in Section 013216.

C. After Substantial Completion expedite completion of remaining work in an organized, efficient manner that maintains quality standards. Perform such work according to following requirements:
   1. Scheduled work in advance with Owner.
   2. Perform Work in occupied spaces when space is not in use, such as after hours in administrative areas or public spaces when public use hours are over for the day, unless otherwise approved by the Owner.
   3. When necessary, use overtime to accomplish work not able to be completed during normal work hours at no extra cost to the Owner.
   4. Perform Work in occupied areas in a manner and at such time as will not significantly interfere with, hamper or inconvenience Owner's program or functions.

1.3 PROJECT CLOSEOUT

A. Insurance: Refer to General Conditions.
   1. Upon completion of work and written acceptance by Owner, provide a Certificate of Insurance indicating specified Completed Operations insurance will be provided a minimum of one year after Owner's acceptance of entire Project.
   2. Specified Property Insurance shall be maintained until final acceptance by Owner of entire Project.

B. Supplemental Agreements: Resolve supplemental agreements prior to final payment, including adjustment of allowances.

C. Consent of Surety: Refer to General Conditions – obtain consent of surety prior to reduction in retained percentage and prior to final payment.

D. Broken Glass: Repair.

E. Guarantees - Warranties: Refer to General Conditions for general guarantee requirements.
   1. In addition to general guarantee, provide written guarantees specified in technical sections of Specifications per Section 017800.

F. Test Reports and Certificates: Refer to Section 017800.

G. Retention of Records: Retain records required by law and good business practice.

H. Record Set of Drawings:
   1. Refer to General Conditions and Section 017800.
   2. Deliver record set to Architect upon Final Completion of Project.
   3. Review set with Architect to clarify or explain changes that may be necessary.

I. Temporary Utilities:
   1. Refer to Section 015100.
   2. Remove temporary facilities and utilities as job progress permits.
   3. Read meters at times specified for transfer of services cost from Contractor to Owner for light/power.

J. Sanitary Facilities:
   1. Refer to Section 015200.
   2. Remove temporary fixtures and restore rooms as specified.

K. Temporary Facilities:
   1. Remove as work progresses and facilities are no longer needed at time acceptable to Architect.
   2. Prior to final payment, remove temporary sheds, offices, fences (including perimeter fence), barricades, surplus materials, debris and other material or items not part of Project.

L. Extra Materials: Refer to Section 017800

1.4 SYSTEMS AND EQUIPMENT TESTING

A. Test equipment and systems to demonstrate each system and piece of equipment is installed and operating properly.

B. Provide a written record of tests and results per Section 017800.

C. After operation and testing of systems, instruct Owner's representatives with Architect's representative present.

1.5 INSTRUCTIONS TO OWNER

A. Provide instructions before final payment is made. Submit evidence that instruction/maintenance manuals were delivered to and were acceptable to Owner.

B. Requirements herein supplement specific requirements provided under individual specification sections.

C. Collect information and data so complete manuals are provided in sufficient time to permit review prior to time for final payment. Refer also to Section 017800.

D. Provide qualified representatives of Contractor or subcontractors to give explanations and instructions.

E. Provide instruction manuals per Section 017800 to be used and reviewed during instructions.

F. Thoroughly and properly instruct the Owner in use, operation, care and maintenance of Project, especially various systems and equipment installed under Contract. Give instructions methodically and carefully. Cover various phases of work and in sufficient detail so Owner fully understands entire Project.

G. Orient and familiarize designated Owner Representatives with locations, methods, materials, uses and operation of systems and equipment, as well as specialized materials installed under Contract.

H. Instruct and demonstrate to the Owner regarding full use, sequence or function and similar information to fully acquaint Owner in proper use, care and control of equipment, systems and devices installed under Contract.

I. Precautionary Measures and Dangers of Misuse.
   1. Specifically explain precautions and dangers of misuse.
   2. Establish specific and agreed upon periods of time with the Owner, adequate to thoroughly present pertinent information.
   3. Owner will record length of time and number of days spent on these instructions.

J. Refer to Section 013100 for additional information and data for maintenance manual such as coordination drawings.

K. Information Not Required:
   1. Normal and routine cleaning of normal floor and wall finishes.
   2. Maintenance of light fixtures.
   3. Cleaning of radiation covers.
   4. Hardware maintenance.
   5. Other similar housekeeping matters.

1.6 CLEAN-UP

A. Refer to General Conditions for cleaning requirements during construction.

B. Clean materials and equipment. Remove (haul away) debris, cartons, crates, surplus materials.

C. Maintain work neat and orderly.

D. Definitions
   1. Thorough Cleaning:
      a. Thorough cleaning required unless otherwise specified.
      b. Remove dust, dirt, debris, laitance, grease, oil, stains, discolorations, droppings, markings, and other soil or foreign matter or substance.
      c. Remove labels except labels specifically designated to remain as part of listed, rated or labeled item.
      d. Use appropriate methods such as sweeping, scrubbing, mopping, washing, dusting vacuuming so surface is completely clean and streak free.
   2. Broom Clean: Remove visible dirt or dust from surface with a new, high quality, clean broom by thoroughly and properly sweeping or brooming so no dust or dirt is visible on surface.

E. Perform general "final" cleaning prior to inspection for Substantial Completion and occupancy. Plan, organize and coordinate cleaning to avoid working in spaces once cleaned. Coordinate timely cleaning with Architect especially for cleaning of glass.

F. Clean entire Project including, but not limited to:
   1. Cleaning required under each Section.
   2. Remove accumulated dust, dirt and debris.
   3. Materials, equipment or other items.

G. Electrical Subcontractor Cleaning: Includes but is not limited to:
   1. Other work under contract needing cleaning.

H. Perform other cleaning as required to turn the Project over to the Owner in new, well maintained condition, ready for full use and occupancy.

I. Clean areas made dirty by work done after Substantial Completion so building is clean as specified prior to Final Completion.

1.7 FINAL ACCEPTANCE AND FINAL PAYMENT

A. Final payment will not be made until final acceptance inspection, completion of punch list items and final sign-off by Owner and Architect.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 017800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout submittals.
   2. Warranties and guarantees.
   3. Test reports and certificates.
   4. Extra materials.
   5. Maintenance manuals.
   6. Record drawings and specifications.

B. Related Sections:
   1. Section 013300 - Submittal Procedures.
   2. Section 017700 - Closeout Procedures.

1.2 WARRANTIES AND GUARANTEES

A. Provide written guarantees specified in technical sections of Specifications.

B. Where guarantee terms are included in Specifications or a specific guarantee is referenced, submit guarantee in specified form.

C. Submit guarantees prior to final payment.

D. Submit a checklist of required guarantees, by section numbers.

1.3 TEST REPORTS AND CERTIFICATES

A. Provide test reports and certificates required in technical sections prior to final payment.

B. Provide a written record of systems and equipment testing and results.

C. Provide a check list of required reports and certificates, by Specifications sections.

1.4 EXTRA MATERIALS

A. Prior to final completion, deliver extra materials specified in various technical sections.

B. Do not allow materials to "collect" in various parts of Project. Deliver to Owner together.

C. Obtain receipt for specified extra materials. Without such evidence of delivery, no credit will be given for fulfilling specified requirements.

D. Provide a checklist of specified extra materials.

1.5 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Coordinate submittals from Section 013300 that will be needed to fulfill following requirements.

B. Provide operating instruction data and maintenance manuals in accordance with Section 017700 - Closeout Procedures.

C. Organize information by classes or types of equipment and systems as follows:

1. Manuals shall consist of neatly edited and typed instruction manuals (in hard cover, indexed, loose-leaf notebook) to explain use, function and control of equipment, materials and systems. Printed information shall include:
   a. Warranties and guarantees.
   b. Common errors made, which will "abuse" equipment or system
   c. Use, function and control of equipment and systems
   d. Clean installation data and pamphlets (not to be left at equipment but included in manuals)
   e. Instructions and explanations.
   f. Cleaning instructions.
   g. Wiring and piping diagrams.
   h. Various types of maintenance procedures.
   i. Lubrication data and schedules.
   j. Maintenance materials to be used.
   k. Maintenance information.
   l. Maintenance instructions with frequency.
   m. Other maintenance information.
   n. Adjustment and repair data.
   o. Parts list with numbers and recommended parts for Owner's stock.
   p. Names, addresses, and telephone numbers parts distributor.
   q. Names, addresses, and telephone numbers of appropriate service organizations for various items and equipment.
2. Manuals shall include systems and equipment as specified, but not limited to following information:
   a. Alarm systems
   b. Electrical distribution systems
   c. Operating equipment of general construction
   d. Electrical work
   e. Other similar systems and equipment.

1.6 RECORD SET OF DRAWINGS AND SPECIFICATIONS

A. Provide record set of Drawings and Specifications to Architect at completion of Contract.
   1. Refer to General Conditions for general requirements.
   2. Refer to Section 013300 - Submittal Procedures for posted (updated) job site contract documents.

B. During construction, maintain clean set of Drawings and Specifications for sole purpose of recording changes to Contract.

C. Mark record set methodically as work progresses, clearly and neatly, in color.

D. Include information cut and pasted into appropriate location of documents to reference change, adjustment, or clarification. Type of information to be recorded on record set includes but is not limited to:
   1. Addendum items sent during bidding
   2. Changes, deviations or revisions made, except minor or non-critical dimensions, including those made by Change Order or Supplementary Instructions.
   3. Accepted submittals including shop drawings, product data and samples.
   4. Omissions, including work omitted by accepted alternates.
   5. Dimensioned locations of major or main utility lines, such as main conduit runs, piping mains and similar work.
   6. Locations of control valves.
   7. Additions to the work.
   8. Changes in significant details.
   9. Changed footing or other elevations.
   10. Locations of electrical home run boxes, including circuit numbers and panel designations for each box.
   11. Coordination drawings.
   12. Changes in locations of panelboards, outlets, drains, piping, openings, dampers and similar features.
   13. Other similar data.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 024113
SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the "Standard Specifications for Public Works Construction," latest edition, shall apply except as modified herein.

1.2 SCOPE OF WORK

A. Work of this Section includes all material, equipment, and labor necessary for and incidental to completing all Site Demolition work complete, as indicated on the Drawings, as reasonably implied, or as specified and designated herein, including, but not limited to, the following:

1. Clearing and grubbing of all vegetation from site work areas.
2. Removal and legal disposal of all deleterious materials.
3. Removal and legal disposal of any additional deleterious items not specifically mentioned herein which may be found within the work limits.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Site Grading: Section 312200

1.4 RESPONSIBILITY AND CO-ORDINATION

A. Contractor shall secure and maintain all required permits and licenses and pay all fees necessary to legally complete the work of this section.

B. Contractor shall notify utility companies for all utilities to be cut off, modified or relocated, and shall maintain and protect all active utilities.

C. Contractor shall coordinate all work with the County in an effort to avoid any conflicts.

1.5 PROTECTION AND SAFETY

A. Contractor shall provide signs and construction fencing in all necessary places to exclude persons, except those connected with the work, from entering the working area. Contractor is responsible for protecting the project site and adjacent properties from dirty water, mud and water accumulation due to Contractor's operations, rainfall run-off or any water that enters the project site from any other source.

B. Contractor to protect from any hazards resulting from his operations.

1.6 SALVAGE MATERIALS

A. All salvage materials are the property of the County. In the event that the County elects not to take possession of these materials, they then become the property of the Contractor and he must immediately remove them from the site.

PART 2 – EXECUTION

2.1 GENERAL

A. No work of this section shall commence until the construction fence is in place.

B. Site Clearance and Disposal

1. Contractor shall notify the County prior to start of demolition, to allow the County to salvage any site furnishings proper to their disposal. Demolition and A.C. paving removal work shall be carefully done to avoid damage to all existing facilities not designated for removal.
2. Clear the site to be improved of weed growth, rubbish and debris, and concrete rubble, etc., that are to be removed for construction of the improvements shown on the construction plans. Roots three inches (3") in diameter and larger, and rocks and broken masonry larger than four inches (4") in the greatest dimension shall be removed to a minimum depth of twelve inches (12") below finished grade.
3. All deleterious materials shall be disposed of off the site in a legal manner by the Contractor, who shall make all necessary arrangements and pay all related costs.

C. Protection

1. All existing palm trees, curbs, walls and concrete paving not slated for demolition shall be protected in place. Any damage to protected site features shall be repaired and/or replaced at the no additional cost to the County.

D. Utilities

1. All known underground utilities are noted on the plans.
2. All miscellaneous inactive underground facilities (e.g., drainage devices, cables, abandoned water lines, irrigation pipes, wiring, etc.), located twelve inches (12") or more below finish grade shall be removed as necessary for proper completion of the work. All miscellaneous active underground facilities that are encountered during the work shall be protected.
3. Should the Contractor encounter any existing underground utilities not shown on the drawings, he shall at once notify the County Project Inspector who will determine further procedure.

E. Debris Burning

1. Burning of debris will not be permitted.

F. Dust Control

1. Dust shall be kept to a minimum during site clearing operations by means of wetting the site with water or other approved method. After all site clear and grub operations are complete, sweep down all existing sidewalks and roadways on and off the site that have become soiled due to Contractor's operations.

G. Payment Terms

1. Payment for site demolition work will be at the lump sum price bid for site demolition. Payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work in site demolition as herein specified. A 10% retention shall apply to all site demolition work.

2.2 EARTHWORK

A. Sediment and Erosion Control

1. Best Management Practices must be used to prevent soil from leaving the site and protect excavated areas from eroding. Earthwork operations must not begin until the Contractor has installed temporary erosion control measures as necessary to protect adjacent streets, property, and all storm sewer inlets from sediment transported by storm water runoff.
2. Prevent soil from leaving the site via storm runoff, vehicular tires, or other means. Use silt fencing as needed and construct an exit drive to clean tires of vehicular traffic leaving the site.
3. Restore eroded topsoil areas subsequent to final vegetative cover being established. Repair ruts and re-establish vegetative cover, with no additional compensation provided. Limit repair work to the smallest earthwork equipment practical.
4. Water from rock construction exit or other operations containing sediment must be treated by filtration, a settling basin or other means sufficient to reduce sediment content.
5. Pollutants such as fuels, lubricants, bitumens, raw wash water or waste from construction operations and other harmful materials must be properly disposed of off-site in a permitted disposal facility in accordance with governing regulations.

6. Silt fences must be installed perpendicular to site slopes before any disturbance begins.
7. Provide protection at all inlets receiving storm runoff from exposed earth areas.
8. Topsoil stockpiles must be isolated by placing a perimeter silt fence.
9. Maintenance: All temporary erosion and sediment control measures must be properly maintained and inspected after each storm event. Immediately restore, cleanout, repair and replace the facilities affected by the storm runoff.
10. All liquid and solid wastes generated by concrete washout operations must be contained in a leak-proof containment facility or impermeable liner. A compacted clay liner that does not allow washout liquids to enter ground water is considered an impermeable liner. The liquid and solid wastes must not contact the ground, and there must not be runoff from the concrete washout operations or areas. Liquid and solid wastes must be disposed of properly and in compliance with applicable regulations. A sign must be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.

B. Stripping: Strip surface soils containing organic matter in areas indicated for disturbance.

C. Maintain adequate and positive drainage of entire site for duration of project; do not allow groundwater, surface water or direct precipitation to accumulate on subgrades or in excavations.

D. Earth Retention System: Place and maintain appropriate systems to support sides of excavation and to prevent soil movement that may endanger adjacent persons, structures, pavements, or utilities.

E. Excavation: Excavate to depth and limits required for construction of building, parking structure, paving sections, utilities, landscaping items, and topsoil placement.
   1. Over-excavate subgrade of ground supported foundation walls, ground supported slabs and paved areas only as specifically required by Testing Agency.
   2. Segregate approved select uniform aggregate materials free of debris for backfill and fill construction in limited locations.
   3. Dispose excess and unsuitable material off-site in accordance with local codes, regulation, and laws.

F. Soils materials:
   1. Landscape area fill and non-retaining wall backfill: On site suitable material.
   2. Structural and paved area fill: Granular Material.
   3. Building wall and retaining wall backfill: Select Granular Material.
   4. Vapor barrier protection layer: 2-inches fine aggregate.
   5. Topsoil borrow must be fertile, friable, natural loam containing 3.3 to 15.0 percent organic matter and be capable of sustaining vigorous plant growth. It must be taken from a well drained arable site and be free of any admixture of subsoil, stones, lumps, clods of hard earth, plants, or their roots, sticks, and other extraneous matter. Topsoil must not be used for planting operations while in a frozen or muddy condition.
   6. Unsuitable Material: All saturated and unsaturated mixtures of soil containing organic and/or inorganic matter, such as humus, spongy matter, roots, stumps, muck, peat, fatty clay, rubbish and other objectionable materials as designated by the TA.
   7. Suitable Material: All mineral soil except topsoil, rock and unsuitable material as defined above is termed suitable.
   8. Select Suitable Material: Non-expansive mineral soil free of significant rock quantities and having a plastiCounty index of 15 (or less), and a liquid limit of 35 (or less). Soil must be free of any materials that may prevent attaining specified density.
   9. Granular Material: Clean granular soil material with at least 90% passing the 1-1/2-inch sieve, and no more than 12% passing the #200 sieve.
   10. Select Granular Material: Clean granular soil material with 100% passing the 1-inch sieve, at least 90% passing the ½-inch sieve, less than 40% passing the #40 sieve, and no more than 5% passing the #200 sieve. Soils meeting ASTM D 2487 categories SP, SW, GP or GW may qualify.
   11. Under-floor Material: This trimmable and compactable granular material must provide a capillary break and suitable sub-grade support for the floor slab.

12. Base Material: Must be 100% crushed quarry rock per ASTM C-33 with a gradation in accordance with size No.57 (1-inch to #4 sieves).
13. Stabilization Aggregate: Must be 100% crushed quarry rock per ASTM C-33 with a gradation in accordance with size No.4 (1-1/2-inch to 3/4-inch sieves).
14. Low Permeability Soil: Cohesive soils with a minimum permeability coefficient of 1 x 0.0000001 cm/sec when compacted to 96% Proctor Density (ASTM D698). Soils meeting Unified Soils Classification System categories CL-CH or CH may qualify.
15. Pond liner: Must be the same material as Low Permeability Soil..
16. Silt Fence: MIRAFI Co. product Silt Fence Structure, or approved equal.

G. Miscellaneous materials:
   1. Below grade seepage protection of exterior walls enclosing finished space: synthetic wall drainage and membrane waterproofing system - W.R. Grace, Mirafi or equal.
   2. Geotextile reinforcement/separation fabric: Amoco 2006, Mirafi 600x or equal.

H. Backfill: Fill uniformly in 9-inch horizontal layers, over approved, compacted subgrade.
   1. Compact fill materials to meet required minimum percentages of proctor densities required by soils report.
   2. Adjust moisture content as required to stay within 3 percent of optimum.

I. Fine grade site subgrade as necessary to receive paving sections and landscape materials.

J. Provide and uniformly place minimum of 6-inches of approved topsoil in landscaped areas.

END OF SECTION

SECTION 055200
METAL RAILINGS

PART I - GENERAL REQUIREMENTS

1.1 RELATED DOCUMENTS

The provisions of the "Standard Specifications for Public Works Construction," latest edition, shall apply except as modified herein.

1.2 SCOPE

A. Work of this Section includes all material, equipment, and labor necessary for and incidental to completing all Metal Fabrication work, as indicated on the Drawings, as reasonably implied or as designated herein, including, but not limited to, the following:

1. Guard Rails.
2. Hand Rails.
3. Miscellaneous Metal Fabrications.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Paving: Section 321313

B. Site Furnishings: Section 129300

1.4 QUALITY ASSURANCE

A. The Contractor shall use adequate numbers of skilled workers who are trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Welding: Perform all shop and field welding required in connection with the work of this Section, adhering of the American Welding Society.

1.5 SUBMITTALS

A. The following are to be submitted to the Landscape Architect at the pre-construction conference.

1. Complete materials list of all items proposed to be furnished and installed under this Section.
2. Manufacturer's specifications and other data required to demonstrate compliance with specified requirements.
3. Shop Drawings of all items proposed to be furnished and installed under this Section. Include plans, sections, elevations, and details as needed.
4. Templates for anchor and bolt installation by other trades.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the work and materials of all other trades.

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Park and Recreation Department.

PART 2 - MATERIALS

All materials shall conform to Section 206 of the Standard Specifications except as modified herein.

2.1 MATERIALS AND COMPONENTS

A. Metal surfaces, general: For fabrication of the work of this Section which will be exposed to view, use only those materials which are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade name, and roughness.

B. Standards: All materials shall comply with:

1. Steel plates, shapes, and bars: ASTM A36.
2. Steel plates to be bent or cold formed: ASTM A283, Grade C.
3. Steel tubing, hot-formed, welded, or seamless: ASTM A501.
4. Steel bars and bar-size shapes: ASTM A306, Grade 65, or ASTM A36.
5. Cold-finished steel bars: ASTM A108, grade as selected by the fabricator.
6. Cold-rolled carbon steel sheets: ASTM A336.
7. Galvanized carbon steel sheets: ASTM A526, with ASTM A525, G90 zinc coating.
8. Stainless steel sheets: Type 302/304 of American Iron and Steel Institute, 24-gauge, with number 4 finish.
9. Gray iron castings: ASTM A48, Class 30.
10. Malleable iron castings: ASTM A47, grade as selected by the fabricator.
11. Steel pipe: ASTM A53, type as selected, Grade A, black finish unless galvanizing is required, standard weight (Schedule 40) unless otherwise indicated.
12. Concrete inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153.
13. Non-shrink nonferrous grout: CE CRD C588.

2.2 FASTENERS

A. General: Provide zinc-coated fasteners for exterior use and where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Standards: All fasteners shall comply with :

1. Bolts and nuts: regular hexagon-head type, ASTM A307, Grade A, Galvanized.
2. Lag bolts: square-head type, Fed. Spec. FF-B-561, Galvanized.
3. Machine screws: cadmium plated steel Fed. Spec. FF-S-92.
4. Wood screws: flat-head carbon steel, Fed. Spec. FF-W-92.
5. Plain washers: round, carbon steel Fed. Spec. FF-W-92.
6. Masonry anchorage devices: lead expansion shield, Fed. Spec.. FF-S-325.
7. Toggle bolts: tumble-wing type, Fed. Spec. FF-B-588, type, class and style as required.
8. Lock washers: helical spring type carbon steel, Fed. Spec. FF-W-84.

2.3 PAINT

A. Metal primer paint:

1. Use mixed pigment, alkyd varnish, linseed oil paint complying with Fed. Spec. TT-P-86, Type II; or iron oxide, raw linseed oil, alkyd paint, complying with SSPC Paint 2-64, or basic silico chromate base iron oxide, linseed oil, alkyd paint complying with Fed. Spec. TT-P-615, Type II.
2. Primer selected shall be compatible with finish coats of paint. Coordinate selection of metal primer with actual finish paint specified.

B. Galvanizing repair paint: Use a high zinc oxide-zinc dust content paint for re-galvanizing welds in galvanized steel, complying with Military Specifications MIL-P-15145.

2.4 FABRICATION

A. Workmanship:

1. Use materials for size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in the finished product.

2. Work to dimensions shown on the plans, or as shown on the approved Shop Drawings, if submitted, using proven details of fabrication and support.
3. Use type of materials shown or specified for the various components of the Work.
4. Form exposed work true to line and level, with accurate angles and surfaces and with straight sharp edges.
5. Ease the exposed edges to a radius of approximately 0.8 mm (1/32") unless otherwise shown.
6. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
7. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections grind exposed welds smooth and flush; match and blend with adjoining surfaces.
8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, use Phillips flat-head (counter-sunk) screws or bolts.
9. Provide for anchorage of the type shown. Coordinate with supporting structure. Fabricate and space the anchoring devices to provide adequate support for intended use.
10. Cut, reinforce, drill, and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

2.6 GALVANIZING

A. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
   1. ASTM A153 for galvanizing iron and steel hardware.
   2. ASTM A123 for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 3mm (1/8") thick and heavier.
   3. ASTM A386 for galvanizing assembled steel products.

2.6 SHOP PAINTING

A. Remove oil, grease, and similar contaminants in accordance with Standard Specifications, Section 310.

B. Clean off heavy rust and loose mill scale and other deleterious materials before applying shop coat in accordance with Standard Specifications, Section 310-2.

C. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's recommendations, and at a rate to provide the recommended dry film thickness.

D. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.

E. Use painting methods which will result in full converge of joints, corners, edges, and exposed surfaces.

F. Apply one shop coat to fabricated metal items; except, apply two shop coats to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first coat.

2.7 MISCELLANIOUS METAL FABRICATIONS

A. Rough hardware:
   1. Provide bent or otherwise custom fabricated bolts, plates, anchors, hangars, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete and other structures.
   2. Manufacture or fabricate items of sizes, shapes, and dimensions required.
   3. Provide malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere furnish steel washers.

PART 3 - EXECUTION

All work shall conform with Section 304 of the "Standard Specifications," except as modified herein.

3.1 INSPECTION

A. Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until satisfactory conditions have been corrected.

3.2 PREPARATION

A. Furnish setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

3.3 INSTALLATION

A. Fastening to in-place construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction including threaded fasteners for concrete inserts, toggle bolts, wood screws, and other connectors as required.

B. Cutting, fitting, and placement:
   1. Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications.
   2. Set work accurately in location, alignment, and elevation, and make plumb, level, true and free from rack, measured from established lines and levels.
   3. Provide temporary bracing or anchors in formwork for items which are to be built into concrete similar construction.
   4. Fit exposed connections accurately together to form tight hairline joints.
   5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
   6. Grind exposed joints smooth, and touch up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections, except where required for vandal resistant anchorage.

C. Field welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of weld made and methods in correcting welding work. Tack weld all exposed fasteners to prevent unauthorized removal.

D. Touch-up painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same materials as sued for shop painting. Apply by brush or spray to provide minimum dry film thickness of 0.051 mm (2.0 mils).

3.4 CLEAN-UP

A. Upon completion of the work of this Section, clean up the project work site removing all unused materials, trimmings, cuttings, metal shavings, burrs, or bits and all other miscellaneous debris and trash that results from this work. Wipe down all fabricated items and adjacent improvements to remove cutting oil, grease, or other soil and stains that may result from this work.

3.5 PAYMENT TERMS

A. Payment for metal fabrications will be at the lump sum price bid for metal fabrications. Payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work in metal fabrications as herein specified. A 10% retention shall apply to all metal fabrications work.

END OF SECTION

SECTION 111200
PARKING CONTROL EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Automatic barrier gates, vehicle detectors, ticket dispensers, card control units, cashier's clock, radio control and accessories.

B. Related Sections:
   1. Section 320523 – Cement and Concrete for Exterior Improvements: Concrete for islands and curbing.
   2. Division 26 - Electrical - Electrical service.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data, specifications, installation, and maintenance instructions for each type of parking equipment required in accordance with Section 013300.
   1. Provide templates for anchor bolts and other items encased in concrete or below finished surfaces in time to not delay work.

B. Shop drawings for each item of parking control equipment required. Include plans, elevations, and details of typical members and other components. Show layout and installation details, including anchorage details.

C. Wiring diagrams detailing wiring for parking control equipment operator, signal, and control systems differentiating clearly between manufacturer-installed wiring and field-installed wiring.
   1. Show locations of connections to electrical service provided as unit of work under other Sections.

D. Maintenance Instructions: Provide manufacturer's instructions for maintenance of parking control equipment.
   1. Include recommended methods and frequency for maintaining equipment in optimum operating condition under anticipated traffic and use conditions.
   2. Include precautions against materials and methods that may be detrimental to finishes and performance.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage experienced Installer who is authorized representative of parking control equipment manufacturer for both installation and maintenance of type of units required for this Project, and whose installations have resulted in construction with record of successful in-service performance.
   1. Maintenance Proximity: Installer shall maintain place of business with maintenance facilities not more than 2 hours normal travel time from Project site.

B. UL and NEMA Compliance: Provide internal electrical components required as part of parking control equipment that are listed and labeled by UL and comply with applicable NEMA Standards.

C. Single-Source Responsibility: Obtain parking control equipment from one source from single manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Automatic Parking Device, Cincinnati Time, Stanley Vemko.

2.2 AUTOMATIC GATE

A. Provide UL approved barrier gate system.

B. Cabinet: Fabricate of not less than 12 gauge cold-rolled steel sheet, reinforced internally with welded steel angle framing. Weld seams and grind smooth. Provide weatherproof gasketed access doors with flush mounted locks; furnish 2 keys for each gate, keyed alike. Finish cabinet with manufacturer's standard baked enamel over primer system, interior and exterior, white color.

C. Gate Arm: Fabricate of nominal one inch clear lumber, length as indicated. Finish with manufacturer's standard coating system with black diagonal stripes on traffic-side face. Provide mounting flange with break-away feature to insure clean break if arm is struck.

1. Provide automatic instant reversing mechanism which stops downward motion of gate arm strikes object, immediately returning arm to upward position. Equip with variable time (0-60 seconds) reset device.

D. Mechanical: 1/3 HP, 115 VAC, 60 HZ, single phase, instant reversing motor for gate arm operation. Power transmitted to gate arm drive shaft through harmonic acting crank and connecting rod. Fabricate cranks, rod, and drive shaft of galvanized or cadmium plated solid bar steel. Provide operable cam for adjustment of arm travel.

E. Electrical: Control components in factory-sealed, plug- in controller. Provide galvanized or cadmium plated box for wiring connections. Furnish one 115 VAC grounded convenience outlet; 250 watt strip heater with control switch and preset thermostat; "off-on" switch; "automatic manual" switch; overload switch protection.

2.3 ACCESSORIES

A. Provide anchor bolts and other accessory items as required for installation and operation, hot-dip galvanized in accordance with ASTM A153.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to beginning equipment installation, examine areas to receive parking control equipment. Verify that critical dimensions are correct and that conditions are acceptable.

1. Do not proceed with installation of parking control equipment until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide templates for anchor bolts and other items encased in concrete or below finished surfaces in sufficient time so as not to delay Work.

3.3 INSTALLATION

A. Install parking control equipment and accessories in accordance with manufacturer's instructions and placement drawings.

B. Coordinate placement of anchors and accessories in concrete work.

3.4 DEMONSTRATION

A. Instruct Owner's personnel in proper operation and maintenance of parking control equipment. Train personnel in procedures to follow in event of operational failures or malfunctions.

3.5 CLEANING

A. After installation, clean finished surfaces. Touch up damaged shop-applied finishes as required to restore damaged areas.

END OF SECTION

SECTION 129300
SITE FURNISHINGS

PART I - GENERAL REQUIREMENTS

1.1 RELATED DOCUMENTS

A. The work of this section shall conform to the "Standard Specifications for Public Works Construction", latest edition, except as modified herein.

1.2 SCOPE OF WORK

A. Work of this Section includes all materials, labor and equipment necessary to provide and install the Site Furnishings as shown on the drawings, as reasonably implied or as specified herein. The equipment shall be assembled on site as per manufacturer's recommendations and this section. All work and equipment provided shall be subject to approval of the Parks Inspector.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Paving: Section 321313

1.4 SUBMITTALS

A. Contractor shall submit a complete list of materials along with manufacturer's catalog data for all materials proposed for use in the work at the pre-construction conference. Proposals for substitution of those materials specified herein shall be submitted and reviewed.

B. Manufacturer's Product Data: Submit three (3) copies of manufacturer's literature for each item of site furnishings.

C. Shop Drawings: Manufacturer's shop Drawings shall be provided for all prefabricated items. Shop Drawings which show complete details shall be furnished in quadruplicate for all items requiring shop fabrication in accordance with Section 2-5.3 of the Standard Specifications.

1.5 GUARANTEE AND LIABILITY INSURANCES

A. Manufacturer shall guarantee all materials and workmanship for a period of one (1) year exclusive of vandalism. Manufacturer will be required to provide product liability insurance coverage in the minimum amount of $1,000,000 per incident. Manufacturer or his representative shall inspect all installation work and provide written certification that equipment has been installed in accordance with the manufacturer's specifications.

B. Each Manufacturer will be required to provide complete installation drawings including specifications and a replacement parts list for all products.

C. Contractor shall provide a written guarantee on his firm's letterhead for all materials and workmanship for a period of one (1) year exclusive of vandalism. Written guarantee shall be submitted to the District at the final inspection prior to final acceptance of the work.

1.6 PROPOSED SUBSTITUTIONS

A. Products proposed for substitutions as "equals" to those specified are subject to the approval of the District. If at the time proposed equals are delivered to the site, it is determined by the District that they are not equal to those specified, they shall be removed and products as specified shall be provided by the Contractor at no additional cost to the District.

1.7 LOCATION INSPECTION

A. No equipment or apparatus or foundations for same shall be placed until location stakes have been inspected for recommended approval by the Landscape Architect and/or Parks Inspector.

PART 2 – MATERIALS

2.2 BENCHES

A. Prefabricated site benches.

B. Acceptable manufacturers:
   1. Landscape Forms –
   2. Different Manufacturer –

2.3 WASTE RECEPTACLES

A. Precast concrete with heavy gauge polyethylene liner. Spun aluminum removable top. Square unit.

B. Acceptable manufacturers:
   1. Architectural Precast.
   2. Landscape Forms

2.4 PLANTERS

A. Precast concrete with heavy gauge polyethylene liner.

B. Acceptable manufacturers:
   1. Wausau Tile: Terra-Form Planter.
   2. Dura Art Stone: Design D 6' diameter by 30 " high

2.5 ASH URNS

A. Precast concrete, 12" square by 24" high.

B. Acceptable manufacturers:
   1. Architectural Precast: Model AT-12-S.
   2. Dura Art Stone: Design TR-D2.
   3. Landscape Forms: Plexus Collection

2.6 BIKE LOOPS

A. 1/2" x 1-1/2" die formed steel with 1/4" black plasticol coating.

B. Acceptable manufacturer and product: Wabash Valley Manufacturing: Model BL-1430.

2.7 FLAGPOLES

A. 30' high tapered aluminum ground set.

2.8 BRIDGES

A. Concrete piers/walls with steel truss systems with 4 x 6 treated wood decking.

2.9 SITE FENCING

A. Chain link, vinyl clad.

PART 3 - EXECUTION:

3.1 LAYOUT

A. Contractor shall stake/mark locations for all slabs equipment or apparatus or foundations for same and shall obtain the acceptance of their location from Landscape Architect and/or Park Inspector prior to commencing any digging. Locations shall be adjusted to provide minimum clear distances

required from all edges of slabs, trees, irrigation heads, or other obstructions.

3.2 CONCRETE WORK

A. All concrete foundation work shall be performed in accordance with the Standard Specifications, Section 201. Contractor shall obtain the acceptance of all forming from the Park Inspector prior to pouring any concrete. Foundations holes shall be inspected and accepted by the Inspector prior to pouring concrete.

3.3 STEEL FABRICATION AND WELDING

A. All steel members shall be thoroughly hand cleaned and solvent cleaned to remove all rust, scale, oil, grease, and foreign material prior to welding. All welds shall be continuous fillet welds along all abutting surfaces. Sand all welds smooth. Galvanized steel shall be touched up after welding with Galvicon paint.

3.4 SITE FURNISHINGS

A. All Site Furnishings shall be installed plumb, at a height above the finish surface as recommended by the manufacturer. Minimum footing size shall conform to the manufacturer's recommendations. **All footings shall be installed prior to placement of concrete slabs, where they occur. No "block outs" will be permitted.**

3.5 PAINTING

A. All items to be painted shall be properly primed prior to application of a minimum of two (2) finish coats.

B. After installation, all site furnishings and play equipment shall be touched-up as necessary. Touch-up paint shall be as supplied by the manufacturer.

3.6 CLEAN-UP

A. Contractor shall clean up and legally dispose of all unused materials, excess soil, and debris at regular intervals throughout the duration of the work, and as directed by the District.

3.7 PAYMENT TERMS

A. Payment for site furnishings will be at the lump sum price bid for site furnishings. Payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work in site furnishings as herein specified. A 10% retention shall apply to all site furnishings work.

END OF SECTION

SECTION 221113
FACILITY WATER DISTRIBUTION PIPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for combined water service and fire-service mains.

B. Eastern Municipal Water District will furnish products to the site, ready for installation.

1.3 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate materials, dimensions, station, method of field assembly, and components.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
   2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
   3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:
   1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
   2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
   1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
   2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
   1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
   2. Do not proceed with interruption of water-distribution service without Construction Manager's written permission.

1.8 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.
   1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
   2. Copper, Pressure-Seal Fittings:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1) Viega; Plumbing & Heating Systems.
   2) Or approved equal.
b. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
c. NPS 2-1/2 to NPS 4: Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.

B. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

C. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 PVC PIPE AND FITTINGS

A. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end.
1. PVC Fabricated Fittings: AWWA C900, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
2. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
3. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   a. Gaskets: AWWA C111, rubber.
4. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.3 JOINING MATERIALS

A. Refer to Division 22 Section "Common Work Results for Plumbing" for commonly used joining materials.

B. Brazing Filler Metals: AWS A5.8, BCuP Series.

C. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.4 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Flexible Connectors:
1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.
2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

2.5 DETECTOR CHECK VALVES

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

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Badger Meter, Inc.
c. FEBCO; SPX Valves & Controls.
d. Globe Fire Sprinkler Corporation.
e. McWane, Inc.; Kennedy Valve Div.
f. Mueller Co.; Hersey Meters.
g. Victaulic Company of America.
h. Viking Corporation.
i. Watts Water Technologies, Inc.
j. Or approved equal.

2. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.
   a. Standards: UL 312 and FMG approved.
   b. Pressure Rating: 175 psig.
   c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

2.6 BUTTERFLY VALVES

A. AWWA Butterfly Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. DeZURIK/Copes-Vulcan; a unit of SPX Corporation.
   b. Milliken Valve Company.
   c. Mosser Valve; a division of Olson Technologies, Inc.
   d. Mueller Co.; Water Products Div.
   e. Pratt, Henry Company.
   f. Val-Matic Valve & Manufacturing Corp.
   g. Or approved equal.
2. Description: Rubber seated.
   a. Standard: AWWA C504.
   b. Body: Cast or ductile iron.
   c. Body Type: Flanged.
   d. Pressure Rating: 150 psig.

2.7 WATER METERS

A. Water meters will be furnished by utility company.

2.8 RELIEF VALVES

A. Air-Release Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Crispin-Multiplex Manufacturing Co.
   b. Apco-Williamette Valve and Primer Corp.
   c. Val-Matic Valve & Manufacturing Corp.
   d. Or approved equal.
2. Description: Hydromechanical device to automatically release accumulated air.
   a. Standard: AWWA C512.

b. Pressure Rating: 175 psig.
c. Body Material: Cast iron.
d. Trim Material: Stainless steel or bronze.

2.9 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Ames Fire & Waterworks; a division of Watts Regulator Co.
   b. Conbraco Industries, Inc.
   c. FEBCO; SPX Valves & Controls.
   d. Flomatic Corporation.
   e. Watts Water Technologies, Inc.
   f. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
   g. Or approved equal.
2. Standard: AWWA C511.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
5. Size: 4", 6", 8" or 10".
6. Recommended Flow Rate: 4" – 1 gpm to 870 gpm, 6" – 1 gpm to 1,500 gpm, 8" – 1 gpm to 2,400 gpm, 10" – 1 gpm to 4,000 gpm.
7. Body: cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
8. End Connections: flanged for NPS 2-1/2 and larger.
9. Configuration: Designed for horizontal, straight through flow.
10. Accessories:
    a. Valves: OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
    b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

B. Double-Check, Detector-Assembly Backflow Preventers:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Ames Fire & Waterworks; a division of Watts Regulator Co.
   b. Conbraco Industries, Inc.
   c. FEBCO; SPX Valves & Controls.
   d. Watts Water Technologies, Inc.
   e. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
   f. Or approved equal.
2. Standards: ASSE 1048 and UL listed or FMG approved.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
5. Size: 4", 6", 8" or 10".
6. Recommended Flow Rate: 4" – 1 gpm to 870 gpm, 6" – 1 gpm to 1,500 gpm, 8" – 1 gpm to 2,400 gpm, 10" – 1 gpm to 4,000 gpm.
7. Body: Cast iron with interior lining complying with AWWA C550 or that is FDA approved.
8. End Connections: Flanged.
9. Configuration: Designed for horizontal, straight through flow.
10. Accessories:
    a. Valves: UL 262, FMG-approved, OS&Y gate type with flanged ends on inlet and outlet.
    b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

C. Backflow Preventer Test Kits:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Conbraco Industries, Inc.
   b. FEBCO; SPX Valves & Controls.
   c. Flomatic Corporation.
   d. Watts Water Technologies, Inc.
   e. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
   f. Or approved equal.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.10 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American AVK Co.; Valves & Fittings Div.
   b. American Cast Iron Pipe Co.; American Flow Control Div.
   c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
   d. American Foundry Group, Inc.
   e. East Jordan Iron Works, Inc.
   f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   g. McWane, Inc.; Kennedy Valve Div.
   h. McWane, Inc.; M & H Valve Company Div.
   i. Mueller Co.; Water Products Div.
   j. Troy Valve; a division of Penn-Troy Manufacturing, Inc.
   k. U.S. Pipe and Foundry Company.
   l. Or approved equal.
2. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, 5-1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
   a. Standard: AWWA C502.
   b. Pressure Rating: 150 psig minimum.
   c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include plastic caps with chains and rings.
   d. Operating and Cap Nuts: Pentagon, 1-1/8 inches face to point.
   e. Direction of Opening: Open hydrant valves by turning operating nut to left or counterclockwise.
   f. Exterior Finish:
      1) Hydrant tops and nozzle caps, 1,500 gpm or greater to be light blue.
      2) Hydrant tops and nozzle caps, 1,000 gpm to 1,499 gpm to be green.
      3) Hydrant tops and nozzle caps, 500 gpm to 999 gpm to be orange.
      4) Hydrant tops and nozzle caps, 500 gpm or less to be red.

B. Wet-Barrel Fire Hydrants:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American AVK Co.; Valves & Fittings Div.
   b. Jones, James Company.
   c. McWane, Inc.; Clow Valve Co. Div. (Corona).
   d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).

e. Mueller Co.; Water Products Div.
f. Or approved equal.

2. Description: Freestanding, with one NPS 4-1/2 and one NPS 2-1/2 outlet, NPS 6 threaded or flanged inlet, and base section with NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550.
   a. Standard: AWWA C503.
   b. Pressure Rating: 150 psig minimum.
   c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include plastic caps with chains and rings.
   d. Operating and Cap Nuts: Pentagon, 1-1/8 inches face to point.
   e. Direction of Opening: Open hydrant valves by turning operating nut to left or counterclockwise.
   f. Exterior Finish:
      1) Hydrant tops and nozzle caps, 1,500 gpm or greater to be light blue.
      2) Hydrant tops and nozzle caps, 1,000 gpm to 1,499 gpm to be green.
      3) Hydrant tops and nozzle caps, 500 gpm to 999 gpm to be orange.
      4) Hydrant tops and nozzle caps, 500 gpm or less to be red.

PART 3 EXECUTION

3.1 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

E. Underground water-service piping NPS 3/4 to NPS 3 shall be of the following:
   1. Soft copper tube, ASTM B 88, Type K; copper, pressure-seal fittings; and pressure-sealed joints.

F. Underground water-service piping NPS 4 to NPS 8 shall be the following:
   1. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end, socket fittings; and solvent-cemented joints.

G. Aboveground Water-Service Piping NPS 3/4 to NPS 3 shall be any of the following:
   1. Hard copper tube, ASTM B 88, Type K; copper, pressure-seal fittings; and pressure-sealed joints.
   2. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end, socket fittings; and solvent-cemented joints.

H. Aboveground water-service piping NPS 4 to NPS 12 shall be the following:
   1. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end, socket fittings; and solvent-cemented joints.

I. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be the following:

1. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.

J. Aboveground Fire-Service-Main Piping NPS 4 to NPS 12 shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

K. Underground Combined Water-Service and Fire-Service-Main Piping NPS 6 to NPS 12 shall be the following:

1. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC fabricated or molded fittings of same class as pipe; and gasketed joints.

L. Aboveground Combined Water Service and Fire-Service-Main Piping NPS 6 to NPS 12 shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.3 PIPING INSTALLATION

A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

B. Make connections larger than NPS 2 with tapping machine according to the following:

1. Install tapping sleeve and tapping valve according to MSS SP-60.
2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.

C. Comply with NFPA 24 for fire-service-main piping materials and installation.

D. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

E. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:

1. Under Driveways: With at least 36 inches cover over top.
2. In Loose Gravelly Soil and Rock: With at least 12 inches additional cover.

F. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

G. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

H. Sleeves are specified in Division 22 Section "Common Work Results for Plumbing."

I. Mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

J. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

K. See Division 21 Section "Water-Based Fire-Suppression Systems" for fire-suppression-water piping inside the building.

L. See Division 22 Section "Domestic Water Piping" for potable-water piping inside the building.

3.4 JOINT CONSTRUCTION

A. See Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

B. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
3. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 22 Section "Common Work Results for Plumbing" for joining piping of dissimilar metals.

3.5 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Bolted flanged joints.
3. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
2. Fire-Service-Main Piping: According to NFPA 24.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.6 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.

E. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.7 DETECTOR-CHECK VALVE INSTALLATION

A. Install in vault or aboveground.

B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.8 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.

D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on adjustable pipe supports.

3.9 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.10 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.

C. AWWA Fire Hydrants: Comply with AWWA M17.

D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.11 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install ball drip valves at each check valve for fire department connection to mains.

B. Install protective pipe bollards on two sides of each fire department connection. Pipe bollards are specified in Division 05 Section "Metal Fabrications."

3.12 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. See Division 22 Section "Common Work Results for Plumbing" for piping connections to valves and equipment.

C. Connect water-distribution piping to interior domestic water and fire-suppression piping.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.13 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.14 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."

B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 22 Section "Common Work Results for Plumbing" for identifying devices.

3.15 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
   a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
   b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
   c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 221313
FACILITY SANITARY SEWERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe and fittings.
   2. Cleanouts.
   3. Encasement for piping.
   4. Manholes.

1.2 ACTION SUBMITTALS

A. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 PRODUCTS

2.1 CLEANOUTS

A. Cleanouts: Cleanouts per Eastern Municipal Water District Standard Drawing SB-52 "Sewer Cleanouts Main Line & On-Site".
   1. Valve Box:
      a. Valve box to be Brooks I-RT valve box marked "SEWER", or approved equal.
      b. Lid must be cast iron for locating purposes.
      c. Casting shall be Alhambra Foundry number A-1241 or approved equal.
   2. Sewer Pipe Fitting and Riser to Cleanout:
      a. Cleanout pipe must be the same diameter and material as main line sewer.
      b. Plug shall be threaded cap with square nut.
      c. Plug shall be cemented in place with cement mortar or shall be neoprene plug or approved equal.

2.2 ENCASEMENT FOR PIPING

A. Encasement: Steel Casing per Eastern Municipal Water District Standard Drawing SB-49 "Pipe Casing Sewer Main Pipeline".

B. Encasement: Concrete Encasement per Eastern Municipal Water District Standard Drawing SB-63 "Sewer Connection at Concrete Encasement."

2.3 MANHOLES

A. Standard Precast Concrete Manholes per Eastern Municipal Water District Standard Drawing SB-53 "Precast Reinforced Concrete Standard 48" & 60" I.D. Manhole".
   1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints and designed for ASSHO H-20 loading.
   2. Diameter: 48 inches minimum unless otherwise indicated.

3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
4. Base Section: 9-inch minimum thickness for floor slab and 4-1/8 inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
5. Riser Sections: 5-inch minimum thickness, of length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: 3/8" thick cement mortar joint neatly struck & pointed, or preformed cold-applied ready-to-use plastic joint sealing compound and primer.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; 13" minimum width (wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step). Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:
1. Manhole Frame and Covers: Manhole frame and cover per Eastern Municipal Water District Standard Drawing SB-8 "Locking Type Manhole Cover and Frame."
2. Description: Manhole cover shall be Alhambra Foundry Co. Type A-1175 for 22-3/4" dia. (Catalog 17-Mar. '65) or approved equal. Include indented top design with lettering cast into cover, using wording equivalent to "E.M.W.D. SEWER" in 1-1/2" letters in 6" x 9" box.
3. Material: Cast iron manhole cover shall be designed for AASHO H-20 loading and shall have minimum tensile strength of 30,000 lb. per sq. in.

2.4 CONCRETE

A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
1. Channels: Sewer mains are to be laid thru the manhole where possible and used as a form for the invert. The top ½ diameter of the pipe is to be broken out to a neat line. Broken edges shall be plastered smooth with cement mortar
2. Benches: Concrete base shall be Class "A" and placed in one operation. Concrete inverts shall be true to grade and alignment and finished with a smooth surface. Special care shall be used in forming all channels to facilitate the flow of sewage.
   a. Slope: ½" cement mortar trowelled smooth.

D. Ballast and Pipe Supports: Portland cement design mix, 3,000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

PART 3 EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, non-pressure, drainage piping according to the following:
   1. Install piping pitched down in direction of flow, at minimum slope of 1 percent unless otherwise indicated.
   2. Install piping with 60-inch minimum cover.

G. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 MANHOLE INSTALLATION

A. General: Install manholes complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

D. Install manhole-cover inserts in frame and immediately below cover.

3.4 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.5 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.
   1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set 4" residential cleanout frames and covers in earth with tops 1 inch above surrounding grade.

C. Set main line cleanout frames and covers in cast-in-place-concrete block, 36 by 24 by 12 inches deep, with tops flush with pavement surface.

3.6 CONNECTIONS

A. Connect non-pressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 22 Section "Sanitary Waste and Vent Piping."

B. Make connections to existing piping and underground manholes.
   1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3,000 psi.
   2. Make branch connections from side into existing piping, 4" to 18". Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3,000 psi.
   3. Make branch connections from side into existing piping, 21" or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
      a. Use concrete that will attain a minimum 28-day compressive strength of 3,000 psi unless otherwise indicated.
      b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
   4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Connect to grease, oil and sand interceptors specified in Division 22 Section "Sanitary Waste Interceptors."

3.7 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
   1. Use detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Submit separate report for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Re-inspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Air Tests: Test sanitary sewerage according to requirements of Eastern Municipal Water District.
   6. Manholes: Perform hydraulic test according to ASTM C 969.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.9 CLEANING

A. Clean dirt and superfluous material from interior of piping.

END OF SECTION

SECTION 260502
BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. This Section supplements Division 1, General Requirements.

B. Where contradictions occur between this Section and Division 1, the most stringent of the two shall apply. Architect shall decide which is most stringent.

C. These Basic Requirements apply to entire Division 26, and to electrical work, material and equipment specified in other divisions.

1.2 SUMMARY

A. Work under this section consists of all labor, material, equipment, services, permits, fees and transportation necessary for, and/or reasonably incidental to, the construction and completion in working order of electrical work shown on the accompanying drawings and/or specified herein.

B. The power source for the new site lighting is at the new OPS BUILDING that is designed and engineered by a separate consultant.

C. Work Includes, But is Not Limited To the Following:
1. New lighting standards, to match the existing for the new parking areas.
2. Branch circuiting and control.
3. Modifications of the existing underground branch circuiting in existing adjacent parking areas that remain to accommodate the new work.
4. Disconnection and removal of existing lighting standards in parking areas that are removed or reconfigured.
5. Removal of existing conductors and conduit interceptions where required, new conduit extensions, pullboxes, repulling of new branch circuit conductors between points of connection, concrete foundations, and controls.
6. Grounding for the parking area lighting system.
7. Excavation and backfill.
8. Precast concrete pull boxes and concrete conduit encasement.
9. Templates and coordination of installation of formed concrete for electrical work such as concrete foundations for lighting standards.
10. Shop drawings, wiring diagrams, equipment data, record drawings, operating and maintenance manuals.
11. Hangers, anchors, sleeves, chases, core drilling, metal supports, channels, mechanical foundation seals, as required for work under this section.
12. Cleaning, patching, repairing and touch up painting.
13. Permits and fees.
14. Testing, adjusting of completed work, inspections and instruction.
15. Temporary power and lighting.

1.3 DEFINITIONS

A. The definitions described in Division 01, and the General Conditions of the Specification, also apply to the Division 26 contract.

B. "Contract Documents" constitute the drawings, specifications, general conditions, project manuals, etc., prepared by the engineer (or other design professional in association with the Engineer) for contractor's bid or contractor's negotiations with the Owner. The Division 26 drawings and specifications prepared by the Engineer are not Construction Documents.

C. "Construction Documents" :"construction drawings", and similar terms for Division 26 work refer to installation diagrams, shop drawings and coordination drawings prepared by the contractor using the design intent indicated on the Engineer's contract documents.

D. "Furnish" means to "supply" and usually refers to an item of equipment.

E. "Install" means to "set in place, connect and place in full operation."

F. "Provide" means to "furnish and install."

G. "Equal or "Equivalent" means "meets the specifications of the referenced product or item in all significant aspects." Significant aspects shall be as determined by the Owner's Representative.

H. "Work by other division(s)", "re _____ Division", and similar expressions, means work to be performed under the contract documents, but not necessarily under the division or section of the work on which the note appears. It is the contractor's sole responsibility to coordinate the work of the contract between his/her suppliers, subcontractors and employees. If clarification is required, consult Owner's Representative before submitting bid.

I. By inference, any reference to a "contractor" or "sub-contractor" means the entity, which has contracted with the Owner for the work of the Contract Documents.

J. "Engineer" means the design professional firm, which has prepared these contract documents. All questions, submittals, etc. regarding this division shall be routed to the Engineer (through proper contractual channels).

1.4 LEGAL REQUIREMENTS AND STANDARDS

A. All materials shall conform with the current applicable industry standards. Workmanship and neat appearance shall be as important as electrical and mechanical operations. Defective or damaged materials shall be replaced or repaired prior to final acceptance at no additional cost to the Owner.

B. Codes and Regulations: Comply with applicable sections of national, state and local codes, laws, ordinances, rules and regulations of authorities having jurisdiction including:
   1. Americans with Disabilities Act (ADA).
   2. California Energy Commission (CEC).
   3. California State Building Code Title 24 (CBC).
   4. City and State Electrical Codes that are being enforced. Applicable portion of local Building codes.
   5. Current edition of the National Electrical Code (NEC).
   6. National Fire Protection Association (NFPA).
   7. California Occupational Safety and Health Administration (CAL-OSHA).
   8. Environmental Protection Agency (EPA).
   9. State and local fire regulations and requirements.
   10. Underwriters' Laboratories, Inc. (UL).
   11. State of California Code of Regulations (CCR).

C. Standards: Comply with latest editions of applicable regulations and standards of:
   1. American National Standards Institute (ANSI).
   2. American Society for Testing and Material (ASTM).
   3. Associated Edison Illuminating Companies (AEIC).
   4. Certified Ballast Manufacturers (CBM).
   5. Energy Policy and Conservation Act (EPCA), National Energy Conservation Amendments (NAECA).
   6. Institute of Electrical and Electronics Engineers (IEEE).
   7. Insulated Cable Engineers Association (ICEA).
   8. National Bureau of Standards (NBS).

9. National Electrical Manufacturers Association (NEMA).
10. National Electrical Testing Association (NETA).

D. Code compliance is mandatory. Nothing in these drawings and specifications permits work not conforming to these codes. Where Codes are contradictory, follow the most stringent. Architect/Engineer shall determine which is most stringent.

E. No work shall be concealed until after inspection and approval by proper authorities. If work is concealed without inspection and approval, Contractor shall be responsible for all work required to open and restore the concealed area including all required modifications.

F. Minimum Requirements:
1. Comply with the requirements of authorities and listed standards as minimum acceptable work. In case of conflict between the requirements, the most stringent govern.
2. Drawings and specifications take precedence when they call for materials or construction of better quality or larger size than required by codes, laws, rules and regulations.

G. Permits: Obtain permits and inspections, and pay fees, unless otherwise specified. Deliver certificates of inspection to the Owner's Representative.

H. Guarding:
1. Provide protection for hazardous conditions.
2. Provide industrial accident and warning signs per ANSI and CAL-OSHA.
3. Erect and maintain suitable barriers, protective devices, lights and warning signs for the protection of the public and employees from the work under this section.
4. Conform with applicable safety regulations, including those of the Owner.

1.5 REQUESTS FOR INFORMATION

A. Procedures and guidelines for submitting Request for Information (RFI'S) are described in Division 1, General Requirements.

B. Direct the RFI to the discipline who needs to provide the clarification or answer. For example; if there is a question regarding conduit penetrations of a structural element, direct the RFI to the structural engineer, not the electrical engineer.

1.6 RECORD DOCUMENTS

A. Drawings:
1. Record of Job Progress: Provide and maintain in good order a complete legible set of blue line electrical contract drawings available at the site for inspection. Keep an accurate dimensional record of installed locations and all job changes, including source and date of authorization.
2. Record of Installation: At the conclusion of the work, purchase from M-E Engineers, a set of CADD CD-ROM of the electrical contract drawings, and have incorporated by a competent CADD operator, all installed data represented on the project progress drawings.
3. Include in Record Drawings the Following:
   a. Revisions, including sketches, bulletins, change orders, written addenda and directives, clarifications and responses generated by requests for information (RFIs), regardless of source of the revision.
   b. As installed location of equipment.
   c. Physical routing of conduits 2" trade size and larger, underground, and exposed.
   d. Location of underground conduit on exterior, pull boxes, and stub outs by elevation and dimensioned from buildings and permanent structures.
4. Acceptance: As a condition for acceptance of the work, deliver two (2) sets of Auto CAD Latest Version CDs and one set of signed and dated reproducible drawings to the Owner's Representative and obtain a receipt.
5. CAD Drawings: For the purposes of facilitating the Contractor's shop drawings and record drawings, electronic AutoCAD drawings are available for purchase from M-E Engineers, Inc.

B. Panel Schedules:
   1. Record of Project Progress: The project panel schedules will be issued with the drawings. Maintain a set of panel schedules (circuit directories) available at the job site for inspections. Keep an accurate, legible and continuously updated record of all circuit modifications, revised schedules as may be issued with bulletins; and source and date of authorization of modifications. Include with the other record drawings.
   2. Acceptance: Provide typed panel schedules (circuit directories) installed in panels to reflect installed condition.

1.7 OPERATING AND MAINTENANCE MANUALS

A. General:
   1. Submit three typed and bound copies of Operating and Maintenance Manuals prior to scheduling systems demonstration for the Owner.
   2. Bind each Maintenance Manual in one or more vinyl covered, 3-ring binders, with pockets for folded drawings. Mark the back spine of each binder with the project name, system identification, a volume number and the year.
   3. Manuals shall have a Table of Contents, tab dividers for each submittal section identifying all equipment and materials installed on the project including a local supplier for replacing a specific piece of equipment.

B. Maintenance Instruction Manual – Include:
   1. Complete record material list.
   2. Catalog brochures for all components.
   3. Test reports.
   4. Manufacturer's directions and conformance certificates.
   5. Guarantee and warranties.
   6. Inspection certificates.
   7. Spare parts lists.
   8. Wiring and block diagrams, where applicable.
   9. Recommended preventive maintenance program, including a list of mechanical items requiring inspection and servicing.

C. Parts List – Include for Replaceable parts:
   1. Description of part, manufacturer's part number, source to obtain part.
   2. Quantity of each replaceable part in the system.
   3. Estimated mean time between failures of major parts.
   4. Recommendation of how many, if any, should be kept in inventory at the site.
   5. List of each type of lighting fixture lamps used, including fixture lamp is used in, and lamp source.

D. Operation Instruction Manual – Describe time switch operating schedule.

E. Shop Drawing Manual: Complete set of record shop drawings, cuts and brochures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

B. Protection of Equipment:

   1. All electrical material shall be properly stored and protected against the elements. All equipment shall be stored under cover, and shall not be stored at the construction site on the ground, in mud, water, rain, sleet, or dust. All equipment shall be protected from rodent damage to internal wires and cables.

2. Conventional electrical construction materials such as building wire, conduit, lighting fixtures, fittings, etc., shall be stored in construction buildings, covered trailers, or portable covered warehouses. Any equipment containing plastic or material subject to damage caused by excessive heat or sunlight shall be stored to prevent such damage. This includes plastic ducts and lenses.
3. Equipment or material damaged as a result of the above conditions shall be replaced at the Contractor's expense.
4. After connections to electrical equipment are complete and the equipment is ready for operation, all debris shall be removed from all enclosures. Such debris includes dust, dirt, wire clippings, tape and insulation removed in order to make the connection.

1.9 SPARES, SPARE PARTS, SPECIAL TOOLS

A. Provide to Owner as specified in other paragraphs of the specification and as outlined herein.

B. Obtain receipts and include copy with Operating and Maintenance Instruction Manual(s).

C. Provide lists of each category describing type, rating and use, and include lists with Operating and Maintenance Instruction Manual(s).

D. Fuses: Three spares of each current rating for each type.

E. Breaker Lockout/Lockon Devices.

F. Special Tools: Provide, as standard accessories, tools not readily available in commercial market required for assembly, adjustment, and/or maintenance of equipment provided under this section.

G. Lighting Fixture Lamps: Five percent of total quantity of each type, but not less than one.

H. Fixture Ballasts: Five percent of total quantity of each type, not less than one, not more than forty.

I. Paint cans for touch up for all factory finished equipment, including but not limited to, lighting standards and fixtures.

1.10 INSPECTIONS

A. In addition to required service calls, make a minimum of two inspections accompanied by operating personnel, within the warranty period and at no expense to the Owner, to insure that all systems are maintained properly and in satisfactory operating condition. Schedule one inspection approximately one month before the end of the Warranty Period.

B. Submit written reports to Owner with copy to Architect signed by operating personnel witnessing inspection, and indicating inspection results.

1.11 COMPLETION

A. Before Final Review: The work hereunder will not be reviewed for final acceptance until Operating and Maintenance Data, and Manufacturer's Literature specified herein have been reviewed and/or properly posted in the building and final cleaning has been completed.

B. Before operating any equipment for demonstration or test, comply with manufacturer's preparation instructions.

C. Demonstration of Operations: When the installation is complete and required adjustments have been made, operate the systems for a period of one week. During this time demonstrate to the Owner's representative that systems are completed and operating and performing in conformance with these specifications.

1.12 GUARANTEES AND WARRANTIES

A. Comply with guarantee requirements of Division 1.

B. Guarantee all material, equipment, and work for a period of one year (or greater where specified elsewhere) from written acceptance of the work against defects of any kind, covering all parts.

C. Guarantee high intensity discharge fixture lighting ballasts for a period of two years after ballast manufacture, but not less than eighteen months after written acceptance of the work for both material and labor. Submit guarantee along with Operating and Maintenance Instruction Manual(s) and include name and telephone number of designated representatives who will perform required maintenance.

D. Obtain guarantees and/or warranties for factory assembled equipment and include with Operation Instruction Manual.

E. In the event of failure of any work, equipment, or device during the life of the guarantee, and at no cost to Owner, repair or replace the defective work and remove, replace, or restore any parts of the structure or building which may be damaged as the direct result of the defective work or in the course of making the replacement of defective work or materials.

1.13 PRELIMINARY OPERATION

A. The owner reserves the right to operate portions of the electrical system on a preliminary basis without voiding the guarantee or relieving the Contractor of his responsibilities.

1.14 ALLOWANCES, UNIT PRICES, ALTERNATES (WHERE INDICATED)

A. Allowances: Include quantity or dollar allowances where indicated on the drawings or elsewhere in the specifications, along with appropriate additional allowance for installation, overhead, and profit.

B. Unit Prices: Submit a list of unit prices for adjustments in the scope of work where requested elsewhere in the specifications.

C. Alternates:
   1. General: Submit with bid, along with associated cost adjustment, alternates requested herein or on the drawings and other alternates in accordance with terms of Division 1.
   2. Architect reserves the right to reject alternate proposals.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. All equipment and materials installed shall be new, unless otherwise specified.

B. All major equipment components shall have manufacturer's name, address, model number and serial number permanently attached in a conspicuous location.

C. All equipment shall be UL listed and bear the UL label.

D. Where UL labeling is not available, provide certification by a Nationally Recognized Testing Laboratory (NRTL).

E. Use products of the same manufacture and type for each category of material and equipment.

2.2 GENERAL SUBMITTAL REQUIREMENTS

A. Coordination and Sequencing:
   1. After receipt of notice to proceed, the Contractor shall submit to the Architect a typed list of submittals and the scheduled date of submission. List shall include submittal number, specification section number, and scheduled date of submission. Submittals shall be grouped and submitted in complete packages. For example all lighting fixtures, etc. Piecemeal submittals are not acceptable.
   2. Prior to submitting shop drawings, review submittal for compliance with Contract Documents and place a stamp or other confirmation thereon which states that submittals have been reviewed. Submittals without such verification will be returned disapproved without review.
   3. Submittals are intended to indicate compliance with the Contract Documents.
   4. Condition of Acceptance with Submittals: No deviation from Contract Documents is permitted unless specifically so noted by Contractor and accepted by Architect in writing.
   5. Contractor Responsibility:
      a. Errors or omissions in submittals regardless of review status of submittals.
      b. Coordination with work of other trades.
      c. Space coordination and maintenance of code required aisle space.
      d. Erection and installation techniques, including structural adequacy and bracing suitable for stability and/or seismic conditions.
      e. Maintenance of installation safety.
      f. Satisfactory performance of all work.

B. Material List: Submit complete list of material and equipment proposed for the project, including manufacturer's name, referenced to applicable sections and paragraphs of the specifications. List only names of proposed manufacturer. Catalog numbers and performance data are not required and will not be reviewed prior to complete submission. Submit all materials and equipment, even if same as specified or shown on the drawings.

C. Preparation of Submittals:
   1. Refer to Division 1 requirements.
   2. The contractor shall submit for review, manufacturer's data for materials and equipment to be incorporated in the work. Submittals shall be supported by descriptive material, catalog cuts, diagrams, performance curves, and charts published by the manufacturer to show conformance to specification and drawing requirements; model numbers alone will not be acceptable. Provide complete electrical characteristics for all equipment. Submit product submittals on items as outlined in sections hereinafter.
   3. For material specified to meet trade standards or Federal Specifications, furnish the manufacturer's or vendor's certification that the material furnished for the work equals or exceeds referenced standards or specifications.
   4. Furnish certification from suppliers and/or manufacturers of materials and equipment that such items meet or exceed the requirements of the drawings and specifications.
   5. Product submittals shall be made by specification section. All items of a section, requiring submission, shall be submitted together at one time in a tabbed binder.
   6. Binders shall be report cover type with solid cover and 3 metal fasteners. If product submittals for section exceed the capacity of one binder, two or more binders shall be used. In addition, a notation cover shall indicate the number of binders for the section and number of that binder (i.e., 2 of 3). Provide permanent marking on each binder identifying project name, Contractor, Subcontractor, submittal name, and number, date of submission, specification section(s), and information to distinguish it from other submittals.
   7. Each individual submittal item within a binder shall be marked to show section number, which pertains to the item.
   8. Submittals not presented in a bound, neat, and legible fashion will be returned disapproved without review.
   9. Submittals shall show Contractor's executed review and approval marking. Submittals, which are received from sources other than through the Contractor's office will be returned disapproved without review.

D. Quantities: Unless otherwise indicated in Division 1, submit six (6) copies.
   1. Refer to Division 1 requirements.
   2. Multiple System Items: Where a required submittal relates to an operational item of equipment used in more than one system, increase the number of final copies as necessary to complete the Maintenance Manuals for each system.
   3. General Distribution:
      a. Provide additional distribution of submittals (not included in foregoing submittal copy requirements) to Subcontractors, Suppliers, Fabricators, Installers, Governing Authorities and others as necessary for proper performance of the work.
      b. Include such additional copies in transmittal to Owner's Representative where required to receive "Action" marking before final distribution.
         1) Show such distributions on transmittal forms.

E. Response to Submittals: Where standard product data has been submitted, it is recognized:
   1. That the Submitter has determined that the products fulfill the specified requirements.
   2. That the submittal is for the Owner's Representative information only, but will be returned with appropriate action where observed to be not in compliance with the requirements.

F. If more than two submittals (either for shop drawings, as-built drawings, or test reports) are made by the contractor due to incompleteness, non-compliance, errors, omissions, etc. the Owner reserves the right to charge the contractor for subsequent reviews by their consultants. Such extra fees shall be deducted from payments by the Owner to the Contractor.

2.3 EQUIVALENTS AND SUBSTITUTIONS

A. The applicable paragraphs for General Requirements, Division 1 apply herein.

B. Basis for Design: The manufacturer's name and product listed on the drawings, or listed first of several names in these Specifications, is used as a basis for design to establish space requirements, a standard of quality and performance, and equipment clearances required by the National Electrical Code.

C. Equivalents: Products of one or more other manufacturer's names listed in these Specifications following the words "or equivalent by" may be selected, subject to paragraph below titled "Contractor's Responsibility for Equivalent and Substitutions.".

D. Other Options:
   1. For products specified by naming only one manufacturer, refer to paragraph below under "Substitutions".
   2. For products specified only by performance characteristics or reference standards, select any manufacturer meeting the requirements.

E. Substitutions: Requests for acceptance of a product, from a manufacturer not listed in these specifications, will be considered if any one of the following conditions is met:
   1. The named product is not available because of strikes or discontinuance of manufacture, and the proposed product is equivalent to the named product.
   2. The proposed product is superior to the named product, in the opinion of the Owner's representative.
   3. The proposed product is equivalent to the named product and its use will be to the advantage of the Owner, by the Owner receiving an equitable credit or cost savings. The Owner's Representative reserves the right to reject any substitution.
   4. Submit proposed substitutions with bid along with alternate price, complete descriptive data and a comparison of the substitute manufacturer's product with specified product. Request for acceptance of a product from a manufacturer not listed in these specifications, is subject to the paragraph titled "Contractor's Responsibility for Equivalents and Substitutions".

F. Contractor's Responsibility for Equivalents and Substitutions:

1. Items submitted as a substitution, to the basis of design, or listed general equivalents, shall be identified as such and shall include a written request for substitution indicating the following:
   a. The reason for requesting the substitution.
   b. Contract price adjustment.
   c. Contract time adjustment.
   d. Item by item breakdown of differences between basis of design and substituted item.
   e. Operation, maintenance and energy cost difference.
2. Products of manufacturer must match the features, construction, performance and size of those selected for design. Standard catalogued products may require certain modifications to meet specified requirements.
3. The responsibility for providing that specified requirements have been met remains with the manufacturer and contractor. Should the substituted item fail to perform in accordance with the Specifications, replace same with the originally specified item without extra cost to the contract.
4. When requesting review of an equivalent or substituted product, submit a comparison chart listing features, construction, performance and sizes of named product versus equivalent or substituted product.
5. Submittals for review of an equivalent or substituted product will be reviewed for acceptability when all the above requirements have been met. Contractor shall be responsible for all costs incurred by the Architect and Engineer for review of equivalency beyond initial review.
6. Coordinate installation of the product with all trades.
7. Contractor shall be responsible for changes in electric wiring, materials and for all other additional costs of construction by all trades involved to accommodate the product to perform the same as the product used for the "Basis of Design".
8. Coordination of General Equivalents and Substitutions: Where Contract Documents permit selection from general equivalents, or where substitutions are authorized, coordinate clearance and other interface requirements with electrical and other work.
9. Provide necessary additional items so that selected or substituted item operates equivalent to the Basis of Design and properly fits in the available space allocated for the Basis of Design.
10. Contractor is responsible for assuring that piping, conduit, duct, flue and other service locations for general equivalents or substitutions do not cause access, service or operational difficulties any greater than would be encountered with the Basis of Design.
11. Failure to comply with these requirements will result in immediate rejection of the request for substitution.

G. Review Process:
   1. The Engineer reserves the right to request a sample of any equipment to be submitted for approval and to retain its possession.
   2. Required Submittals: Submit shop drawings and technical data on equipment and auxiliary systems, in sufficient detail to indicate conformance with the drawings and specifications, including but not limited to:
      a. Catalog cuts of exterior lighting standards and lighting fixtures,. Include finish data, socket specifications, metal gauge, diffuser specifications, independent test laboratory photometric data, agency labeling, weight. Indicate compliance with general and specific specification requirements, ballast specifications.
      b. Concrete pull boxes.
      c. Grounding system components.
      d. Conductor lugs and connectors.
      e. Test reports.
   3. Review of shop drawings and product data by the Engineer, including any review annotations or stamp notations, does not relieve the contractor from the required compliance with the Contract Documents.
   4. If resubmittals are necessary, they shall be made as specified above for submittals. Resubmittals shall highlight all revisions made and cover shall include the phrase "RESUBMITTAL NO _____." Coordinate this procedure with the Architect.
      a. Resubmittal requirements do not entitle the Contractor to additional time and are not a cause for delay of the project.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. Examine the drawings of all trades, and specification sections, survey the existing conditions, and include necessary allowances in bid proposal.

B. Resolve conflicts with code requirements, site conditions and the work of other trades.

C. Verify the locations of existing utilities prior to construction and protect them from damage.

D. Pay costs incurred due to damage of existing utilities or other facilities.

3.2 LOCATIONS

A. Drawings are essentially diagrammatic, and although the size and locations of equipment are generally shown to scale, make use of data in Contract Documents, and informational documents, including shop drawings, and verify this information against field conditions.

B. Drawings indicate the required size and points of termination of conduits, and the number and size of wires and suggest proper routing of conduit. Install conduit with necessary offsets, pullboxes, and fittings to avoid obstructions, and satisfy the requirements of the governing codes and the standards of good practice.

C. Architectural drawings and specifications take precedence over the electrical drawings in the representation of the general construction work. Civil drawings take precedence in the representation of the site work. Refer to the drawings, specifications, and reviewed shop drawings for all work, in order to coordinate electrical work with other work of the project.

D. When changes in indicated locations or arrangements are necessary due to conflict in location, make such changes at no cost to Owner, provided that the change is ordered before conduit is installed and that length of conduit run is not revised by more than ten feet.

E. Bring discrepancies between different drawings, between drawings and actual field conditions, or between drawings and specifications, promptly to the attention of the Architect for decision, and stop pertinent work subject to resolution of the conflict.

F. Provide clarifying details where required by inspecting authority and obtain Architect's and Inspector's approval prior to installation.

3.3 RESPONSIBILITY

A. Provide complete functioning systems and include labor, material and associated tools and transportation required for the system to operate safely and satisfactorily. Provide empty conduit systems where specified, complete, clear, and with pull wires, ready to accept conductors and allow for equipment installation.

B. Provide work indicated on the drawings whether or not specifically mentioned in the specifications.

C. Coordinate the installation of electrical items with the schedules for work of other trades to prevent delays in total work. Assume responsibility for cooperative work, which must be altered due to lack of proper supervision or failure to make proper provision in time. Perform alterations and pay costs.

D. Resolve code conflicts prior to installation. Remove and replace work conflicting with codes or, not meeting specified requirements and pay costs.

3.4 QUALITY ASSURANCE

A. Provide an experienced superintendent in charge of erection of the work, together with all necessary journeymen, helpers and laborers required to properly unload, erect, connect, adjust, operate and test the work involved to provide a neat, workmanlike installation. Latest industry standards are considered minimum.

B. For the actual fabrication, installation and testing of the work of this section use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the manufacturers of the specified items. Where specified, provide factory personnel for testing and adjusting. Submit quality assurance program and detailed testing procedures for review.

3.5 EXISTING FACILITIES

A. Examine the drawings and specifications of the complete work, and inspect the site to establish the scope of demolition work and new work to be provided under this section and clarification of the phasing of the work.

B. Based on project phasing and scheduling, demolition work will be taking place in and around existing areas that are to remain in service. Where the work under this section affects or interferes with the operation of existing areas to remain in service, or portions of the work already in operation, provide necessary work and material including premium pay, required to avoid shutdown of these areas during normal operations. Obtain Owner's approval for shutdown, in writing, 48 hours prior to shutdown.

C. Existing electrical and signal facilities outside of the demolition area to remain in place and in service during demolition.

D. Unless specifically noted or otherwise indicated or directed, remove existing electrical equipment from the areas to be demolished. Deliver equipment removed, including lighting fixtures, to the Owner's representative.

3.6 DEMOLITION

A. Where areas of existing facilities are indicated to be demolished, visit site to determine scope of work. Reroute or replace conduit and wiring as required to conform with new use of the area and maintain operation of adjacent areas.

3.7 EXCAVATION, BACKFILLING

A. Provide excavation, backfilling, and pumping required for work under this section, in accordance with requirements of Earthwork Section, Division 2, of the specifications. Remove surplus materials as directed.

B. Where trenches are required through existing paving, resurface, after installation, to match existing in accordance with appropriate sections of Division 2, using accredited journeymen of respective trades.

C. Provide cover over buried electrical power conduits in accordance with NEC limitations. Cut trenches to bottom of conduit, allowing for concrete encasement, and make cuts as narrow as possible. In rock, excavate 6" below conduit and backfill with gravel.

3.8 IDENTIFICATION

A. Identify all branch circuit system conductors with premarked self-adhesive, wraparound cloth wire markers, indicating circuit number and name of panel of origin, at panelboards, and pullboxes.

B. Conductor Color Coding: Per NEC (or CEC) Article 200, provide color coding for secondary service, feeder, and branch circuit conductors throughout the project secondary electrical system as follows:

Conductor	Color 120/208 V	Color 277/480V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Equipment Ground	Green	Green

C. Panel Schedules: Provide typewritten panel schedules on inside of panel doors behind clear plastic. Indicate as-built quantity and type of equipment served and general location.

3.9 PROTECTION AND CLEANING

A. Materials and Equipment: Cover all lighting standards and fixtures, stored or installed on the site, with polyethylene sheets or approved equal, to protect equipment from the work of other trades. Plug or cap conduit ends until final connection. Protect conduit stubs, stub-ups and risers from construction equipment.

B. Storage: Provide proper and adequate storage facilities. Store conductors, raceways and fittings, in dry, protected locations.

C. Damage: Replace damaged or defective work, materials or equipment. Install sensitive or delicate equipment after major construction work is completed.

D. Parts: Store and protect all portable and detachable parts or portions of the installation such as spare parts, fittings, fuses, keys, locks, adapters, locking clips and inserts until completion of the work. As a precondition for acceptance of the work, deliver to the Owner's representative and obtain itemized receipt. Include receipts with the Operating and Maintenance Instruction Manual(s) required under other paragraphs of the specifications.

E. Site Cleaning: Periodically remove waste and rubbish and maintain order.

F. Equipment Finish: Clean and polish finished metal surfaces. Clean and prepare prime coated equipment for painting.

3.10 PAINTING

A. Outdoors and in Wet Locations: Provide additional factory coat of exterior lacquer for a two mils finish thickness. Indicate finish on shop drawings.

B. Touchup: Use factory supplied paint for touchup of rusty or scratched surfaces. Replace marred or scratched plated finishes.

3.11 LICENSES, FEES AND PERMITS

A. Arrange for required inspections and pay all license, permit and inspection fees. Furnish a certificate of final inspections and approvals from local authority having jurisdiction over electrical installation.

3.12 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A. Only professional quality workmanship will be accepted. Haphazard or poor installation practice will be the cause for rejection of work.

B. Provide foreman in charge of this work at all times. Foreman for this work shall have had experience in installing not less than 5 such electrical systems of equal or greater complexity.

C. Where specifications call for an installation to be made in accordance with manufacturer's recommendations, a copy of such recommendations shall at all times be kept in job superintendent's office.

3.13 RELATION WITH OTHER TRADES

A.. Contractor shall coordinate work of this Division with other trades to avoid conflict and to provide rough-ins and other connections for equipment furnished under other divisions that require electrical connections. Inform other trades of required clearances or accessibility around electrical equipment to maintain serviceability and code compliance.

B. Verify equipment dimensions and rough-in requirements for all related Specification Divisions with provisions specified under this Section of work, and report discrepancies to the Architect in ample time to prevent delays or unwarranted changes of work.

3.14 TESTING

A. Provide all labor, materials, and equipment necessary to make required tests. Tests shall be complete and results approved before final inspection is begun.

3.15 PROGRESS OF WORK

A. Order progress of electrical work so as to conform to progress of work of other trades, and complete entire installation as soon as the conditions will permit. Assume any cost resulting from defective or ill-timed work performed under this Division.

3.16 TEMPORARY POWER

A. Provide temporary power as requested by the General Contractor and in accordance with CAL-OSHA and local code requirements.

3.17 COMMISSIONING

A. After startup and testing of each system has been completed, the Owner shall have an independent firm conduct detailed observations of the equipment and systems to confirm compliance with the Contract Documents.

B. The Division 26 Contractor shall include, as part of the work of his contract, costs to cover manpower, equipment, tools, ladders, instruments, etc., necessary to expedite the system performance observations.

C. The independent firm shall develop systems, equipment checkout procedure, and data forms for recording compliance of the systems to the Contract Documents, performance, and construction observation lists, and will assist in developing schedules for checkout and Owner acceptance at a future date during the construction phase.

END OF SECTION

SECTION 260505
MANUFACTURERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections.

1.2 SUMMARY

A. The following lists of manufacturers are for the specifications as identified.

B. All submittals and documents shall be in accordance with the project General Requirements, Division 01.

1.3 RELATED APPLICABLE SECTIONS

A. Section 260502, BASIC ELECTRICAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products, which may be incorporated in the work, are listed herein. All manufacturers not listed shall be pre-approved prior to bid in order to be considered. Refer to Division 01 for pre-approval format.

2.2 ACCEPTABLE MANUFACTURERS: (Subject to conformance with specification.)

A. Contactors and Relays:
   1. Mechanically Held: 20A – ASCO Bulletin 917; 30A and Larger – ASCO Bulletin 920.
   2. Magnetically Held Contactors: General Electric, Square D, Eaton/Cutler Hammer..
   3. Magnetically Held Relays: Industrial grade with normally open and normally closed contacts. Manufacturers same as for motor starters: General Electric CR2810.
   4. Time Delay Relays: Manufacturers same as for motor starters, General Electric CR2820B Series.

B. Time Switches: All with spring wound reserve, contacts as required.
   1. 7 Day: Tork TW-LE Series, equivalent by Paragon, Intermatic.
   2. 24 Hour with Astro Dial: Tork TZ-LE Series, equivalent by Paragon, Intermatic.

C. Photoelectric Cells: Fischer Pierce PPN7790B with FPNS47673 receptacle mounted on cast box. Equivalent by Paragon, Tork.

D. Gutters and Wireways: Circle AW, Hoffman Engineering Company, Square D.

E. Lighting Fixtures:
   1. Conform with all requirements described under Section 265600, EXTERIOR LIGHTING, in addition to scheduled descriptions. Submit itemized conformance list with bid.
   2. Ballasts, Electronic: Advance, MagneTek Traid, Osram Sylvania, Valmont.
   3. Lamps: General Electric, Osram, Phillips, Venture Lighting.

F. Insulated Bushings: O. Z. Gedney Types A, B and copper lug BLG, equivalent by Midwest Electric.

G. EMT Fittings – Steel Raintight: Appleton TW Series, Crouse-Hinds MW Series, Steel City TC710 Series, Thomas and Betts 5120 Series, Tomic 20 Series.

H. Nonmetallic Conduit, Polyvinyl Chloride Schedule 40 and 80, 90°C Rated: Can-Tex Industries, Carlon, CertainTeed, Kraloy Plastics.

I. Expansion Joints: O. Z. Gedney Type DX or combination of fittings, equivalent by Appleton. See conduit installation specifications.

J. Caulking Compound: Tremco-Acoustic Sealant, Manville – Duxseal Interchemical – Presstite 579.64, Chase Foam.

K. Firestopping: 3M, Dow Corning, Nelson Electric.

L. Conduit Wrapping: Polyvinyl tape – 20 mil 1/2 lap by Manville, Minnesota Mining Scotch or 40 mil PVC coating by Occidental Coating Company, Robroy.

M. Cast Boxes and Conduit Bodies: Appleton, Crouse-Hinds, Pyle-National, O. Z. Gedney.

N. 600V Conductor Installation Accessories:
   1. Steel Spring Connectors (No. 8 and Smaller): Scotchlok types R and Y, Ideal Wirenut.
   2. Solderless Connectors: (No. 6 and Larger) Copper or Bronze Bolted Pressure Bar Type: Burndy, Thomas and Betts, O. Z. Gedney, Teledyne Penn-Union.
   3. Tape: Scotch #23 rubber tape and #33 vinyl tape. Sola Basic, Sierra-Tomic.
   4. Sealant: Scotchkote. No known equal.
   5. Pulling Compound: Powdered Soapstone, Ideal Yellow 77, Wirelube, Minerallac #100, Sierra-Tomic.

O. Grounding System Components:
   1. Grounding Lugs, Clamps and Connectors: Burndy, Thomas & Betts, O.Z. Gedney.
   2. Conductor Joint: Exothermic-Cadweld, Thermoweld. Compression-Burndy Hyground.

P. Afterset Anchors: Expansion shield type, Hilti Kwik Bolt, Phillips "Redhead" Wedge Type.

Q. Precast Concrete Pull Boxes:
   1. Enclosure: Jensen Precast, Brooks Products, Christy Concrete Products, or equivalent.
   2. Waterproofing: Sonneborn Hydrocide. Equal by Dow Corning.

R. Power Centrs: Eaton/Cutler Hammer :Mini-Power Center" or equivalent by General Electric or Square D.

PART 3 – EXECUTION – Not Used

END OF SECTION

SECTION 260519
LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections.

1.2 SUMMARY

A. This Section includes conductors and connectors for power, lighting, signal, control, and related systems rated 600 volts and less.

1.3 RELATED APPLICABLE SECTIONS

A. Section 260502, BASIC ELECTRICAL REQUIREMENTS.

B. Section 260505, MANUFACTURERS.

C. Section 260533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.

1.4 SUBMITTALS

A. Submit Manufacturer's Product Data for conductors and connectors.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the following:
   1. NFPA 70 "National Electrical Code."
   2. Conform to applicable codes and regulations regarding toxicity of combustion products of insulating materials.

B. UL Compliance: Provide components which are listed and labeled by UL under the following standards.
   1. UL Std. 44 Thermoset Insulated Wires and Cables
   2. UL Std. 83 Thermoplastic-Insulated Wires and Cables
   3. UL Std. 486A - 486B Wire Connectors

C. ICEA/NEMA Compliance: Provide components which comply with the following standards:
   1. ICEA S-95-658/NEMA WC-70: Nonshielded 0-2KV Cables for the Transmission and Distribution of Electrical Energy.

D. IEEE Compliance: Provide components which comply with the following standard.
   1. Std. 82 - 2002: Test procedures for Impulse Voltage Tests on Insulated Conductors.

PART 2 -PRODUCTS

2.1 CONDUCTORS (600 VOLT)

A. General: Provide conductors suitable for the temperature, conditions, and location where installed. All conductors shall be new and delivered to the site in original unbroken packages and reels. Manufactured within (8) months of installation, of soft drawn copper of not less than 98 percent conductivity, 75° C temperature rating, conforming with ASTM Specification and the Code; 600V

insulation unless specifically noted otherwise, of the type specified, standard American Wire Gauge (AWG) sizes; solid for No. 10 and smaller; stranded for No. 8 AWG and larger.

B. All packages, plainly marked or tagged with UL labels; size, type, insulation and voltage rating of the wire; name of manufacturing company and the trade name of the wire; date of manufacture.

C. Conductor Material: All conductors shall be copper, single conductor rated at 600 volts, which conform to or exceed ICEA specifications and the following conductor insulation:
   1. In all Locations Unless Otherwise Noted: THWN, THHW.
   2. For Dry Locations: THWN, THHN.

PART 3 - EXECUTION

3.1 INSTALLATION OF CONDUCTORS

A. Store conductors where continuously protected from sunlight, heat and weather.

B. Circuit as indicated on plans.

C. Do not install more conductors in a raceway than indicated on the drawings.

D. Minimum wire size shall be No.12 AWG.

E. Acceptable pulling means include: fish tape with ball type heads, cable rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachments to wire or cable.

F. Use only lubricant, which does not damage conductors, as a pulling aid.

G. Bundle and secure branch circuit conductors, in panelboards, with nylon tie wraps suitable for conductor size. Provide tie wraps on approximately 12" centers. Identify spare conductors.

H. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturers' torque requirements are not indicated, tighten connectors and terminals to comply with tightening torque values specified in UL 486A and UL 486B.

I. Install all conductors in conduit. Complete conduit system and clean and dry conduit before pulling in conductors. Install conductors after general construction work in area has progressed sufficiently to avoid conductor damage.

J. Run neutral conductors continuous to panel. Do not combine. Do not splice or tap in equipment enclosures or conduit bodies. Make necessary splices or taps only in pull boxes, or in oversize wiring gutters designed for the purpose at panelboards.

K. Allow 12" minimum free length of conductor where terminating at a pull box or light standard Provide longer lengths where indicated.

3.2 CONNECTIONS AND TERMINATIONS, LINE VOLTAGE CONDUCTORS

A. For joints, splices, taps and connections for 600V conductors, use solderless connectors.

B. For branch circuit conductors No. 8 AWG and smaller, use steel spring with semi-rigid insulating shell, or setscrew type, taped.

C. Terminate solid conductors, No. 10 AWG and smaller by a fast holding application of the conductor directly to the binding screws of the equipment to be connected.

D. For conductors No. 6 AWG and larger, use copper or bronze bolted pressure bar mechanical connectors and lugs, or compression type at Contractor's option, sized for conductors. For conductors No. 1 AWG and larger, use lugs with two bolts through tongue minimum, or equal anti-turn construction (submit sample). Connectors and lugs which are crimp type or which apply setscrews directly to the conductors are not acceptable. Fasten lugs with flat and spring washers and hex nut.

E. Splice grounding conductors by means of exothermic welding and terminate by means of approved grounding connectors. Do not solder.

F. Tape non-insulated connections with lap wound layers of vinyl plastic tape or lap wound layers of rubber tape covered by lap wound layers of friction tape, to provide insulation equal to 150 percent of the conductor's insulation, but in no case less than three layers. Split bakelite casings with stainless steel spring clips designed for specific connectors may be used alternately.

G. Position splices in pull boxes, so they are accessible from the removable cover side of the box.

H. Provide waterproof connections in wet locations. Pencil and roughen conductors and apply rubber tape equal to insulation thickness. Cover with two half-lapped layers of 8.5 mil, all weather, vinyl plastic tape, suitable for below freezing application, and coat with sealant. Form conductors into drip loops so that water does not collect on connections. Blow out conduit to remove moisture and seal conduit ends with waterproof compound.

I. Torque electrical conductor terminations in accordance with equipment manufacturer's directions and industry standards.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections.

B. Requirements of this section apply to electrical grounding and bonding work referenced in other sections of these specifications.

1.2 SUMMARY

A. Grounding and bonding work includes circuits, and equipment.

B. A system equipment ground is available at the new panelboards in the OPS BUILDING.

C. The code requirements for grounding and bonding are clearly defined in the California Electrical Code CEC Article 250, and are intentionally not repeated herein. This section is intended to supplement what is described in the code, and to address building conditions.

1.3 RELATED APPLICABLE SECTIONS

A. Section 260502, BASIC ELECTRICAL REQUIREMENTS.

B. Section 260519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

C. Section 260533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.

1.4 SUBMITTALS

A. Submit manufacturer's product data for grounding and bonding hardware and materials, and associated accessories.

B. Submittal to include the following:
   1. Insulated and bare copper grounding conductors.
   2. Exothermic welding-system.
   3. Grounding lugs and connectors.

1.5 QUALITY ASSURANCE

A. Codes and Standards:
   1. Comply with applicable electrical code requirements of the authority having jurisdiction, as applicable to electrical grounding and bonding, pertaining to circuits, and equipment.
   2. Comply with applicable UL requirements pertaining to grounding and bonding of circuits, and equipment. Provide grounding and bonding products which are UL-listed and labeled for their intended usage.
   3. Comply with applicable standards and recommended installation practices pertaining to grounding and bonding of circuits, and equipment.

1.6 TEST REPORTS

A. Provide testing of the grounding system in accordance with NETA ((National Electrical Testing Association) Standards by an independent testing firm. Submit test reports for the installed equipment.

PART 2 - PRODUCTS

2.1 ROUNDING AND BONDING

A. Materials and Components:
   1. General: Provide an electrical grounding and bonding system; with an assembly of materials, including, but not limited to, conductors, connectors, solderless lug terminals, exothermic welding, needed for a complete installation. Where more than one type component product meets indicated requirements, selection is installer's option. Where materials or components are not indicated, provide products which comply with UL, IEEE and Code requirements and with established industry standards.
   2. Where buried or exposed bare ground conductors are specified, provide soft drawn stranded copper conductors.
   3. Where insulated ground conductors in conduit are specified, provide THWN copper conductors.
   4. Provide cast bronze heavy-duty ground clamps with bronze nuts and bolts, copper two hole heavy-duty compression lugs and heavy-duty compression connectors.
   5. Utilize the exothermic process for welded conductor connections.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide a grounding and bonding system with resistance to ground of three ohms or less and in accordance with the Code. Maintain equipment ground continuity throughout the entire system including raceways, and lighting standards and fixtures and devices. Provide grounding as specified. Include equipment ground conductor in all nonmetallic conduits, and with branch circuiting where indicated on the symbol list.

B. Ground Continuity:
   1. Provide green THWN insulated ground conductor in all nonmetallic conduits with branch circuits. For lighting circuits, connect ground wire to fixture ground lead where available or bond to fixture housing by mechanical means. Connect grounding conductors to ground busses in panelboards and bond to all lighting standards.
   2. Provide ground bushings, fittings and jumpers as required wherever ground continuity is broken. Provide ground bushings on conduit stub-ups at lighting standards.
   3. Bond isolated metal parts of lighting fixtures to equipment ground.

3.2 FIELD QUALITY CONTROL

A. Upon completion of installation of electrical grounding and bonding systems, test ground resistance with ground resistance tester. Where tests show resistance to ground is over 3 ohms, take appropriate action to reduce resistance to 3 ohms, or less.

END OF SECTION

SECTION 260533
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, boxes and fittings for electrical wiring. Types of raceways and boxes in this section include the following:
   1. Electrical metallic tubing (EMT).
   2. Intermediate metal conduit (IMC).
   3. Rigid metallic conduit (RMC).
   4. Rigid non-metallic conduit.
   5. Junction boxes.
   6. Bushings.
   7. Locknuts.
   8. Knockout closures.

1.3 RELATED APPLICABLE SECTIONS

A. Section 260502, BASIC ELECTRICAL REQUIREMENTS.

B. Section 260526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

C. Section 260505, MANUFACTURERS.

D. Section 260519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

E. Division 31 Section – EARTHWORK (Trenching & Backfilling).

1.4 SUBMITTALS

A. Submit Manufacturer's Product Data for the following:
   1. Metallic and non-metallic raceways and fittings.
   2. Junction boxes.

B. Submit manufacturer's recommended installation methods for non-metallic raceway products.

1.5 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of electrical boxes, raceways and fittings of types, sizes, and capacities required, whose products have been in satisfactory use in similar service for not less than five years.

B. Code Compliance: Components and installation shall comply with NFPA 70 "National Electrical Code."

C. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to electrical raceways, boxes and fittings.

D. UL Compliance and Labeling: Comply with applicable requirements of UL standards pertaining to electrical raceway systems, boxes and fittings. Provide products and components listed and labeled by UL.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store non-metallic (PVC) conduit and fittings on a flat surface in an area that is protected from direct sunlight.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1: Rigid Conduit Including Couplings, Locknuts, Nipples: Steel, hot-dipped galvanized inside and out after threading, galvanized, threaded malleable iron or steel fittings, notched locknuts with gripping teeth. Deliver with plastic thread protectors on exposed conduit threads.

B. Intermediate Steel Conduit: UL 1242: Intermediate Metal Conduit Including Couplings, Locknuts, Nipples: Steel, hot process galvanized outside, lacquered or enameled inside, galvanized threads, galvanized threaded malleable iron or steel fittings, notched locknuts with gripping teeth. Deliver with plastic thread protectors on exposed conduit threads.

C. Electrical Metallic Tubing and Fittings: ANSI C80.3.: Electrical Metallic Tubing (EMT) Including Locknuts, Couplings and Connectors: Galvanized steel, lacquered or enameled interior; raintight gland ring compression type fittings, insulated throat connectors. Submit sample fittings for approval. Indenture fittings are unacceptable.

2.2 NONMETALLIC CONDUIT

A. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, Schedule 40 or 80 PVC as specified, high impact 90°C polyvinyl chloride, extruded to iron pipe sizes with factory spacers, couplings, bends and offsets. Plastic to plastic connections, tightly fitted and butted, cement welded utilizing tinted primer per ASTM F656 and heavy body, medium set cement per ASTM D2564, in accordance with manufacturer's directions. Plastic to metal connection with UL listed adapters.

B. PVC Conduit Fittings: NEMA TC3; match to conduit type and material.

C. Conduit, Duct Accessories: Types, sizes, and materials complying with manufacturer's published product information. Mate and match accessories with raceway.

2.3 CONDUIT BODIES AND FITTINGS

A. General: Types, shapes, and sizes as required to suit individual applications and Code requirements. Provide matching gasketed covers secured with corrosion-resistant screws.

B. Rigid and Intermediate Steel Conduit: Use metallic conduit bodies with threaded hubs for threaded raceways.

C. EMT Conduit: Use metallic conduit bodies with threaded hubs for steel compression gland connectors and couplings.

D. Bushings: Insulated type, designed to prevent abrasion of wires without impairing the continuity of the conduit grounding system, for rigid steel conduit and IMC, larger than 3/4" size.

2.4 JUNCTION BOXES AND FITTINGS

A. Provide bright and new stock, stored where continuously protected from the weather and conforming to the following:
   1. Cast Outlet Boxes: Cast ferrous metal construction, galvanized, complete with threaded hubs for rigid conduit, number and location as required, and plugs in unused hubs; meeting NEC