16

RESOLUTION

WHEREAS, Title 19 (Subdivisions) of the El Paso City Code (the "Code") was adopted to promote the health, safety, morals and general welfare of the community by guiding the future growth and development of the city in accordance with The Plan for El Paso and by encouraging the orderly and beneficial development of the city through appropriate growth management techniques and by establishing reasonable standards of design and procedures for subdivisions and resubdivisions of land in order to further the orderly layout and use of land; and,

WHEREAS, the Subdivision Ordinance helps guide the physical development of the community by promoting orderly and healthful design, and particularly by ensuring adequate public facilities and services are available to new development, to include transportation, water, sewerage, schools, parks and other public improvements are available concurrent with development and will have a sufficient capacity to serve the subdivision and to ensure the subdivider provides for the required public improvements attributable to the development; and,

WHEREAS, the City Council of El Paso adopted a new Subdivision ordinance on May 6, 2008 with an effective date of June 1, 2008; and,

WHEREAS, the adopted Subdivision ordinance requires parks within subdivisions to be developed and constructed in accordance with certain standards;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EL PASO:

That the City Council of El Paso hereby adopts the Park Facilities Standards, attached as Exhibit "A," regulating the design and construction of park facilities within subdivisions.

ADOPTED THIS 3rd **DAY OF** June**, 2008.**

THE CITY OF EL PASO

John F. Cook, Mayor

ATTEST:

Richarda Duffy Momsen, City Clerk

APPROVED AS TO FORM:

Lupe Cuellar
Assistant City Attorney

APPROVED AS TO CONTENT:

Nanette L. Smejkal, Director
Department of Parks and Recreation

#39342 v1 - reeso/park standards/subdivisoin
Document Author: LCUE

Fact Sheet - Park Facilities Standards

Additions:

- Cut sheets for lighting equipment
- Park Trail Lighting Standard

Modifications:

- Parkland Dedication Minimum Improvements revised to conform to new ordinance
- Table of Contents re-ordered
- Pages numbered
- General housekeeping (spelling, grammar, etc.)

Reviews:

- Ad hoc committee – meetings per posted agendas
- Parks and Recreation Advisory Board – May 6, 2008

City of El Paso, Texas

Park Design

And

Construction

Standards

(Park Facilities Standards)

May 27, 2008

PARK DESIGN AND CONSTRUCTION STANDARDS

Table of Contents

Division	Description	Page Number
I.	Park Land Dedication Minimum Improvements	3
II.	Irrigation System Design Criteria	5
III.	Irrigation System Specification.	12
IV.	Surge Protection/Grounding Specification	23
V.	Digital Flow Monitor Specification	24
VI.	Weather Station Specification	25
VII.	MAXICOM-Irrigation System Central Control	27
VIII.	Seeding and Restoration of Existing Lawns Specification	29
IX.	Sodding Specification	34
X.	Trees, Shrubs and Ground Cover Specification	39
XI.	Concrete Sidewalk Standard	47
XII.	Trail Construction Standard	49
XIII.	Playground Design Criteria	51
XIV.	Playground Equipment and Structure	54
XV.	Park Furniture Specification	81
XVI.	Bicycle Rack Specification	85
XVII.	Play Field Equipment Specification	92
XVIII.	Metal Shelter Standard	94
XIX.	Bleacher Specification	95
XX.	Chain Link Fencing Standard	97
XXI.	Park Trail Lighting Standard	105
XXII.	Park Area Lighting Standard	107
XXIII.	Park Perimeter Lighting Standard	108
XXIV.	Athletic Field Lighting Specification	109
XXV.	Area and Trail Lighting Equipment Cut-Sheets	114
XXVI.	El Paso Electric Company Street Lighting Cut-Sheets	127

Park Land Dedication Minimum Improvements

1. Park Land Minimum Improvements Requirements are:
    a. Water meter service.
    b. Electric meter service.
    c. Electric power panel of 100-amps.
    d. Irrigation System designed by a Licensed Irrigator Registered in Texas in good standing with a minimum 5 years experience and minimum of 10 designs of comparable size systems.
    e. Submit irrigation system designs for review and approval by Parks and Recreation Department as set forth in Design Criteria Division.
    f. Irrigation System must be designed to accommodate site static water pressure or a pump must be incorporated in design and installed to accommodate design criteria as established by irrigation system design.
    g. Seeding of site or installation of sod will be methods used to establish Turf. Turf must be established as set forth in applicable specification; either seeding or sod. Maintenance will be provided to meet the requirements set forth in each respective specification as is applicable.
    h. Construction of sidewalk along street right-of-way adjacent to back of concrete curb and gutter. Minimum frontage required for a park site is 100 linear feet.
    i. An improved park shall, at a minimum, include the following
        aa. Paving frontage, curbing, and gutter for all street frontage abutting the outside perimeter of the parkland;
        bb. Utility (water, sanitary sewer and electricity) extensions to the perimeter of the park at a location indicated by the Director of Parks and Recreation and that are consistent with published EPWU Rules.

cc. An accessible route installed adjacent to the curb on all street frontage abutting the outside perimeter of the parkland of a minimum width and construction to provide accessibility to individuals with disabilities as provided in the subdivision improvement design standards. The sidewalk alignment and width shall be approved by the Director of Parks and Recreation.

dd. Grading, automatic irrigation and turf within the parkland boundaries shall be installed prior to the acceptance of the proposed parkland submittal. The design and installation shall be approved by the Director of the Parks and Recreation Department. The City Plan Commission may, upon an affirmative recommendation from the parks and recreation department, allow parkland to remain undisturbed in its natural state.

ee. One age appropriate play structure unit, from an approved Park Department list of acceptable alternatives, including an appropriate safety surface that meets industry requirements.

ff. A minimum of two accessible picnic tables on concrete pads.

gg. Perimeter lighting along adjacent public street rights of way

hh. Where open space lands to be left in an undisturbed state are accepted as required parklands, grading, automatic irrigation and turf establishment requirements shall be waived.

2. Upon completion of improvements Developer will submit request for acceptance of improvements and park site to the City of El Paso.
3. Developer will provide a one-year warranty on park improvements and system operations.

Irrigation System Design Criteria:

Parks and Recreation irrigation system design criteria for new construction and rehabilitation of Park Sites.

Design Requirements for Designer and Irrigation Systems on Park sites.

1. Designer shall be a Licensed Irrigator in the State of Texas in good standing.

2. Designer shall meet with PSB to verify water supply line sizes, proposed meter locations, actual field tested pressures, and size new meter installations to insure service connection will meet water demands of the system.

3. Designer shall provide written verification and confirmation from PSB as to water supply line sizes and that meter sizes are acceptable as designed by the architect.

4. Designer shall comply with all City ordinances, plumbing codes, electrical codes, TCEQ requirements as set forth in Texas Water Code Chapter 34, and City of El Paso Parks and Recreation Department Design Standards and specifications.

5. Irrigation system design must be based on equilateral triangular spacing.

6. Designer shall be required to provide a water audit of the system after installation of the system is complete to verify actual application rates of design.

7. Design shall provide precipitation schedule for the system with information to include number of controllers, number of stations, total gallons per station, precipitation rates, recommended run times, number of heads per station, nozzle sizes, description of area watered and total run time per station to obtain required precipitation rates.

8. Designer shall provide a watering schedule showing his design will apply 1.2" of water in 10 hours.

9. Designer shall develop design in three phases.

   A. Initial design phase will include:
      1) Site Plan with all proposed development items such as: sidewalks, curbs, parking lot, athletic fields, paths, trees, shrubs, landscaping, turf areas, water meter location, electric meter location, and other existing utilities transformers, pads, pedestals, etc.
      2) Irrigation Design Plan to show site layout, sprinkler head placement, spray coverage arcs of sprinklers, Legend of all proposed equipment such as sprinklers, remote

control valves, irrigation controllers, strong box enclosure, quick couplers (QC), QC valves, QC keys, back flow prevent device (BFP), BFP insulated stainless steel enclosure.

3) Details Sheet of irrigation system details for all applicable information of each irrigation system component such as: sprinkler head, controller pedestal, valves, quick coupling valve, etc.

4) Details Sheet with applicable details and construction notes for planting methods of trees, shrubs and other landscaping items.

5) Detail Sheet with sections of all construction elements such as sidewalks, curb, pavement, etc.

9. Designer shall develop design in three phases - continued:

A. Development Phase:
   1) Will include items 1, 3, 4, and 5 from the initial design phase with any required revisions addressed.
   2) Irrigation Plan will reflect required revisions incorporated from Initial design phase and show proposed pipe routing and remote control valve placements.

B. Final Design Phase:

   1) Will include items 1 and 2 from Development Phase with any required revisions addressed.
   2) Irrigation Plan will reflect required revisions incorporated from Development Phase and show pipe sizing and pipe routing for entire irrigation system.
   3) Designer will provide design criteria and design based calculations for irrigation system and critical head(s) as applicable.
   4) Designer will provide Precipitation Rate Schedule and Calculations for said schedule.
   5) Designer will provide a proposed watering schedule for designed irrigation system.

10. Design – pressure main water line must be routed outside of athletic fields as it applies.

11. Design – remote control valves will be located outside of all athletic fields as it applies.

12. Design – all irrigation zones for athletic fields shall be separate from the remainder of the park open space.

13. Protective enclosure of Stainless Steel or Aluminum material and insulated, set on concrete pad, anchored to pad and lockable.

14. System shall be MAXICOM compatible as determined by Parks and Recreation Department Director or designee.

15. Main line shall be looped as required to provide maximum watering in 10 hours. Time window may be reduced as required based on adjoining land use facilities.

16. Maximum flow through Irrigations System main line and lateral lines shall not exceed five feet per second (5fps).

17. Main line shall incorporate 45 degrees fittings in lieu of 90 degrees turn fittings.

18. Sprinkler head coverage for Roto-type sprinklers shall have a 10' - 15' overlap.

19. Sprinkler head coverage for Pop-Up sprays shall have a minimum 3' overlap.

20. Thrust blocks shall be required at all eight inches (8") main line fittings when gasket pipe is used.

21. Thrust block calculations shall be required to determine size of thrust block.

22. No thrust block shall be required on solvent welded main lines smaller than three inches (3").

23. PVC Schedule 40 IPS Plastic piping shall be used on all main lines four inches (4") or smaller. All other main lines larger than four inches shall be PVC Class 200 IPS Plastic Pipe.

24. PVC Class 200 IPS Plastic Pipe shall be used on all laterals.

25. Parks and Recreation Director shall approve all irrigation system components including heads and valves prior to initial design.

26. PVC Pipe Joints solvent welding preparation shall be specified as follows:

    A. All pipe cuts shall be mitered to 90 degrees to assure a proper solvent weld.
    B. All burrs shall be removed prior to gluing. Pipes three inches or larger must have filed beveled edge a minimum of one fourth (1/4) the width of pipe wall.

27. PVC Pipe Joint solvent welding procedures on all joints shall be specified as follows:

    A. Use IPS Weld-On cleaner.
    B. Use IPS Weld-On purple primer P68 or P70.

C. Use IPS Weld-On gray glue # 711 Heavy Duty.

D. Wipe off all excess cement and let set as per manufacturers recommendations.

E. Initial set times shall be minimum of 5 minutes for ½" to 1 ¼" pipe, 8 minutes for 1 ½" to 2" pipe, and 2 hours for 2 ½" to 6" pipe.

F. Cure times - 20 minutes for ½" to 1 ¼" pipe, 30 minutes for 1 ½" to 2" pipe, 4 hours for 2 ½" to 6" pipe. When humidity exceeds 60%, increase cure time by 50%.

G. Set times - Once weld is set, pipe shall not be moved for any reason until set times have been achieved.

H. Water shall not be turned on until all cure times have been achieved.

28. Pressure mains and laterals to be hydro-statically tested as called for on specifications.

29. Swing Joints - Use prefabricated Lasco swing joints on rotors, spray heads and QCs.

30. Rotary Sprinkler heads shall have in-head check valves and stainless steel risers.

31. Backflow prevention devices shall be Reduced Pressure Backflow Prevent Device type with pressure gauges before and after the device.

32. Gate valve shall be installed upstream and downstream of backflow device. All backflow devices shall be supported with pipe saddles prior to making connection to meter or main line.

33. Backflow prevent device shall be fed with copper piping from meter side up to device, past device and transition to PVC Pipe past enclosure slab or past pump shelter where required. Transition to be done with threaded coupling set in a Carson jumbo valve box for ease of visual inspection.

34. Backflow prevention devices shall be housed in stainless steel or aluminum insulated enclosure that has an R-Value of 25 minimum. All BFP enclosures shall be provided with a sturdy, securable element (Lock Hasp) as approved by Department.

35. Stations or Zones shall be fed or served by lateral lines that feed comparable heads. For example: part circle arc heads shall be on same zone as other part circle arc heads, and full circle heads shall be combined on zones where full circle heads are located only.

36. All heads shall be installed perpendicular too and flush with grade.

37. Electrical Requirements - All electrical connections and supplies shall be installed per City

code. All grounds to all electrical equipment components and irrigation controllers, pumps, and pump relays shall be grounded as per manufacturer's recommendation. See attached grounding method in specification section.

Electrical Power – design diagram shall be provided for entire system to include field wiring, controllers, pumps, Maxicom controls etc.

38. Controllers shall be on separate circuits from any other equipment with surge protection enclosed in a junction box on the high and low voltage sides.

39. Controllers shall be provided with power cord plugs to plug into a GFI protected 120V supply outlet that is on a dedicated circuit with an on/off switch.

40. Controllers – each controller shall have a dedicated common wire.

41. Controllers – provide three spare remote control valve wires for each controller and extend to furthest valve.

42. Remote Control Valve wiring - no splicing is allowed in field wiring between remote control valves and controller. Valve wiring must be labeled with a weatherproof tag both in the field valve box and at controller location.

43. Valve wiring shall be standard colors: red (hot) and white (common) unless otherwise approved by Parks and Recreation Department. Label all wire ends at controller and in valve box.

44. Field wiring shall be in separate trench minimum five feet (5') from pressure main line on north and west side of main.

45. Field wiring - provide expansion loops for all field wiring every 200 feet. Wires shall not be stretched tight.

46. Valve wire connections at valves must be made with Dri-Splice connectors. Connectors must be ready filled from factory with silicone.

47. Sleeves – use sleeves wherever piping is routed under all hard surfaces. Sleeves must be two times the diameter size of pipe encased. Extend sleeve twenty-four inches (24") beyond edge of hard surfaces; wrap ends with four (4) mils plastic and tape with good quality plastic tape. Gray, cloth duct tape is not acceptable.

48. Pumps:

A. Pumps start relay shall be installed as required to meet pressure demands of system.
B. Pump relays shall be minimum of 8' from irrigation controller.
C. Pump control wiring shall be on separate circuits.
D. Pumps shall be installed with high-pressure and low-pressure limit switches, relief valves, and pressure gauges on inlet and outlet sides of pump.

E. Pumps shall be installed with cutoff valves on inlet and outlet sides.

F. Pumps shall be installed with bypass piping and isolation valve.

G. Pump houses shall be properly vented and allow for drainage to exterior of building.

H. Pump relief valves shall be vented to exterior of pump houses.

I. Irrigation controllers shall be installed in water tight NEMA rated, securable enclosures when set in general area of pump(s).

49. Materials and Equipment Listing:

A. Backflow Prevent Devices shall be Reduced Pressure Device manufactured by FEBCO.

B. Remote Control Valves – one and a half inch (1.5") valves and larger shall be manufactured by Weathermatic, with brass body and straight thru flow.

C. Remote Control Valves – one and a quarter inch (1.25") valves and smaller shall be manufactured by Rain Bird®.

D. Valve Boxes shall be heavy duty, with hinged lid and secured by tamper proof bolt as manufactured by Carson. Valve box and lids must be sized accordingly.

E. Rotary type sprinkler heads to be Hunter I-25, with check valves and stainless steel risers. Adjustable or 360° arc as required per design.

F. Pop-Up Sprays to be: 1800™ Series by Rain Bird; or PS Series, SRS Series or Pro-Spray® by Hunter.

G. Irrigation System Controllers must be Maxicom compatible – use Rain Bird ESP Series Controller, Controller must be installed in a weather-proof securable metal box that has a hasp, rain hood, door hinge stop and plan pocket holder.

H. Quick coupler (QC) - use 1" Buckner, double lug QC with Lasco Snap-Lok w/ Male brass Stabilizer Elbow to be set in a Carson Valve Box.

I. Pipe Fittings – all pipe assembly fittings must be Schedule 40 PVC Pipe fittings.

J. Copper Tubing for feed from water meter shall be used on all installations from meter past BFP device or past pump as applicable.

IRRIGATION SYSTEM
Specification

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Installer's qualifications: Texas Licensed Irrigator in good standing with a minimum of 8 years experience installing irrigation systems of comparable size.
B. Installer's qualifications: Provide résumé of projects comparable in size for the past eight (8) years and current active Irrigators License.

1.02 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each of the system components.
B. Submit the following material samples:

1. Piping and fittings. (With all markings)
2. Glue and primer.
3. Wire
4. Wire connectors and sealer.

C. Submit the following equipment samples for approval by the Parks & Recreation Department Staff Department and Designer:

1. Sprinkler heads, 1 of each type, complete with housing.
2. Valves, valve access boxes and covers.
3. Controller
4. Remote Control Valve wire.

D. Approved equipment samples will be returned to Contractor and may be used in the work.

E. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Landscape Architect or Licensed Irrigator (Designer).

F. Provide irrigation system record drawings: reproducible drawings-

1. Legibly mark drawings to record actual construction to include dimensions.
2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.

3. Identify field changes of dimension and detail and changes made by Change Order.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible to the site.
B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both: threaded or plain type piping as applicable.
C. Store and handle materials to prevent damage and deterioration.
D. Store materials out of sun to prevent weatherizing and discoloration.
E. Provide secure, locked storage for valves, sprinkler heads, and similar components that cannot be immediately replaced, to prevent installation delays.

1.04 PROJECT CONDITIONS

A. Known underground and surface utility lines are indicated within set of drawings.
B. Contractor to coordinate and call before any excavation to insure that all utilities are marked at the site. Any damaged utilities will be restored at contractor's expense.
C. Protect existing trees, plants, lawns, and other features designated to remain as part of the final landscape work.
D. Promptly repair damage to adjacent facilities caused by irrigation system work operations. Cost of repairs is at Contractor's expense.
E. Promptly notify Parks & Recreation Department Staff Department and Designer (Landscape Architect) of unexpected sub-surface conditions.
F. Irrigation system layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be established by Contractor in the field at time of installation and coordinated with Parks & Recreation Department Staff Department and Designer (Landscape Architect) prior to start of any work.
    1. Space sprinkler components as indicated on plans or as required to be modified in field and obtain acceptance of locations by Parks & Recreation Department Staff and Designer (Landscape Architect).
    2. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to Parks & Recreation Department Staff Department and Landscape Architect.

G. Cutting and patching:
    1. Cut through concrete and masonry with core drills. Jackhammers not permitted.
    2. Materials and finishes for patching shall match existing cut surface materials and finish. Exercise special care to provide patching at openings in exterior walls to insure water tightness.
    3. Method and materials used for cutting and patching shall be acceptable to Parks & Recreation Department Staff and Designer (Landscape Architect).

2.01 ACCEPTABLE MANUFACTURERS

Manufacturer: Sprinkler heads:	Hunter Inc.
A. Manufacturer: Backflow:	Febco P.O. Box 8070 Fresno, CA 93147
B. Manufacturer: Controls:	Rain Bird Inc. 145 North Grand Ave. Glendora, CA. 91740

2.02 MATERIALS

A. General:

1. Provide only new material, without flaws or defects of the highest quality of their specified class and kind.
2. Comply with pipe sizes indicated. No substitution of smaller pipes will be permitted. Larger pipe sizes may be used subject to acceptance by the Designer (Landscape Architect) and Parks & Recreation Staff. Remove damage and defective pipe from the site immediately.
3. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size, schedule, type of pipe, working pressure at 73 degrees F., and National Sanitation Foundation (NSF) approval.

B. Plastic pipe, fittings, and connections:

1. Polyvinyl chloride pipe: ASTM D2241, rigid, un-plasticized PVC, extruded from virgin parent material. Provide pipe homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.
   a. Distribution laterals: SDR 21, Class 200.
   b. Pressure mains: PVC Schedule 40 IPS Plastic Pipe for 4-inch or smaller main lines.
   c. Pressure mains: PVC Class 200 IPS Plastic Pipe for main lines larger than 4-inch.

2. PVC Pipe Fittings: ASTM D2241 schedule 40 PVC molded fittings suitable for solvent weld, or screwed connections. Fittings made of other materials are not permitted.
   a. Size slip fitting socket and taper to permit a dry un-softened pipe end to be inserted no more than halfway into the socket. Saddle fittings are not permitted.
   b. Schedule 80 PVC pipe may be threaded.
   c. Use male adapters for plastic to metal connections. Hand tighten male adapters plus one turn with a strap wrench.

3. Insert fittings: ASTM D-2466 insert type fittings.
   a. Saddle and cross fittings not permitted.

C. Sprinkler heads, pumps, valves, and associated equipment:

1. Refer to drawings materials list.
   a. Rotor Gear driven type sprinkler heads: Hunter I-25 adjustable or full circle with check valve and stainless steel riser
   b. Manual Valves: Wilkins
   c. Electrical Remote Control Valves: one and a half inch (1.5") valves and larger shall be manufactured by Weathermatic, with brass body and straight thru flow.
   d. Electrical Remote Control Valves: one and a quarter inch (1.25") valves and smaller shall be manufactured by Rain Bird®.
   e. Back Flow Prevent Device: Febco Reduce Pressure.
   f. Valve access box: shall be heavy duty, with hinged lid and secured by tamper proof bolt as manufactured by Carson. Valve box and lids must be sized accordingly. Provide tool for tamper proof bolt.
   g. Spray type sprinkler heads: Hunter PS or ProSpray, or RainBird 1800-PRS Series - as approved by Parks & Recreation Staff.

D. Controllers (Clocks):

1. Refer to drawings materials list.
   a. Controller(s): must be Maxicom compatible – use Rain Bird ESP.
   b. Cluster control unit(s): must be Maxicom compatible – use Rain Bird.

2. Irrigation System Controllers - Controller must be installed in a weatherproof securable metal box that has a hasp, rain hood, door hinge stop and plan pocket holder.

E. Electrical control wire:

1. Electrical control and ground wire: Direct burial Type UF 600 volt AWG control cable #14 or larger as required by manufacturer based on total distance.
2. Wire color code:
   a. Provide control or "hot" wires either black or red in color.
   b. Provide common or "ground" wires white in color.

2.03 ACCESSORIES

A. Drainage fill: 3/8" washed pea gravel in sufficient quantity to provide a minimum depth of 4-inch and clear equipment underside. Provide this at valve boxes, drip emitter boxes, quick couplers, pressure regulators, isolation valves, filters and air relief valves.

B. Fill: Back fill material will be clean soil free of: stones larger than 1" diameter, foreign matter, organic material, and debris.
   1. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.
   2. Suitable excavated materials removed to accommodate the irrigation system work may be used as fill material subject to the Parks Architect's review and acceptance.
C. Low voltage wire connectors: Socket seal type wire connectors and waterproof silicone sealer – provide Dri-Splice, pre-filled connectors.
D. Valve access boxes: Tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes. Provide lid of same material, green in color, hinged and lockable.
   1. 12" deep x 18" long x 13" wide base dimensions.
E. Quick coupler (QC) - use 1" Buckner, double lug QC with LASCO Snap-Lok w/ Male brass Stabilizer Elbow to be set in a Carson Valve Box.
F. Pipe Fittings – all pipe assembly fittings must be Schedule 40 PVC Pipe fittings.
G. Swings Joints – swing joints will be manufactured by LASCO and factory pre-assembled. No swing joint assembly will be permitted in field.
H. Copper Tubing for feed from water meter shall be used on all installations from meter past BFP device or past pump as applicable.
I. Paint: Blue or Green, rust inhibitive paint as approved by Parks & Recreation Department Staff.
J. Pressure Reducer Back Flow Prevent Device Enclosure – provide stainless steel or aluminum enclosure, insulated, with lockable hasp, hinges for ease of access to BFP test ports mounted on concrete pad.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Layout and stake the location of each pipe run and all sprinkler heads and sprinkler valves. Obtain Parks & Recreation Department Staff and Designer (Landscape Architect) acceptance of layout prior to excavating.
B. Remove existing paving for sleeve installation. Saw cut existing paving to provide uniform straight transition at new to existing paving as applicable.
C. Place sleeves as indicated for installation of control wires where hard surfaces will be traversed. Extend sleeve 24 inches beyond edge of hard surface.
D. Place sleeves as indicated for installation of main and lateral lines piping – extend 24 inches beyond edge of hard surface; keep clean of debris; wrap with 4-mil plastic; and tape with good quality non-cloth duct tape.

3.03 INSTALLATION

A. Excavating and backfilling:

1. All excavation shall be considered unclassified excavation and include all materials encountered.
2. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings.
3. Main Lines - Provide 18-inch cover on all main lines installation based on finished grades.
4. Lateral Lines - Install irrigation laterals with a minimum cover of 12" based on finished grades.
5. Excavate to depths required to provide 4" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.
6. Fill to match adjacent grade elevations with clean construction sand. Place and compact fill layers not greater than 8" depth at a maximum 85% Density.
7. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.
8. Place markers at all joints or assembly points of main and lateral lines for ease of access during pressure test of system.
9. Replace paving of same materials, using joints and patterns to match existing adjoining paving surfaces. Where excess patches are required a larger area of paved surface will be removed and patched to provide minimal patching.

B. Plastic pipe:

1. Make plastic to metal joints with plastic male adapters.
2. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.
3. Make solvent weld joints in accordance with manufacturer's recommendations or as specified herewith.
4. Allow joints to set at least 24 hours before water or pressure is applied to the system.
5. PVC Pipe Joints solvent welding preparation shall be performed as follows:
   a. All pipe cuts shall be mitered to 90 degrees to insure a proper solvent weld.
   b. Pipes three inches or larger in size must have filed beveled edge a minimum of one fourth (1/4) the width of pipe wall.
   c. All burrs shall be removed prior to gluing.

C. PVC Pipe Joint Solvent Welding - Use three step gluing method.
Procedures for preparation and assembly of all joints shall be performed as follows:

1. Use IPS Weld-On cleaner.
2. Use IPS Weld-On purple primer P68 or P70.

3. Use IPS Weld-On gray glue # 711 Heavy Duty.
4. Apply cleaner, primer or glue by performing one complete pass over pipe joint without overlapping pass. Apply cleaner, primer or glue on both assembly points of pipe and fitting.
5. Initial set times shall be minimum of 5 minutes for ½" to 1 ¼" pipe, 8 minutes for 1 ½" to 2" pipe, and 2 hours for 2 ½" to 6" pipe.
6. Cure times - 20 minutes for ½" to 1 ¼" pipe, 30 minutes for 1 ½" to 2" pipe, 4 hours for 2 ½" to 6" pipe. When humidity exceeds 60%, increase cure time by 50%.
7. Wipe off all excess cement and let set as per manufacturers recommendations.
8. Set times - Once weld is set, pipe shall not be moved for any reason until set times have been achieved.
9. Water shall not be turned on until all cure times have been achieved.
10. Welding of joints must comply with manufacturers' recommendations for ambient temperature requirements.

D. Sprinklers, fittings, valves, and accessories:

1. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.
2. Set sprinkler heads perpendicular to finished grades, except as otherwise indicted.
3. Obtain Parks & Recreation Department Staff and Designer's (Landscape Architect) review and acceptance of height for proposed sprinkler heads and valves prior to installation.
4. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed sprinkler head spacing distances indicated.
5. Install risers for spray heads in shrub or flowerbed areas and planters of sufficient height to prevent interruption of the stream by the plant material.
6. Install pop-up, impact, or gear driven sprinklers with an adjustable double swing joint riser of at least 3 standard 90-degree elbows. Use double swing joint risers by LASCO, factory pre-assembled units.
7. Install backflow prevention valve, fittings, and accessories as shown or required to complete the system.
8. Install controller(s) as detailed.
9. Install valve access boxes on a suitable base of bricks and gravel to provide a level foundation at proper grade and to provide drainage of the access box.
10. Seal threaded connections on pressure side of control valves with Teflon tape or approved plastic joint type compound.

E. Control wiring:

1. Install electric control cable in separate trenches with minimum 12" of cover. Trench for wires will be minimum 5 feet from main line on north and west side of main as applicable. Install wire with slack to allow for thermal expansion and contraction.

Expansion joints in wire may be provided at 200-foot intervals by making 5-6 turns of the wire around a piece for 1/2" pipe instead of slack.

2. Provide sufficient slack at site connections at remote control valve boxes to allow raising the valve bonnet or valve splice to the surface without disconnecting the wires when repair is required.
3. Connect each remote control valve to one station of a controller except as otherwise indicated.
4. Connect one dedicated common ground wire for each Controller and remote control valves operated by Controller.
5. Make wire connections to remote control electric valves with Dri-Splice ready filled connectors.
6. Splices are not allowed between the Controller and corresponding remote control valve(s).

F. Controllers:

1. Controllers shall be on separate circuits from any other equipment with surge protection enclosed in a junction box with cover on the high and low voltage sides.
2. Controllers shall be provided with power cord plugs to plug into a GFI protected 120V supply outlet that is on a dedicated circuit with an on/off switch.
3. Controllers shall be provided with quick disconnect stripes for irrigation remote control valve wires.

G. Sleeves:

1. Irrigation Remote Control Valve Wires - Provide new sleeves for all locations where hardscape exists. Install new sleeves prior to paving or sidewalk installation at all applicable locations. Keep sleeve clean of debris; wrap with 4-mil plastic; and tape with good quality non-cloth duct tape.
2. Irrigation Main and Lateral Lines – Provide sleeves minimum 1 and ½ times the size of piping it will hold. Place sleeves as indicated for installation of main and lateral line piping – extend 24 inches beyond edge of hard surface; keep clean of debris; wrap with 4-mil plastic; and tape with good quality non-cloth duct tape.
3. Install pipe sleeves under existing concrete or asphalt surface by jacking, boring, or hydraulic driving of the sleeve. Remove and replace existing concrete and asphalt surfaces where cutting is necessary. Obtain Owner's permission before cutting existing concrete and asphalt surfaces. Where piping is shown under paved areas that are adjacent to turf areas, install piping in the turf areas.

H. Back Flow Prevent Device:

1. Support back flow prevent device during installation and after concrete pad is installed.
2. Provide concrete pad of 3,000 psi compressive strength at 28 days, a minimum thickness of 4-inches with 8-inch deep by 8-inch wide turn downs along perimeter.
3. Provide PVC pipe sleeves where copper pipe risers pass through concrete slab.

4. Concrete slab to extend minimum of 4-inches beyond outer face of back flow prevent device enclosure cabinet.
5. Enclosure cabinet must be properly secured to concrete pad in manner that may not be tampered.
6. Back flow prevent device must have adjustable support brackets provided under both sides and set in place properly.

I. Flushing, testing, and adjustment:

1. Flushing:
   a. Flush main lines prior to installation of control valves.
   b. Flush main lines – flushing of main lines is performed prior to pressure test and after irrigation valves are installed.
   c. Flush lateral lines – flushing of lateral lines is performed prior to pressure test and after sprinkler heads are installed.
   d. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.

2. Testing:
   a. Pressure Test Main Line – after all main line piping, related work and installation of all irrigation remote control valves is completed for a period of 24-hours. Test main water line at 50 psi above static pressure or design pressure, based on highest value; with a maximum loss of 1% to pass. Water main must be pressurized hydraulically and not pneumatically.
   b. Pressure Test Lateral Lines – for a period of 2-hours, test lateral lines at static or design pressure, based on highest value, with a maximum loss of 2% to pass. Lateral lines must be pressurized hydraulically.
   c. The main line pressure test must be conducted from Monday through Thursday so that completion of test is conducted on a regularly scheduled working day.
   d. Perform system testing upon completion of each section. Make necessary repairs and re-test repaired sections as required.
   e. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.

3. Adjustments:
   a. Adjust sprinklers after installation for proper and adequate distribution of water over the coverage pattern.
   b. Adjust sprinklers for the proper arc (radius) coverage.
   c. Adjust nozzles on sprinklers for proper and uniform distribution.
   d. Adjust sprinkler nozzles as required with approval from Parks and Recreation Department Staff and Designer (Landscape Architect) to give the best arc and pattern of coverage when applicable.

J. Service and Guarantee:

1. Contractor shall guarantee the irrigation system for one year (365 days) from the date of acceptance against defects in materials and workmanship, the guarantee does not include vandalism.
2. Contractor shall respond to callbacks within 24 hours of notification.
3. Emergency repairs done by Parks & Recreation Department Staff shall not void the warranty.
4. Emergency or other repairs performed by Parks Staff due to contractors' lack of timely response will be invoiced and charged to Contractor. Checks will be made payable to City of El Paso, care of Parks and Recreation Department.

3.04 SPARE PARTS:

A. Provide Spare Parts in the following counts and delivery method.

1. 3 extra remote control valve wires installed from Controller to furthest valve with extra slack as required to perform connections at valves.
2. 1 case extra sprinkler head(s) of each size and type – hand delivered to Parks & Recreation Department Staff.
3. 1 extra valve(s) of each size – hand delivered to Parks & Recreation Department Staff. Minimum of 3 valves will be required based on sizes used.
4. 20 extra Dri-Splice ready filled connectors – hand delivered to Parks & Recreation Department Staff.

3.05 DISPOSAL OF WASTE MATERIAL

A. Stockpile and keep site free of loose and air born debris, perform daily clean up of site in dispose of waste material in an appropriate type container.
B. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock trash, and debris on a weekly basis.
C. Maintain disposal route clear, clean and free of debris.

3.06 ACCEPTANCE

A. Test and demonstrate to the Parks & Recreation Staff, Designer (Landscape Architect) and Owner the satisfactory operation of the system free of leaks and mechanical or electrical flaws.

   Instruct the Parks & Recreation Department Staff and/or Owner's designated personnel in the operation of the system, including adjustment of sprinklers, controller(s), valves, pump controls, and moisture sensing control(s) and related irrigation equipment.

   Upon acceptance the Owner will assume operation of the system.

3.07 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.

3.04 PUMPS

Provide size of pump and installation method criteria for pump and protective enclosure as supplement to irrigation system specification.

1. Pumps start relay shall be installed as required to meet pressure demands of system.
2. Pump relays shall be minimum of 8' from irrigation controller.
3. Pump control wiring shall be on separate circuits.
4. Pumps shall be installed with high-pressure and low-pressure limit switches, relief valves, and pressure gauges on inlet and outlet sides of pump.
5. Pumps shall be installed with cutoff valves on inlet and outlet sides.
6. Pumps shall be installed with bypass piping and isolation valves.
7. Pump houses shall be properly vented and allow for drainage to exterior of building.
8. Pump relief valves shall be vented to exterior of pump houses.

Irrigation controllers shall be installed in water tight NEMA rated, securable enclosures when set in general area of pump(s).

SURGE PROTECTION/GROUNDING

SATELLITE UNITS - At each field satellite unit or cluster of units furnish and install, as shown on the drawings and as required by the manufacturer, an MSP-1 surge arrestor mounted in the cabinet/pedestal of the first satellite unit and wired to the terminal strip as shown in the detail with the satellite unit. EACH satellite unit shall also be grounded, by means of a *10 or larger bare copper grounding wire to a 3-rod grid copper grounding network (three (3) - 5/8" diameter copper clad rods 8' long arranged in a triangle at least 8' apart and tied together underground with *10 or larger bare copper wire). Each leg of the 120 Volt A.C. power wiring shall have an LPP-K surge arrestor installed on it and wired to the grounding terminal of the terminal strip. Grounding network shall measure 15 OHMS or less when measured with a Vibra-Ground instruments. It is IMPORTANT that a good ground be maintained for the surge arrestors to be effective.

CCU/ENCODER UNIT - On the 2-WIRE PATH to the CCU Unit, furnish and install an MSP-1 surge arrestor, wired into the 2-Wire path as shown on the drawings and as instructed, with ground wires run to a three (3) rod grid copper grounding network (three (3) -5/8" diameter copper clad rods 8' long arranged in a triangle at least 8' apart and tied together underground with *10 or larger bare copper wire). A *10 or larger grounding wire shall be run from the round terminal of the CCU Unit to the grounding network. Grounding network shall measure 15 OHMS or less when measured with a Vibra-Ground instrument. It is IMPORTANT that a good ground be maintained for the surge arrestors to be effective.

PRIMARY POWER CIRCUIT - Furnish and install on the power circuit furnishing power to the central computer equipment, a "ZAP TRAP" surge arrestor. Install in the electrical panel as shown and directed and ground to the electrical panel grounding bus.

DIGITAL FLOW MONITOR SPECIFICATION

MANUFACTURER: Data Industrial Corporation
53 Portside Drive
Pocasset, MA 02559
Telephone:(508) 563-7196

FLOW MONITOR MODEL NUMBER: 1000
Microprocessor based flow monitor LCD display for rate of flow
English and metric units of measure security cover.

LOCAL ADJUSTABLE RELAY CONTROL MODEL NUMBER 800/850 LARC:

To be mounted in side of metal box with controllers.

Provide all wiring, valve boxes, and connectors as needed to properly install as per manufacturer's recommendations.

WEATHER STATION

Furnish and install, where shown on the drawings or where directed, a WEATHER STATION for the purpose of monitoring the critical daily weather conditions.

TELEPHONE OPERATED WEATHER STATION: (If Applicable)

Furnish and install a Rain Bird Model WS-200, remote connected Weather Station. The unit shall be complete with the necessary instruments for recording wind speed, wind direction, relative humidity, rainfall, solar radiation, and air temperature. A micro-logger shall pole and record the data every five (5) seconds on an around-the-clock basis. An answering modem shall be used for communication of the computer to the weather station. Unit shall be complete with a plug-in 120V/26.5V _transformer. Furnish a telephone line (from the Telephone Company) with standard J-11 jack for connection to the weather station modem.

The weather station (model WS-200) shall be mounted on a poured concrete base securely bolted to it and have a 6'-O" high (minimum) security fence on all sides at least 8'-0" out from the weather station base with access gate. Security fence shall be such as not to interfere with the correct readings of the instruments. Furnish and install MSP-1 surge arrestors for both the communication cable and the 26.5 Volt power wires, as shown on the drawings and as directed. Weather station as well as the MSP-1 surge arrestors shall be grounded to an earth grounding grid, consisting of three (3) 5/8" diameter copper clad grounding rods spaced in a triangle 8' apart and tied together underground with #10 or larger bare copper wire. Ground network shall be 15 OHMS or less when tested with a Vibra-Ground instrument.

Weather Station Features:
Powerful internal micro-logger:

1. Data collection, logging, and analysis.
2. Constant communication with weather sensors.
3. Stores 9 days of data.

Sensors monitor 6 weather parameters:

1. Air temperature.
2. Solar radiation.
3. Relative humidity.
4. Wind Speed
5. Wind direction
6. Rainfall.

Construction:

1. Rugged yet lightweight metal construction.
2. Sensors located 9 feet above ground for added vandal resistance.
3. Full gasket housing.
4. Water-resistant sensor connectors and cables.
5. Powered by rechargeable sealed gel-cell batteries.
6. Simple-to-service sensors and internal components.
7. Batteries charged by 120 VAC/26.5 VAC Transformer or optional solar power.

Self-diagnostic test mechanisms:

1. Internal moisture sensor.
2. Battery voltage level.
3. Test port for local sensor check.

State-of-the-art weather software:

1. Calculates "ET" values.
2. Stores daily and historic ET data.
3. Monitors and displays current weather conditions.
4. Graphically displays weather parameters.

Stand-alone operation or functions as integral part of MAXI-ET System. Optional phone modem model (WS-200) to control system over distances of 4,000 feet.

WEATHER STATION INSTALLATION PREPARATION

A requirement for all installations is the low voltage power wires (*14UF) used to 'supply 24 VAC to the weather station. A remote transformer must be located at a source of primary power that is not easily turned off. The 24 VAC power is used to provide constant charging of the battery within the weather station.

The Model WS-200 Weather Station communicates via a standard telephone line. Copper shielded, burial phone cable should enter the weather station pedestal via the conduit.

Surge protection installation requires the addition of a valve box near the conduit entry to the weather station. An MSP-1 Surge Arrestor must be inserted into the power line and an additional MSP-1 in the Short Haul Modem line. The line side of the MSP-1 must go to the field on both cases. The telephone line does not require an MSP-1. A standard phone line transient protector is provided within the weather station.

With the weather station, a template will be provided and four anchor bolts to mount in cement as shown in the PRE-INSTALLATION drawing. The template is shipped attached to the bottom of the weather station. DONOT throw the template away. It is used later to complete the weather station installation.

The threaded end of the anchor bolts should extend a minimum of 1 3/4' above the concrete. The template should be within 1" of the concrete, allowing room for the bottom-nuts to clear the concrete.

MAXICOM
Irrigation System Central Control

MAXICOM SECURITY:

The SECURITY for the MAX ICOM System is contained in a chip, which is mounted on the micro-processor PC board of the CCU-M or CCU-1 for MAXICOM Jr. systems. The computer MUST find this security before the MAXICOM program is allowed to function. Should the system fail to "clear" this security' check this communication path from the computer to the CCU-M *I* CCU-1. Don't over look the fact that it could be the computer serial port or the security chip in the CCU as well as the communication path itself- although the most likely area is the communication path itself.

CLUSTER CONTROL

The CCU, receiving information from the computer, UNIT (CCU) communicates to the satellites in the field. Each CCU communicates with satellites via one of two different communication paths: the two-wire path or the MaxiLink (wireless radio) path. This is referred to as "Satellite Data Path". The CCU is capable of communicating with a maximum of twenty-eight (28) satellites or decoders on it -as the CCU can generate (28) different signals, which we refer to as channels. The CCU also receives "feed back" information from the field satellites and/or decoders and relays it back to the computer at download or upload.

MAXICOM

The CCU also displays current "feed back" information while on-line with the computer. On CCU-1 and CCU-M models, channel LED indicators show when any channel is active. A reset button is available to reset or cancel the "memory buffer" in the CCU and cancel all operating channels.

COMMUNICATION TO FIELD SATELLITES:

The communication between the CCU and the Field Satellite units is by means of the 2-Wire Path or MAXILink™ wireless communication with 450 MHz point to point radios. As with all the communication schemes used in MAXICOM, the communication scheme used in this portion of the MAXICOM system is true two-way communication. The signal is transmitted from the CCU Interface Module out to the satellite and a "feed-back" signal is transmitted from the satellite back to the CCU over the communication path.

The signal is NOT a HIGH FREQUENCY signal but rather a modified low voltage signal. The signal, therefore, is NOT subject to outside Interference and thus DOES NOT require any type of shielded cable. The signal is, however, very subject to voltage, and therefore the 2-Wire Path must be protected against any surges and leakage to ground. For this reason care must be taken in making any underground splices. Proper surge protection and "telephone-type" wire connectors and splice kits must be used.

If utilizing the 2-Wire Path, PE-39/89 wire is highly recommended. PE-39/89 is a type of wire commonly used in the telecommunications industry that has been tested and Improved over a long period of time. This wire is resistant to most all electrical surges and voltage leaks. The wire is manufactured with multiple pairs of wire, each pair being twisted together for ease of Identification and use. A polyethylene outer jacket surrounds the twisted pair conductors. The double insulation jelly-filled material is to assure that we resist electrical surges and do not get leakage to ground via pin-holes In the UF Insulation.

The MAXICOM wire for the 2-Wire Paths DOES NOT have to be "looped" but rather can be branched as often and in any direction desired. Also, there can be as many "dead ends" as may be required. Therefore Installation of the 2 – Wire Path(s) is made as simple and as easy as possible and with the least amount of wire required. The system also lends itself to be easily expanded in the future, should the need arise. As long as there are "SPARE CHANNELS" on a given CCU, it only requires the Installation of a Satellite or Decoder on the site and tying into the 2-Wire Path.

MAXICOM Training Seminar

The IAXILink™ product line allows the CCU to communicate with the satellites via wireless radio signals. This allows for easy retrofit of existing system where installing wire is very cost prohibitive. The CCU and satellites are installed with radios of the same frequency and set to communicate like the 2-wire path does. Before installation, a site survey must be performed to see if the site is conducive to radio operation.

SEEDING AND RESTORATION OF EXISTING LAWNS

PART 1 GENERAL

1.1 DESCRIPTION

A. Provide seeded lawns as shown and specified. The work includes:
   1. Soil preparation
   2. Hydro-Seeding lawns
   3. Mulching
   4. Maintenance

B. Related work:
   1. Section 02810: Irrigation system

1.2 QUALITY ASSURANCE

A. Comply with General Quality Control

B. Provide and pay for materials testing. Testing agency shall be acceptable to the Parks & Recreation Department Staff and Landscape Architect (Designer). Provide the following data:
   1. Test representative materials samples proposed for use
   2. Topsoil Upper 12": New Topsoil, imported and Existing
      a. PH factor
      b. Mechanical and structural analysis
      c. Percentage of organic content
      d. Recommendations on type and quality of additives required establishing satisfactory factory PH factor and supply of nutrients to bring nutrients to satisfactory level for planting.
   3. Subsoil 12" to 36": To be imported or existing
      a. Structural analysis

1.3 SUBMITTALS

A. Submit seed vendor's certification for required grass seed mixture and wildflower for each mixture, indicating percentage by weight, and percentages of purity, germination and weed see grass species.

B. Submit the following material samples:
   1. Seed
   2. Fertilizer, mulch and topsoil

C. Submit the following materials certification:

1. Fertilizer(s) analysis
2. Seed

D. Submit materials test report
E. Upon completion, submit written maintenance instruction recommending procedures for maintenance of areas

1.4 DELIVERIES, STORAGE AND HANDLING

A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration

1.5 PROJECT CONDITIONS

A. Work notification: Notify Architect at least 7 working days prior to start of seeding operations.
B. Protect existing utilities, paving and other facilities from damage caused by seeding operations.
C. Perform seeding or sod work only after tillage work has been performed to insure permeability (good drainage) within soil.
D. Restrict traffic from lawn areas until grass is established. Erect sign and barriers as required.
E. Provide watering equipment as required
F. The irrigation system will be installed prior to seeding. Locate, protect, and maintain the irrigation system during seeding operations. Repair irrigation system components damaged during seeding operations at the Contractor's expense.

1.6 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining seeded areas until final acceptance. Reseed areas, with specified materials, which fail to provide a uniform 90% coverage of grass until the Parks & Recreation Department Staff and Landscape Architect (Designer) accept all affected areas.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lawn seed: Fresh, clean and new crop seed (mixture).
   1. Common Bermuda: Five (5) pounds per 1,000 Sq. Ft.

B. Fertilizer
   1. Granular, non-burning product composed of not more than 50% organic slow acting, guaranteed analysis professional fertilizer.
      a. Type A: Starter fertilizer containing 20% nitrogen, 26% phosphoric acid, and 6% potash by weight or similar approved composition.
      b. Type B: Top dressing fertilizer containing 16% nitrogen, 8% phosphoric acid, 8% potash and 5% iron by weight or similar approved composition
C. Wood cellulose fiber mulch: Degradable green yet wood cellulose fiber or 100% recycled long fiber pulp, free from weeds or other foreign matter toxic to seed germination and suitable for hydro-mulching.
D. Organic Material: Well rotted material aged, shredded to a fine workable material.
E. Water: Free of substance harmful to seed growth. Hoses or other methods of transportation furnished by contractor.

PART 3 EXECUTION

3.1 INSPECTIONS

A. Examine finish surfaces, grades, topsoil quality, and depth. Do not start seeding work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Limit preparation to areas, which will be immediately seeded.
B. Loosen suitable topsoil of lawn area to minimum depth of 6". Remove stones over 1" in dimension and sticks, roots, rubbish and extraneous matter. If existing suitable topsoil is less than 12" in depth import sufficient topsoil material to establish at minimum 12" deep growing medium.
C. Remove unfavorable growing medium if necessary and replace with good suitable topsoil to a depth of 12" minimum.
D. If Caliche soils are found they must be shattered to a depth of 24" minimum and covered with minimum 12" of good top soil suitable for establishing and maintaining turf.
E. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Roll rake, remove ridges, and fill depressions as required to drain.
F. Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with soil to a depth of 3" by disking or other approved method. Fertilize areas inaccessible to power equipment with hand tools and incorporate into soil.
G. Apply Type A fertilizer to indicated turf areas at a rate equal to 1.0 lb. Of actual nitrogen per 1,000 sq. ft. (220 lbs/acre).
H. Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to seeding.

3.3 INSTALLATION

A. Seeding:

1. Seed immediately after preparation of bed. Spring seeding between May 1 and June 1 and fall seeding between August 1 and September 15 or at such other times acceptable to the Parks & Recreation Department Staff and Landscape Architect (Designer).
2. Seed indicated areas within contract limits and areas adjoining areas disturbed as a result of construction operations.
3. Perform seeding operations when the soil is dry and when winds do not exceed 5 miles per hour velocity.
4. Seed grass seed at a rate of 4 lbs per 1,000 sq. ft.

3.4 RECONDITIONING EXISTING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations, including storage of materials or equipment and movement of construction vehicles, and existing lawn Areas are indicated.
B. Provide fertilizer, seed and soil amendments as specified for new lawns or as required to provide a satisfactory reconditioned lawn. Provide topsoil as required to fill areas and meet new finish grades.
C. Cultivate bare and compacted areas thoroughly.
D. Remove diseased or unsatisfactory lawn areas. Do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, stone, gravel, and other construction materials.
E. Where substantial but thin lawn remains, rake, aerate if compacted, and cultivate soil; fertilize seed.
F. Water newly seeded areas. Maintain adequate soil moisture until new grass is established.

3.5 MAINTENACE

A. Maintain seed lawn for a period of at least 60 days after completion and acceptance of seeding operations.

B. Maintain seeded lawn areas, including watering spot weeding, mowing, and applications of herbicides, fungicides, insecticides, and re-seeding until a full, uniform stand of grass free of weeks undesirable grass species, disease, and insects is achieved and accepted by Parks & Recreation Department Staff and Landscape Architect (Designer).

1. Water daily to maintain adequate surface soil moisture for proper seed germination. Continue daily watering for no less than 30 days. Thereafter apply ½" of water twice weekly until acceptance.

2. Repair, rework and re-seed all areas that have washed out, are eroded, or do not catch.
3. Mow lawn areas as soon as lawn top growth reaches 2" height. Cut back to 1" in height. Repeat mowing as required to maintain specified height.
4. Apply type B fertilizer to lawns approximately 30 days after seeding at a rate equal to 1.0 lb. Of actual nitrogen per 1,000 sq. ft. (140 lbs/acre). Apply with mechanical rotary or drop distributor. Thoroughly water into soil.

3.6 ACCEPTANCE

A. Seeded areas will be inspected at completion of installation and accepted subject to compliance with specified materials and installation requirements.
B. Inspection to determine acceptance of seeded lawns will be made by the Parks & Recreation Department Staff and Landscape Architect (Designer), upon Contractors request. Provide notification at least 10 working days before requested inspection date.
    1. Seeded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, uniform, close stand of the specified grass is established free of weeds, undesirable grass species, disease, and insects.
    2. No individual lawn areas shall have bare spots or unacceptable cover totaling more than 2% of the individual areas, in areas requested to be inspected.

C. Upon acceptance, the Owner will assume lawn maintenance.

3.7 CLEANING

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from seeding operations

SODDING SPECIFICATION

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide sodded lawns as shown and specified. The work includes:

1. Soil preparation.
2. Sodding lawns.
3. Maintenance.

B. Related work:

1. Site clearing.
2. Irrigation System.

1.02 QUALITY ASSURANCE

A. Comply with Section III-A and III-B requirements.

B. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.

C. Provide and pay for materials testing. Testing agency shall be acceptable to the Parks & Recreation Department Staff and Landscape Architect (Designer). Provide the following data:

1. Test representative materials samples proposed for use.
2. Existing soil on site.
3. Topsoil Upper 12": New Topsoil, imported and Existing
   a. pH factor.
   b. Mechanical analysis.
   c. Percentage of organic content.
   d. Recommendations on type and quantity of additives required to establish satisfactory pH I factor and supply of nutrients to bring nutrients to satisfactory level for planting.
4. Subsoil 12" to 36: To be imported or existing
   a. Structural analysis

1.03 SUBMITTALS

A. Submit sod growers certification of grass species. Identify source location.

B. Submit the following materials samples:
   1. ** Hybrid Santa Ana Bermuda

C. Submit the following materials certification:

1. Fertilizer(s) analysis.
2. ** Additives required

D. Submit materials test report.

E. Upon sodded lawn acceptance, submit written maintenance instructions recommending procedures for maintenance of sodded lawns.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Cut, deliver, and install sod within a 24-hour period.

1. Do not harvest or transport sod when moisture content may adversely affect sod survival.
2. Protect sod from sun, wind, and dehydration prior to installation.
3. Do not tear, stretch, or drop sod during handling and installation.

1.05 PROJECT CONDITIONS

A. Work notification: Notify Landscape Architect at least 7 working days prior to start of sodding operations.
B. Protect existing utilities, paving, and other facilities from damage caused by sodding operations.
C. Perform sodding work only after planting and other work affecting ground surface has been completed.
D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.
E. The irrigation system will be installed prior to sodding. Locate, protect and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sodding operations at this Contractor's expense.

1.06 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining lawn areas until final acceptance. Re-So areas, with specified materials, which fail to provide a uniform stand of grass until all impacted areas are accepted by Parks.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: Nursery grown pasture sod. Sod Type: Hybrid Santa Ana Bermuda

B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free to weeds, undesirable grasses, stones, roots, thatch, and extraneous material; viable and capable of growth and development when planted.

   1. Furnish sod machine stripped and of Supplier's standard width, length, and thickness: Uniformly 1" to 1-1/2" thick with clean cut edges. Mow sod before stripping.

C. Fertilizer:

   1. Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.

      a. Type A: Starter fertilizer containing 20% nitrogen, 26% phosphoric acid, and 6% potash by weight or similar approved composition.
      b. Type B: Top dressing fertilizer containing 16% nitrogen, 8% phosphoric acid, 8% potash by weight or similar approved composition.

D. Water: Free of substance harmful to sod growth to be delivered and apply by use of hoses or other methods of transportation furnished by Contractor.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine finish surfaces, grades, topsoil quality, and depth. Do not start sodding work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Limit preparation to areas that will be immediately sodded.
B. Loosen suitable topsoil of lawn areas to minimum depth of 6". Remove stones over 1" in any dimension and sticks, roots, rubbish, and extraneous matter. If existing suitable topsoil is less than 12" in depth import sufficient topsoil material to establish at minimum 12" deep growing medium.
C. Remove unfavorable growing medium if necessary and replace with good suitable topsoil to a depth of 12" minimum.
D. If Caliche soils are found they must be shattered to a depth of 24" minimum and covered with minimum 12" of good top soil suitable for establishing and maintaining turf.
E. Grade lawn areas to smooth, free draining and even surface with a loose, uniformly, fine texture. Roll and rake; remove ridges and fill depressions as required to drain.
F. Dampen dry soil prior to sodding.
G. Restore prepared areas to specified conditions if eroded, settled, or otherwise disturbed after fine grading and prior to sodding.
H. Apply Type A fertilizer at the rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft (220

lbs/acre). Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with the soil to a depth of 3" by disking or other approved methods. Fertilizer areas inaccessible to power equipment with hand tools and incorporated it into soil.

3.03 INSTALLATION

A. Sodding:

1. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with adjacent curbs, sidewalks, drains and seeded areas.
2. Do not lay dormant sod or install sod on saturated or frozen soil.
3. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row.
4. Peg sod on slopes greater than 3 to 1 to prevent slippage at a rate of 2 stakes per yd. of sod.
5. Water sod thoroughly with a fine spray immediately after laying.
6. Roll with light lawn roller to ensure contact with sub-grade. Rolling shall be performed in two opposite directions.

B. Sod indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.

3.04 MAINTENANCE

A. Maintain sodded lawns for a period of at least 60 days after completion and acceptance of sodding operations.
B. Maintain sodded lawn areas, including watering, spot weeding, mowing, application of herbicides, fungicides, insecticides, and re-sodding until a full, uniform 'stand of grass free of weed, undesirable grass species, disease ½ and insects is achieved and accepted by the Parks Architect.

1. Water sod thoroughly every 2 to 3 days min., as required to establish proper rooting.
2. Repair, rework and re-sod all areas that have washed out or are eroded. Replace undesirable or dead areas with new sod.
3. Mow lawn areas as soon as lawn top growth reaches a 2" height. Cut back to 1" height. Repeat mowing as required to maintain specified height. Not more than 40% of grass leaf shall be removed at any single mowing.

4. Apply Type B fertilizer to lawns approximately 30 days after sodding at a rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft (140 lbs/acre). Apply with a mechanical rotary or drop type distributor, thoroughly water soil.
5. Apply herbicides as required to control weed growth or undesirable grass species.
6. Apply fungicides and insecticides as required to control diseases and insects.

3.5 ACCEPTANCE

A. Inspection to determine acceptance of sodded lawns will be made by the Parks Architect, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.

1. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weeds, undesirable grass species, disease, and insects.

TREES, SHRUBS AND GROUND COVERS

PART 1 GENERAL

1.0 SECTION INCLUDES

A. Related Documents
B. Quality Assurance
C. Submittals
D. Delivery, Storage and Handling
E. Project Conditions
F. Warranty

1.1 RELATED DOCUMENTS

A. Section 02810: Irrigation system

1.2 QUALITY ASSURANCE

A. Comply with Standard Landscape Practices and all general requirements in the specifications.

B. Plant names indicated; comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticulture Nomenclature. Names of varieties not listed conform generally with Names accepted by the nursery trade. Provide stock true to the botanical name and legibly tagged.

C. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock." A plant shall be dimensioned as it stands in its natural position.

D. All plants shall be nursery grown under climatic conditions similar to those in locality of the project for a minimum of 2 years.

E. Stock furnished shall be at least the minimum size indicated. Large stock is acceptable, at no additional cost, and providing that the larger plants will not be cut back to size indicated.

F. Provide "specimen" plants with a special height, shap4e or character of growth. Tag specimen trees or shrubs at the source of supply. The landscape Architect will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

G. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size and variety.
   1. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.

H. Provide and pay for materials testing. Testing agency shall be acceptable to the Landscape Architect. Provide the following data:
   1. Test representative material samples proposed for use.
   2. Topsoil:
      a. PH factor
      b. Mechanical analysis
      c. Percentage of organic content

1.3 SUBMITTAL

A. Submit the following material samples:
   1. Mulches: Shredded Decomposed Bark Mulch
   2. Planting accessories
   3. Topsoil source and PH value
   4. Plant fertilizer

B. Submit material test reports
C. Upon plant material acceptance, submit written maintenance recommending procedures for maintenance of plant materials
D. Provide plant materials record drawings:
   1. Legibly mark drawings to record actual construction
   2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
   3. Identify field changes of dimensions, detail and changes made by Change Order.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.
B. Take all precautions customary in good trade practice in preparing plants for moving workmanship that fails t meet the highest standards will be reflected. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filled with the Landscape Architect.
C. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, shredded decomposed bark, or in a manner acceptable to the Landscape Architect. Water healed-in planting daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

D. Cover plans transported on open vehicles with a protective covering to prevent windburn.
E. Provide dry, loose topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

1.5 PROJECT CONDITIONS

A. Work notification: Notify Landscape Architect at least 7 working days to installation of plan material.
B. Protect existing utilities, paving, and other facilities from damage caused by landscaping operations.
C. A complete list of plants, including a schedule of sizes, quantity, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
D. The irrigation system will be installed prior to planting Locate, protect, and maintain the irrigation system during planting operations. Repair irrigation system components, damaged during planting operation, at this Contractor's expense.

1.6 WARRANTY

A. Warrant plant material to remain alive and be in healthy, vigorous condition for a period of 1 year after completion and acceptance of entire project.
   1. Inspection of plants will be made by the Parks & Recreation Department Staff and Designer (Landscape Architect) at completion of planting.

B. Replace, in accordance with the drawings and specifications, all plants that are dead or as determined by the Landscape Architect, are in unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. The cost of such replacement(s) is a Contractor's expense. Warrant all replacement plants for 1 year after installation.
C. Warranty shall not include damage or loss of trees, plants, or ground covers caused by fires, floods, freezing, rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.
D. Remove an immediately replace all plants, as determined by the Landscape Architect, to be unsatisfactory during the initial planting installation.

PART 2 PRODUCTS

2.0 SECTION INCLUDES

A. Materials
B. Accessories

2.1 MATERIALS

A. Plants: Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scaled injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all for infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be reflected if they show signs of growth during storage.

1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock." Cracked or mushroomed balls are not acceptable.

2. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
   a. No plants shall be loose in the container
   b. Container stock shall not be root bound'

3. Provide tree species that mature at heights over 25'-0 with a single main trunk. Trees that have a main trunk forming a "Y" shape are not acceptable.

4. Plants planted in rows shall be matched in form.

5. Plants larger than those specified in the plant list, may be used when acceptable to the Landscape Architect.
   a. If the use of larger plants is acceptable, increase the spread of root ball in proportion to the size of the plant.

6. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.

7. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.

8. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.
   a. the measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.
   b. Single stemmed or thin plants will not be accepted.
   c. Side branches shall be generous, well-twigged, and the plant as a whole well-bushed to the ground.
   d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other roots or branch injuries.

2.2 ACCESSORIES

A. Topsoil for Planting Beds: Fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sand, stones, plants, roost, sticks and other foreign materials, with acidity range between pH 6.0 and 8.0.
   1. Identify source location of topsoil proposed for use on the project.
   2. Provide topsoil free of substances harmful to the plants which will be grown in the soil

B. Shredded Decomposed Bark: Brown to black in color, weed and seed free, granulated bark, well decomposed, containing not more than 9% mineral on dry basis.

C. Tree Wrap: Standard waterproofed tree wrapping paper, 2 ½" wide, made of 2 layers of crepe Kraft paper weighing not less than 30 lbs. Per ream, cemented together with asphalt.

D. Fertilizer:
   1. Plant Fertilizer Type "A": Commercial type approved by the Landscape Architect, containing 16% nitrogen, 8% phosphoric acid, and 8% potash by weight. Fertilizer shall contain 5% iron.

E. Water: Free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.

F. Weed Control Barrier: Rot resistant polypropylene fabric, water and air permeable. DeWitt Pro 5.

PART 3 EXECUTION

3.0 SECTION INCLUDES

A. Inspection
B. Preparation
C. Installation
D. Mulching
E. Pruning
F. Maintenance
G. Acceptance
H. Cleaning

3.1 INSPECTION

A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Time of planting:

1. Evergreen material: Plant evergreen materials between September 1 and November 15 or in spring before new growth begins.
2. Deciduous material: Plant deciduous materials in a dormant condition. If deciduous trees are planted in-leaf, they shall be handed stripped of all leaves before planting.
3. Planting times other than those indicated shall be acceptable to the Landscape Architect.

B. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.

C. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.

D. Excavate circular plant pits with vertical sides for plants. Provide tree pits at least 36" greater than root ball of the tree and shrub pits at least 12" greater than root ball of the shrub. Depth of pit shall accommodate the root ball. Scarify the sides and bottom of the pit to a depth of 2". Remove excavated materials that are rocky or determined (by Landscape Architect) unsuitable for planting from the site.

E. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of 5 parts planting topsoil to 1 shredded decomposed bark and ½ lb plant fertilizer Type "A" for each cu. Yd. Of mixture.

F. Provide pre-mixed ground cover bed planting mixture consisting of 3 parts planting topsoil to 1 part shredded decomposed bark and ½ lb. Plant fertilizer Type "A" per cu. Yd. Provide beds a minimum of 8" deep. If slopes are greater than 4 to 1 increase depth to 12".

G. Provide pre-mixed planting mixture for use around the balls and roots of ericaceous plants consisting of 5 parts planting top soil to 1 part shredded decomposed bark and ½ lb plant fertilizer Type "A" per cu. Yd. Of mixture.

3.3 INSTALLATION

A. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plum, and faced to give the best appearance or relationship to each other or adjacent

structure. Set plant material top of root ball flush with finish grade.
No filling will be permitted around trunks or stems. Back fill the pit with planting mixture. Do not use frozen or muddy mixture for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

B. After balled and burlapped plants are set, water planting soil mixture around bases of balls and fill all voids.
   1. Remove all burlap, ropes, and wires from the tops and sides of balls

C. Space plants or as show in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" min. of the trunks of trees and shrubs within planting bed shall be planted to within 1-6" of all edges at all hardscape surfaces.

D. Mulching:
   1. Mulch tree and shrub planting pits and shrub beds with required mulching material 4" deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.
   2. Install week control barrier over grade prior to mulching tree and shrub planting pits and shrubs beds. Secure on slopes with "T"pin anchors.

E. Wrapping, guying, staking:
   1. Inspect trees for injury to trunks, evidence of inset infestation, and improper pruning before wrapping.
   2. Wrap trunks of all trees spirally from bottom to top with specified tree wrap and secure in place.
      a. Overlap ½ the width of the tree wrap strip and cover the trunk from the ground to the height of the second branch.
      b. Secure tree wrap in place with water resistant tape.

3.4 MAINTENANCE

A. Maintain planting until completion and acceptance of the entire project.
B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.
   1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
   2. Tighten and repair guy wires and stakes as required.
   3. Correct defective work as soon as possible after deficiencies become apparent and weather and season permit.
   4. Water trees and shrubs within the first 24 hours of initial planting, and not less than twice per week until final acceptance.

3.5 ACCEPTANCE

A. Inspection to determine acceptance of planted areas will be made by the Landscape Architect, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.
   1. Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive and in a healthy, vigorous condition.

B. Upon acceptance, the Owner or designated maintenance company will assume plant maintenance.

3.6 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soils, debris, and equipment. Repair damage resulting from planting operations.

Concrete Sidewalk Standard

Provide 7' (seven feet) wide concrete sidewalk along park perimeter on street right-of-way and abut it to the back of the standard concrete curb and gutter. Sidewalk construction must comply with all applicable Municipal, State and Federal Regulations to include TAS and ADA.

Sidewalk Construction Standard:

1. Four inches thick minimum.
2. Concrete strength to be 3,000 psi minimum
3. Rough broom finish.
4. Cross-slope may not exceed two percent (2%), require standard cross slope to be set at one percent (1%).
5. Expansion joint must be provided along back of concrete curb and be provided with ½" thick expansion joint material.
6. Scored joint marks ¼" wide and ½" deep, every three and half feet (3.5') on center, both ways.
7. Expansion Cold joint every twenty-one feet (21') with ½" thick expansion joint material.
8. Running slope of sidewalk may not exceed five percent (5%) in any direction.

Wheel Chair Ramp:

1. Wheel chair ramp will not exceed six feet (6') in length or exceed an eight point three percent (8.3%) slope.
2. Wheel chair ramp(s) at street intersections must be provided by installation of two ramps running along direction of sidewalk with a landing at the bottom level to standard concrete curb and gutter, gutter line and a landing at top level to the concrete sidewalk.
3. Wheel chair ramp(s) and landing(s) must have a cross slope of one percent (1%) and not exceed two percent (2%). Surfaces must be sloped to insure that water does not collect or stand after a rain. Drain onto street or park site as required.
4. Wheel chair ramps and landing are to have a six inches (6") high by six inches (6") wide and six inches (6") deep curb installed on park side to insure that erosion does not occur onto ramps and landings.
5. Wheel chair ramp must comply with other requirements as set forth in City of El Paso design criteria for compliance with TAS and ADA.

Construction:

1. Forms – provide clean and damage free forms.
2. Install using good industry practices and methods with proper vertical and horizontal control to insure compliance with slope and cross-slope requirements.
3. Maintain forms in good repair prior to and during installation and while pouring of concrete sidewalk.
4. Sub-grade – scarify and compact eight inches (8") of sub-grade. Sub-grade must be compacted to 95% density per ASTM D-1557.
5. Densities – provide density tests of sub-grade as deemed necessary based on length of concrete sidewalk. Provide a minimum of one every 300 feet.
6. Site cleaning – complete and thorough cleaning is required of site after concrete sidewalk is installed. This is to include concrete waste (debris) found in soils and concrete splatter residue found on existing concrete curb and gutter or adjacent sidewalks.
7. Site restoration – adjacent ground and/or landscaping surfaces must be restored to previous condition as directed by Park Staff to insure that site is clear and free of any foreign materials not suitable for a park setting or maintenance of turf.

Trail Construction Standard

Trail Structure:

1. Trail Structure along street right-of-way shall be minimum eight feet (8') wide with six inches (6") header curbs. Narrower trails will not count as credit towards parkland requirements. Trail surface material shall follow the requirements. Trail surface material shall follow the requirements of the City of El Paso Park Development Standards. The City of El Paso may elect to contribute to the cost of the trail if a width wider than 8' is deemed appropriate for that specific location.

2. Trail width along easements or pedestrian right-of-ways shall be minimum eleven feet (11') wide with ten feet (10') of pavement and two (2) 6"x12" concrete header curbs.

3. Pavement shall be Min.1-1/2" thick and type "D" mix, seal coated (2 coats); compacted at 98 % minimum density as per ASTM D-1557.

4. Pavement structure shall be over Min. 4-1/2" of base course (CSBC) material compacted at 100 % density as per ASTM D-1557 & Min. 8" scarified sub-grade compacted at 95 % minimum density as per ASTM D-1557.

5. Header curbs shall be 3,000 psi concrete strength and shall include 2 continuous #4 rebars, with ½" expansion joints every 20' and scored joints every 5', and a broom finish.

6. A zone that is a minimum of 5 feet wide along each side of the trail shall be improved with a natural non-irrigated landscape treatment, follow guidelines contained in the Parks Facility Standards referenced in Section 19.20.5.

Trail Landscaping:

1. Trails shall include a minimum 3-feet wide strip of landscape on each side of the Hike / Bike Trail; Landscaped to Min. 4" of screening material over non woven polypropylene weed barrier pinned every 12" o/c along overlapped edges and seams, and every 2' o/c in field.

2. Install shrubs at a minimum spacing of 7' apart complete with drip irrigation system to include: water meter(s) backflow preventer(s), controller(s), and power for controller(s).

3. Minimum of one park bench shall be provided for each section of the trail or spaced at a minimum 600' apart. Park bench must have concrete pad to insure compliance with accessibility requirement for companion seating.

4. Trees, when applicable shall be 20' a part minimum spaced and have drip irrigation system provided as specified in Park Design Standards.

5. Trail right-of-way beyond required improvements shall remain undisturbed. Any areas that are disturbed due construction must be restored to original conditions to include shrubs, turf and irrigation for slopes stabilization as required.

Trail Access and Signage:

1. Street Right-of-Way: provide a 7' wide concrete sidewalk adjacent to concrete curb along street frontage where trail abuts public roadways.

2. Concrete curb on roadway to be standard 6" concrete curb and gutter along street frontage that abuts trail right-of-way

3. Sidewalk to be 6" thick concrete minimum 3,000 psi strength with #6-6X6 wire mesh. 8" of Sub-grade to be scarified and compact to minimum 95% density per ASTM D – 1557.

4. Removable barrier(s) to be provided to prevent unauthorized vehicular access on to trail. Bollards or operable guard rails are acceptable as removable barriers. Bollards are to be set at 4' on center the width of the pedestrian right-of-way.

5. Provide Park Rule signage, pedestrian caution signage, and no motorized vehicle warning signage where trail intersects with public roadways.

Playground Design Criteria:

Here are minimum requirements for playground equipment, specifications and installation at Park sites.

1. Specify Landscape Structures, Inc. or Playworld Systems as approved playground equipment manufacturer.
2. Equipment and components to be IPEMA certified.
3. Equipment manufacturer to comply with ISO 9001.
4. Equipment manufacturer to provide clear installation manual and project layout at completion of project: hard copy and digital file.
5. Equipment and Fall Surfacing must comply with current Standards and Guidelines as listed:
   a. CPSC Handbook for Public Playground Safety, Pub. No. 325;
   b. ASTM Designation: F 1478-01 Standard;
   c. Accessibility Guidelines for Play Areas;
   d. ASTM 1292 Specification;
   e. ASTM 1591 Specification;
   f. 2.2 *ANSI Standards:* Z535.1 Safety Color Code, Z535.4 Products Safety-Signs and Labels;
   g. 2.3 *Federal Standards:* 16 CFR Part 1303, 16 CFR 1500 – Including Sections 1500.48 and 1500.49, 16 CFR Section 1501, 36 CFR Part 1191;
   h. 2.4 *UL Standards:* UL 969 Standard for Safety: Marking and Labeling Systems;
   i. 2.5 *CSA Standards*: CAN/CSA-Z614 Children's Playspaces and Equipment.

6. Equipment to be called out with lengths for Overhead Activities, spacing between rails for Curley Climbers, Track Rides, etc.

7. Equipment to have safety top rail with a minimum clearance of 72-inches at climbing or sliding elements.

8. Equipment manufacturer sales representative to be NPSI certified.

9. Equipment installation to be inspected and certified for proper assembly by Manufacturer Representative NPSI certified.

10. Equipment must be superseded by submittal packets that have the following information for review and release by Project Designer and Parks and Recreation Staff:
    a. Project site plan reflecting construction drawings or actual field conditions,
    b. Site plan with construction control point,

c. Site plan with dimensions for all use zones and between independent pieces of equipment,
d. Location of containment wall or curb,
e. Location, limits and dimensions of accessible path of travel (rubberized resilient poured-in-place surfacing),
f. Location of any shade canopies as applicable,
g. Equipment color selection chart, and
h. Equipment information including installation.

11. Manufacturer to provide sealed maintenance kit to include: tool box, sand paper, owners manual, hardware (20 pieces each minimum) assorted sizes of vandal proof nuts, bolts, washers, fastening tools (one each size - wrench and chuck keys), 4 cans of primer, 2 cans of each color of touch-up paint, plastic repair kit, anti-graffiti remover.

12. Equipment installation to be performed by contractor meeting the following requirements (a. and b. are installation experience requirements that must be met, c. and d. are optional requirements that may be substituted for either a or b.): Contractor must submit a résumé for review and approval by Consultant and Parks and Recreation Department prior to installation of equipment.

    a. Minimum 8 yrs. experience installing same equipment,
    b. Complete, good quality installation of a minimum of 20 structures of same or similar size.
    c. Training and certification by equipment manufacturer,
    d. and NPSI certification

13. Equipment and Fall surfaces to be audited and tested by an independent contractor (Play Safe, LLC, Inc.). Toll Free # for Play Safe: 1-87-PlaySafe - audit to include: audit date, auditor(s) name(s), equipment inventory, and plan view with dimensions of playground area improvements, equipment manufacturer, and fall surfaces manufacturer with toll free telephone numbers. Any items found deficient in audit must be corrected and a re-audited performed to insure that all deficient items are addressed.

14. Playground area to be fenced and properly secured throughout course of construction up to acceptance of project.

15. Equipment to have a minimum 10-ft. safety use (fall) zone.

16. Construction Work on playground area will not commence until all materials and supplies are in possession of contractors.

17. Equipment to be installed prior to any associated playground area improvements.
18. Contractor will insure that work progress will be ongoing and job site will not be left abandoned for any time period greater than 48 hours.
19. Contractor will insure that job site is kept clean and clear of any construction debris on a daily basis.

PLAYGROUND EQUIPMENT AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes playground equipment consisting of the following type[s] of play structures:

1. Freestanding.
2. Composite.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for filling and grading work.
2. Division 2 Section "Playground Surface Systems" for protective surfacing under and around playground equipment.
3. Division 3 Section "Cast-in-Place Concrete" for concrete footings.

1.3 DEFINITIONS:

A. Standards and Guidelines: applicable standards and guidelines will include but not be limited to most current additions of: ASTM F-1487; ASTM F-1292; CPSC Pub. No. 325; USATBCB Guide to ADA Accessibility guidelines for play areas. (Will be referred to ASTM and CPSC as applicable.)

B. Composite Play Structures: According to ASTM F 1487, this means "two or more play structures attached or functionally linked," creating one integral unit with more than one play activity.

C. Critical Height: According to CPSC No. 325, this means "the fall height below which a life-threatening head injury would not be expected to occur."

D. Fall Height: According to ASTM F 1487, this means "the vertical distance between a designated play surface and the protective surfacing beneath it."

The fall height of playground equipment should not exceed the Critical Height of the protective surfacing beneath it as set forth by play activity or specified critical fall height, whichever is more restrictive.

E. IPEMA: International Play Equipment Manufacturers Association.

F. HDPE: High-density polyethylene.

G. LLDPE: Linear low-density polyethylene.

H. MDPE: Medium-density polyethylene.

I. Play Structure: According to ASTM F 1487, this is "a free-standing structure with one or more components and their supporting members."

J. Protective Surfacing: According to ASTM F 1487, this means impact-attenuating "materials to be used within the use zone of any playground equipment" for playground surface systems.

K. PVC: Polyvinyl chloride.

L. Transfer Point: According to ASTM F 1487, this is "a platform or deck along an accessible route of travel or an accessible platform provided to allow a child in a wheelchair to transfer from the chair onto the equipment."

M. Use Zone: According to ASTM F 1487, this is "the area beneath and immediately adjacent to a play structure that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment."

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For each type of playground equipment, include materials, plans, elevations, sections, and details, method of field assembly, connections, and installation details. Indicate capacity and number of play activities.

1. Project site plan reflecting construction drawings or actual field conditions,
2. Site plan with construction control point,

3. Site plan with dimensions for all use zones including use zones between independent pieces of equipment,
4. Location of containment wall or curb,
5. Location, limits and dimensions of accessible path of travel (rubberized resilient poured-in-place surfacing where applicable),
6. Location of any shade canopies/structures as applicable,
7. Color selection chart: provide a color chart and a color selection sheet with list of components and available colors from chart.
8. Equipment information including installation guidelines.

C. Coordination Drawings: Layout plans and elevations drawn to scale and coordinating playground equipment with playground surface systems and containment barrier. Show playground equipment locations, use zones, fall heights, extent of protective surfacing, and Critical Heights as specified or required by equipment (whichever is more stringent).

D. Color Selection Charts: Provide a complete color selection chart with each component and piece of equipment listed with available colors.

E. Samples for Initial Selection: Manufacturer's color charts or 6-inch (150-mm) lengths of actual units showing the full range of colors and textures available for components with factory-applied color finishes.

F. Samples for Verification: For the following products, for each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected. Architect reserves the right to require additional Samples that show fabrication techniques, workmanship, and design of playground equipment.

1. Posts and Rails: Not less than 6 inches (150 mm) long.
2. Platforms, Stairs, Ramps and Bridges: Not less than 6 inches (150 mm) square.
3. Molded Plastic: Not less than 3 inches (75 mm) square.
4. Recycled Plastics (PVC) Products: Not less than 6 inches square
5. Accessories: Not less than 6 inches square
6. Hardware: Sample one each

G. Product Certificates: Signed by manufacturers of playground equipment certifying that products furnished comply with all requirements set forth in specifications and/or construction drawings.

H. Installer Certificates: Signed by manufacturer certifying that manufacturer complies with requirements.

I. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.

J. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Aluminum
2. Steel components
3. PVC Products
4. Hardware
5. Paints and similar finishes.
6. Recycled plastic.

K. Product Test Reports: From a qualified testing agency indicating playground equipment complies with requirements, based on comprehensive testing of current products.

L. Field Quality-Control Report: Manufacturer to provide report that indicates playground and playground equipment installation meet requirements.

M. Maintenance Guidelines: For playground equipment and finishes to be included in maintenance manuals specified in Division 1.

N. Maintenance Kit: For playground equipment with paint, primer, sandpaper, anti-graffiti remover, hardware, tools and storage container box.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer of playground equipment. Installer must meet two of the following requirements:

1. Equipment installation to be performed by contractor meeting the following requirements (a. and b. are installation experience requirements that must be met; and c. or d. are a supplemental requirement where one or the other must be met.) Contractor must submit a résumé for review and approval by Consultant and Parks and Recreation Department prior to installation of equipment.
   a. Minimum 5 yrs. experience installing same equipment of similar size and complexity, *(Required.)* and
   b. Complete and good quality installation of a minimum of 20 structures of same or similar size within last 5 years. *(Required.)*
   c. Factory trained and certified by equipment manufacturer, or

d. NPSI certification, in good standing. Certified individual must be present at site at all times during installation.

B. All hardware, equipment, and components must be IPEMA certified and compliant with all specifications as set forth herewith.

C. Manufacturer Qualifications: A firm whose playground equipment, components, and hardware have been certified by IPEMA's "3rd Party Certification" service.

1. Provide only playground equipment and play structure components bearing the IPEMA Certification Seal.
2. Provide the following playground equipment and play structure components bearing the IPEMA Certification Seal:
   a. See Construction Drawing for equipment list.

D. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct playground audit and the testing of fall surfacing materials according to ASTM E 548 & ASTM 1292.

E. Standards and Guidelines: Provide playground equipment complying with or exceeding requirements in the following:

1. ASTM F 1487: To include warning labels, manufacturer's identification.
2. CPSC No. 325, "Handbook for Public Playground Safety."
3. Playground Equipment and Structure Specifications.
4. Signs – provide signs and labels for age appropriate equipment and recommendations for proper use with adult supervision.
5. 2.2 *ANSI Standards:* Z535.1 Safety Color Code, Z535.4 Products Safety-Signs and Labels;
6. 2.3 *Federal Standards:* 16 CFR Part 1303, 16 CFR 1500 – Including Sections 1500.48 and 1500.49, 16 CFR Section 1501, 36 CFR Part 1191;
7. 2.4 *UL Standards:* UL 969 Standard for Safety: Marking and Labeling Systems;
8. 2.5 *CSA Standards*: CAN/CSA-Z614 Children's Playspaces and Equipment.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect and Park's Department at least eight days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.
3. Before excavating, contact utility-locator service and Park's Department for area where Project is located.

B. Use Zone: Provide ten feet (10') use zone around equipment at minimum or as required by ASTM and CPSC standards/guidelines if greater than ten feet.

C. Fall Height: Provide for a Critical Fall Height of 9' for Rubberized Unitary Poured-in-Place Surfacing Material with a wear coat of ½ inches thick.

D. Fiber wood chips shall be used as specified if applicable and shall comply with ASTM-1292 requirements.

1.7 COORDINATION

A. Coordinate construction of equipment use zones and fall heights during installation of playground equipment with installation of protective surfacing specified in Division 2 Section "Playground Surface Systems." Sequence work so protective surfacing can be installed immediately after concrete footings have set.

B. Coordinate construction of play area containment barrier to insure specified and/or required use zones are kept free and clear of hazardous obstructions for users. Must provide most stringent use zone as specified or required.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the Playground Equipment Schedule at the end of Part 3 and as shown on drawings.

B. Products: Subject to compliance with requirements, provide one of the products specified for each designation in the Playground Equipment Schedule at the end of Part 3 and as shown on drawings.

C. Manufacturers: Manufacturer's equipment, components and manufacturing procedures must comply with requirements specified. All products illustrated and referenced in construction drawings must comply with specifications requirements and applicable ASTM and CPSC standards and guidelines.

2.2 PLAYGROUND EQUIPMENT, GENERAL

A. Colors: As selected in submittal review process.

B. Equipment and Components: As shown on design drawings.

2.3 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and to comply with performance requirements for structural aluminum; mill finish or decorative baked-enamel powder-coat finish.

1. Extruded Bars, Profiles, Tubes and Posts: ASTM B 221 (ASTM B 221M).

   a. Equipment Support Structure will be five inches (5") outside diameter in size with a 0.125 inches wall thickness. Minimum yield strength of 35,000 lbf/sq.in. (241 MPa) and minimum tensile strength of 38,000 lbf/sq.in (262 MPa); % elongation in 2 inches :10; and modules of elasticity :10 x 10^6 P.S.I.

   b. Tubing: Minimum yield strength of 35,000 lbf/sq.in. (241 MPa) and minimum tensile strength of 38,000 lbf/sq. in. (262 MPa); % elongation in 2 inches: 10; and modules of elasticity :10 x 10^6 P.S.I.

2. Cast Aluminum: ASTM B 179.

B. Steel: Comply with the following:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, hot-dip galvanized.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53 or electric-resistance-welded pipe complying with ASTM A 135, with minimum yield strength of 30,000 lbf/sq.in. (205 MPa); hot-dip galvanized internally and externally.
3. Steel Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513 or steel tubing fabricated from steel complying with ASTM A 569/A 569M and complying with the dimensional tolerances in ASTM A 500; with a minimum yield strength of 40,000 lbf/sq.in. (276 MPa) and a minimum tensile strength of 45,000 lbf/sq.in. (310 MPa); zinc coated internally and externally.
4. Steel Sheet: Commercial steel sheet complying with ASTM A 569/A 569M.
5. Galvanized Steel Sheet: Commercial steel sheet, hot-dip galvanized, complying with ASTM A 653/A 653M for not less than G60 (Z180) coating designation; mill phosphatized.
6. Perforated Metal: For Decks, Ramps, Bridges, Stairs, Accessible Platforms and Transfer Stations.
   a. Fabricate from steel sheet not less than 12 Ga. (0.105") nominal thickness with maximum 5/16" diameter punched holes in manufacturer's standard perforation pattern not to exceed 1" spacing on center both ways.

b. The sheet shall be perforated then flanged formed and reinforced properly to insure structural integrity with little (1/16 inch maximum) to no flex.

c. Upon completion of assembly and fabrication the perforated metal component shall be thoroughly cleaned in a hot phosphatizing pressure washer, and then primed with a water-based thermosetting solution. Primed parts shall be preheated prior to dipping in U. V. stabilized, liquid polyvinyl chloride (PVC), and then salt cured at approximately 400° Fahrenheit. The finished coat shall be 0.08" thick at an 85-durometer hardness and have a matte finish.

C. Stainless-Steel Sheet: Type 304, complying with ASTM A 240/A 240M or ASTM A 666; cold rolled and finished on exposed faces with No. 2B finish.

D. Opaque Plastic: Color impregnated, UV stabilized, and mold resistant.

1. Polyethylene: Rotationally-Molded Poly Parts (components) such as: roofs, slides, tunnel slides exit chutes, spiral slides, slides entrance hoods, climbers. Shall be fabricated using prime compounded linear low-density polyethylene from virgin plastic resin rotationally molded MDPE or HDPE with UV stabilizing additives for color retention. These materials shall have a tensile strength of 2500 psi per ASTM D638. Wall thickness varies as noted:

   a. Roofs – Double wall, with not less than 1/4-inch (0.250") wall thickness.

   b. Slides – Double wall, with not less than 5/16-inch (0.312") wall thickness.

   c. Activity Panels – Double wall, with not less than 1/4-inch (0.250") wall thickness.

   d. Activity Panels Character Discs – Double wall, with not less than 3/16-inch (0.178") wall thickness.

2. Polyethylene: Solid-Molded Poly Parts (components) such as: crawl tunnels, crawl tunnels entrance panels, activity panels, handhold panels, tunnel slides, and sign panels. Shall be fabricated using prime compounded linear high-density polyethylene from virgin plastic resin rotationally molded MDPE or HDPE with UV stabilizing additives for color retention. These materials shall meet density of 0.960 G/cc per ASTM D 1505, and have a tensile strength of 2400 psi per ASTM D638. Wall thickness varies as noted:

   a. Tunnel Slides – single wall, with not less than 5/16-inch (0.312") wall thickness and minimum 1 ¾-inch (1.750") wide flange at ends to allow for assembly by abutting up to adjacent surface. No slip assembly will be accepted on components.

   b. Crawl Tunnels – single wall, with not less than 5/16-inch (0.312") wall thickness and minimum 1 ¾-inch (1.750") wide flange at ends to allow for assembly by abutting up to adjacent surface. No slip assembly will be accepted on components.

   c. Activity Panels and Handhold Panels – solid single wall, with not less than ¾-inch (0.750") wall thickness.

d. Sign Panels – solid single wall, with not less than ¾-inch (0.750") wall thickness.

3. Recycled Polyethylene: Fabricated from not less than 96 percent recycled, purified, fractional-melt plastic resin (provide information on percentage of recycled plastic and resin characteristics for review) for not less than [90 percent recycled post consumer waste by weight] (provide information on recycled plastic characteristic such as percent post consumer recycled content) content HDPE.

E. Transparent Plastic: Clear, colorless, abrasion-resistant, UV-stabilized monolithic polycarbonate sheet, not less than 3/16-inch (5 mm) thick.

F. Swing Chain and Fittings: 4/0 or 5/0, welded-straight-link coil chain complying with ASTM A 467/A 467M, Class CS; zinc plated and PVC color coated with colors as selected by Architect from manufacturer's full range. With dropforged carbon steel, heat-treated and zinc plated Bolt Link, and Double Clevis steel connectors. Bolts shall be stainless steel per ASTM F 879, socketed and pinned tamperproof in construction.

G. Post Caps: Cast aluminum, color to match posts. Caps to be factory installed and secured with self-sealing rivets.

H. Platform Clamps and Hangers: Die cast aluminum alloy, 369.1 with following characteristics:

1. Tensile Strength of 47,000 psi.
2. Yield Strength of 28,000 psi.
3. Elongation of 7% in 2 inches.
4. Shear Strength of 29,000 psi.
5. Endurance limit of 20,000 psi.

I. Hardware: Manufacturer's standard hardware shall be stainless steel per ASTM F 879, socketed and pinned tamperproof in construction, with lock-tit adhesive on threads for extra securing measure. Hardware must have curved edges to prevent entanglement.

J. Fasteners: Manufacturer's standard hardware shall be stainless steel per ASTM F 879, socketed and pinned tamperproof in construction, with lock-tit adhesive on threads for extra securing measure. Fasteners must have curved edges to prevent entanglement.

K. Drainage Fill: Washed coarse-aggregate mixture of crushed stone, or crushed or uncrushed gravel.

L. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent, not less than 0.3-mil- (0.0076-mm-) thick, zinc pigmented coating.

2. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

M. Paint and PVC-Coat Finish: Comply with 16 CFR 1303 for limiting lead in paint.

2.4 FABRICATION

A. General: Manufacturer must provide equipment and components that are manufactured in their factory. Products will include: decks, ramps, stairs, platforms, roto-molded roofs, roto-molded slides, roto-molded panels, roto-molded activity panel disks, solid PVC panels, solid PVC tunnels, solid PVC slides, solid PVC handholds, barriers, handrails, AND application of PVC coatings and paint finishes.

B. General: Fabrication and Finishes - All assembly components with welds must be cleaned and kept free of slag and splatter. All PVC components, coated or fabricated, must have the same color and shade. PVC components and PVC coated components to include: slides, roofs, tunnels and activity panels.

C. General: Provide sizes, strengths, thickness, wall thickness, and weights of components as indicated but not less than required to comply with structural performance and other requirements in ASTM F 1487. Factory drill components for field assembly. Unnecessary holes in components not required for field assembly are not permitted. Provide complete play structure, including supporting members and connections, means of access and egress, designated play surfaces, barriers, handrails, handholds, and other components indicated or required to comply with referenced standard(s) and as specified herewith for equipment indicated. No field modifications to equipment will be acceptable.

1. Composite Play Structure: Provide complete play structure, designed to be modular, linked, and expandable, forming one integral unit for more than one play activity.

D. Aluminum and Metal Frames: Fabricate mainframe upright support posts from aluminum with cross-section profile and dimensions as indicated in the Playground Equipment Products Schedule on Part 2. Fabricate secondary frame members, bracing, and connections from either steel or aluminum. Unless otherwise indicated, provide each pipe or tubing mainframe member with manufacturer's standard drainable bottom plate or support flange with structural performance and other requirements in ASTM F 1487.

E. Rung Ladders, Stepladders, Stairways, Ramps, Step Platforms, and Transfer Points: Provide complete means of access and egress, with evenly spaced treads and rungs, easily grasped handholds, and slip-resistant foot surfaces; fabricated from

Manufacturer's standard materials complying with requirements indicated and compatible with frame and play surfaces. Provide closed risers and protective barriers as indicated by referenced standards and scheduled on Part 2.

F. Play Surfaces: Provide elevated decks, platforms, landings, walkways, ramps, and similar transitional play surfaces, designed and framed to withstand loads and allowing for drainage: fabricated from perforated steel sheet with roll-formed edges; perforated steel sheet reinforced by steel strip welded to underside, with roll-formed edges; made into floor units with slip-resistant foot surfaces. Fabricate units in manufacturer's standard modular sizes and shapes, to form assembled play surfaces as indicated on Drawings.

1. Decks, Platforms, Landings: Deck assembly and connections must fit snuggly and wrap around support posts to eliminate entanglements and insure that assembly provides for a properly supported deck at clamp.

2. Ramps: Assembly and connections of ramps with decks must fit snuggly and securely to eliminate entanglements and tripping hazards.

3. Elevated Play Surfaces: Provide protective devices, completely surrounding play surface except for access openings where play-surface heights above protective surfacing exceed the following based on age group indicated:

   a. Two through Five Years: Unless otherwise indicated, provide protective barriers if play-surface heights above protective surfacing exceed 6-inches (152 mm).

   b. Five through twelve Years: Unless otherwise indicated, provide protective barriers if play-surface heights above protective surfacing exceed 12-inches (300 mm).

4. Stepped Play Surfaces: Provide protective infill between stepped platforms. Insure that all stepped play surfaces comply with ADAAG requirements.

G. Protective Barriers: Fabricated from welded metal pipe or tubing with vertical bars; sheet steel with openings for vision and ventilation; metal-pipe or -tubing-framed, welded wire; solid-plastic panels; plastic panels with openings for vision and ventilation; plastic panels with flat, circular window made from transparent plastic; plastic panels with circular, three-dimensional bubble window made from transparent plastic; and fabricated with any openings within the barrier and between the barrier and the play surface precluding passage of the torso probe according to (ASTM F 1487) (CPSC No. 325) and the most stringent requirements in ASTM F 1487 and CPSC No. 325. Provide barriers designed to minimize the possibility of climbing, free of hand- and footholds, and configured to completely surround the protected area except for access openings, no guard rails shall be used on the structure. Extend barriers to the following height above the protected elevated surface for use by age group indicated:

1. Two through Five Years: Top surface not less than 29 inches (740 mm) high.

2. 5 through 12 Years: Top surface not less than 38 inches (970 mm) high.

H. Handrails and Handhold Panels: Handrails - Welded metal pipe or tubing, OD between **0.095 to 1.55 inches (24.1 to 39.4 mm)** and **0.125 inch (3.2 mm)** thick. Handhold Panels – solid single wall, with not less than ¾-inch (0.750") wall thickness. Provide handrails at height between the following dimensions for use by age group indicated:

1. 2 through 12 Years: 22 to 38 inches (560 to 970 mm).

2. Two through Five Years: 22 to 26 inches (560 to 660 mm).

3. 5 through 12 Years: 22 to 38 inches (560 to 970 mm).

I. Structural Plastic Panels, Tubes, Tunnels and Slide Chutes: Opaque plastic, unless transparent plastic is indicated. All structural plastics shall be fabricated by Playground Equipment Manufacturer and not supplied or purchased from separate manufacturer.

J. Roofs and Canopies: Fabricated from opaque plastic; clear polycarbonate plastic; polyethylene; recycled polyethylene; metal; metal-pipe or tubing-framed with high-density polyethylene or welded wire, designed to be positioned overhead and to discourage and minimize climbing by users.

1. Roofs and Canopies must maintain a head clearance of six feet (6') from deck surface or highest adjacent deck or stair surface to lowest underside portion of Roof and Canopy.

K. To-Fro Swing Seats: Provide seat cushioned with soft edges, in style indicated, designed to accommodate one child at a time.

1. Belt Seats: Fabricated from flexible EPDM rubber encapsulating a slash-resistant metal insert, securely attached at each end to stainless steel end plates with galvanized steel fittings for attaching chains.
2. Swings: Design single-axis swings with pivot points for suspended swing seats at no greater than 8 feet (2.4 m) above protective surfacing.
3. Molded Bucket Seats: Roto-molded double wall plastic not less than 1/4-inch (0.250") wall thickness.

L. Equipment for Users Two through Five Years Old: Comply with the following:

1. Infant/Tot Swing Seats: Provide encircling, full-bucket-type swing seats designed to support a child on all sides with no danger of strangulation or entrapment when tested according to ASTM F 1487. Provide chains and fittings or other means to suspend seat so the underside of the occupied seat is no less than 24 inches (610 mm) above protective surfacing.
2. Swings: Design single-axis swings with pivot points for suspended swing seats at no greater than 8 feet (2.4 m) above protective surfacing.

3. Overhead Fixed Horizontal Equipment: Design equipment with horizontal members spaced apart no more than 12 inches (305 mm) on center.

M. Climbing Ropes, Cables, and Chains: Designed to be secured at both ends so length cannot be looped back on itself creating a loop with an inside perimeter greater than 5 inches (127 mm). Ropes, cables, and chains with length 7 inches (178 mm) or less may be attached at one end only.

N. Flexible Net Climbers:
   1. Flexible Climbers other than Nets must be constructed to securely connect flexible-climber components used as access to other components at both ends. For components with one end connected to ground level, provide flexible climbers designed with the anchoring connection to ground placed beneath the base of protective surfacing.
   2. Nets must be constructed of a galvanized six-stranded and tempered steel wire rope. The steel wire cores must be heated and tightly wrapped with plyamide yarn; the wrapping must be inductively melted on to each strand individually to insure that surface fibers are removed through initial friction. Edges of ropes must be reinforced with additional steel wire core. Tempered ropes are used exclusively for climbing nets. All hardware must be as follows: Mast and mast foot of seamless steel (ST-37); S-clamps, hasps, chains, threaded rods, u-bolts and press-in shells of Stainless steel; Rope eyelets, anchor bars, turnbuckles and hammock anchors of Hot-dipped galvanized steel; Swages, end pressings, mast head, post clamps and bearers of Aluminum; and Post caps of Rubber.

O. Steel and Iron Components: Galvanized, galvanized and color coated, color coated or PVC coated. Bare metal steel or iron components are not permitted.
   1. Color-Coated Pipe and Tubing for Main Frame: Galvanized before applying baked-enamel powder coating.
   2. Play Surfaces: PVC or Baked polyester-enamel powder coated steel.
   3. Color-Coated Pipe and Tubing for Component Frames: PVC-coat or baked-enamel powder coat applied to steel or galvanized steel.

2.5 CAST-IN-PLACE CONCRETE

A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" and ACI 301 to produce normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20.7 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.

B. Concrete Materials and Properties: Dry-packaged concrete mix complying with ASTM C 387 and mixed at the site with potable water, according to manufacturer's written instructions, to produce normal-weight concrete with a minimum 28-day compressive strength of 3000 psi (20.7 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.

2.6 METAL FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating metal finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Baked-Enamel Powder-Coat Finish: Manufacturer's standard, baked, polyester-TGIC, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness of 0.004" [**4 mils (0.100 mm)**]. Parts shall be thoroughly cleaned by a five-stage pre-treatment process. Parts are then thoroughly dried and proceeded through a set of automatic sprayers that apply electrostatic powder-coat. Parts are oven cured at 400° Fahrenheit.

2.8 STEEL, GALVANIZED STEEL AND ALUMINUM FINISHES

A. Baked-Enamel Powder-Coat Finish: Manufacturer's standard, baked, polyester-TGIC, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness of 0.004" [**4 mils (0.100 mm)**]. Parts shall be thoroughly cleaned by a five-stage pre-treatment process. Parts are then thoroughly dried and proceed through a set of automatic sprayers that apply electrostatic powder-coat. Parts are oven cured at 400° Fahrenheit.

B. PVC Finish: Manufacturer's standard, UV-stabilized, mold-resistant, slip-resistant, matte-textured, dipped, PVC-plastic finish, with flame retardant added, complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness of 0.080" [**80 mils (2 mm)**] at an 85 duro-meter hardness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site visit is required to examine areas and conditions, with Installer, Architect, and Parks Staff present, for compliance with requirements for site clearing, earthwork, site

surface and sub-grade drainage, and other conditions affecting performance.

1. Do not begin any work until final grades have been approved by Architect and Parks Staff.

B. Proceed with installation only after unsatisfactory conditions have been corrected and approved by Architect and Parks Staff.

3.2 PREPARATION

A. Verify locations of playground perimeter and pathways. Verify that playground layout and equipment locations comply with requirements for each type and component of equipment.

3.3 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated on Shop Drawings.

1. Maximum Equipment Height: Coordinate installed heights of equipment and components with installation of protective surfacing. Set equipment so fall heights and elevation requirements for age group use are within required limits of construction drawings and shop drawings. Verify that playground elevations comply with requirements for each type and component of equipment.

B. Post and Footing Excavation: Hand-excavate or mechanically excavate with augur all holes for posts and footings to dimensions, profile, spacing, and in locations indicated on Drawings, in firm, undisturbed or compacted sub-grade soil. Level bearing surfaces with drainage fill or brick to required elevation.

C. Post Setting: Set mainframe equipment posts in concrete footing. Protect portion of posts above footing from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb or at the correct angle and are aligned and at the correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

1. Concrete Footings: Smooth top, and shape to shed water.

3.4 FIELD QUALITY CONTROL

A. Protect all equipment to prevent from damaging factory applied finishes: PVC coatings, and Powder coat finishes, during installation. Damaged surfaces will be evaluated for extent of damage and Architect and Parks Staff will determine corrective measures required to restore factory applied finishes.

B. Contractor, Installer or Manufacturer will restore damaged equipment due to delivery, neglect, or vandalism, at no additional cost to Owner, as determined by Parks Staff.

C. Arrange for playground equipment manufacturer's technical personnel to inspect playground and playground equipment and components during installation and at final completion and to certify compliance with the following:
   1. ASTM F 1487.
   2. CPSC No. 325.
   3. SECTION 02881 - PLAYGROUND EQUIPMENT AND STRUCTURES

D. Audit: At completion of equipment installation an independent company will inspect and audit equipment and installation for compliance with specifications and applicable standards and guidelines. Audit agency will be PlaySafe, LLC.®, contact telephone number is (877) 529-7233. Any deficiencies and discrepancies found must be corrected and re-audited to insure that equipment and installation comply with all applicable specifications.

E. Notify Architect and Owner (Parks Staff) 48 hours in advance of date audit will be performed and of time for final inspection.

3.5 ADJUSTING

A. Adjust movable playground equipment components to operate smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.

3.6 CLEANING

A. After completing playground equipment installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component as determined by Architect and Parks Staff.

3.7 PLAYGROUND EQUIPMENT SCHEDULE

A. Swing Main Frame and Accessories: Comply with ASTM F 1487 and CPSC No. 325 requirements and the following:
   1. Products: Tot-Swings.
   2. Products: Belt Swings.
   3. Products: Roto-Molded Swings.
   4. Traditional Style: Frame fabricated from aluminum steel pipe or tubing securely joined by aluminum pipe or tubing yokes for pipe connections and fasteners with one, two, three, or four connected frame section[s] as shown on the drawings. Support frames must be two-leg arch upright end supports.
      a. Pipe or Tubing OD: Not less than 5" (127-mm) OD, upright leg and overhead beam.

b. Overhead Beam Height: **8 feet (2.4 m)** above protective surfacing.

5. Chain: Standard link or Short link not permitting finger penetration; link must be PVC coated; and chain length and number of chains as required to complete swing installation.
6. Swing Connector Type: Double clevis and bolt link.
7. S-Hooks are not acceptable.
8. Swing Hanger: Galvanized heavy-duty ductile iron designed for swing action indicated.
9. Color-Coated Frames: Colors to be selected during submittal review.

B. To-Fro Swings: Comply with ASTM F 1487 and CPSC No. 325 requirements for infant/tot users younger than 4 years old and the following:
1. Products: Tot-Swing.
2. Swing: Single-axis, single-occupant swing. Provide no more than two swings per support frame section, located as indicated on Drawings.
   a. Flexible Infant/Tot Seat: Full-bucket type, with insert consisting of steel sheet end plates with steel cable reinforcement and standard infant/tot-size leg holes.
   b. Colors: Colors to be selected during submittal review.

C. To-Fro Swings: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 through 5 years old and from 5 to 12 years old, as shown on the drawings and according to the following:
1. Products: Flexible Belt Swing.
2. Swing: Single-axis, single-occupant swing. Provide no more than two swings per support frame section, located as indicated on Drawings.
   a. Flexible Belt Seat: U-shaped profile, not less than 6 inches (150 mm) wide by 24 inches (610 mm) long by 5/8 inch (16 mm) thick, with a 22 Gage stainless-steel spring insert and 4 - 0.1.05" stainless steel washers.
   b. Colors: Colors to be selected during submittal review.

D. Therapeutic To-Fro Swings: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of disabled users from 5 through 12 years old and the following:
1. Products: Roto-Molded Seat.
2. Swing: Single-axis, single-occupant swing, designed to support the body of the user as indicated, complete with safety restraint of torso and leg with harness and a pull device for setting swing in motion. Provide number of swing(s) as indicated on Drawings.
   a. Rigid Seat: Full-body or Head and torso support, fabricated from rigid molded polyethylene.
   b. Colors: Colors to be selected during submittal review.

E. Rocking/Springing Equipment: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 through 12 years old and the following:

1. Products: as shown on drawings.
2. Single Seating: use standard Manufacturer's equipment with a capacity to accommodate one user. Style based on equipment listed on drawings.
3. Seat: Single in quantities as shown on drawings, fabricated from cast aluminum or high-density polyethylene; with handholds and footrests.
   a. Animal figures to be manufactured of cast aluminum.
   b. Fun Shapes – animals, autos, trains, and plains to be manufactured of high-density polyethylene material a minimum of ¾" thick.
   c. Colors: Colors to be selected during submittal review.

4. Spring to be a minimum of 5-5/8" in diameter, steel wound, from 9/16" thick tempered steel with a guaranteed firm support, and designed to not have any pinch points when loaded.
   a. Colors: Colors to be selected during submittal review.

5. Support Frame: Consists of 3-1/2" outside diameter galvanized steel tubing that is a minimum of 0.120" thick and a ¼" thick by 10" diameter zinc plated steel mounting plate(s) as required for installation by Manufacturer.
   a. Colors: Colors to be selected during submittal review.

F. Freestanding Slide: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 through 12 years old and the following:

1. Products: as shown on drawings.
2. Sliding Surface Configuration: Flat or curved to be inclined and/or Wavy as shown on drawings.
3. Sliding Surface Chute: Single, Double-parallel or side-by-side, three side rail, Double-diverging, chute[s] as shown on drawings.
4. Unit: Designed for sliding-down action along a straight-aligned, quarter-turn, half-turn or C-shaped, three-quarter-turn, full-turn spiral, S-shaped, or squiggle-shaped; descending chute with horizontal entrance transition platform and exit region. Provide roto-molded double wall hoods at entrance and roto-molded double wall chute at exit for assisting transition from standing to sitting at entrance and return to standing position at exit. Provide complete freestanding unit with elevated access and at-grade exit complete with stairs or ladders, enclosed entry platform, secure end, and intermediate or center support members, bracing, and connections. Equipment as shown on drawings.
5. Slide Fabrication: Flat with integral, full-length side rails; U-shaped with integral, full-length side rails; Round tube or tunnel, ID not less than **30 inches (760 mm)**; Oval tube or tunnel, minor ID not less than **30 inches (760 mm);** formed into a one-piece slide from securely joined sections that assemble with flanges. Slide-in inserts (similar to a coupling) for assembly of slide sections are not acceptable.

a. Sliding Surface and Slide Rails: Made from rotationally molded MDPE or HDPE plastic, or molded HDPE plastic.
b. Assembly points of slides with sections or deck will not have any gaps. Gaps are defined as an opening that allows light to be visible through it.
c. Colors: Colors to be selected during submittal review.

6. Slide Access: Stair or step-ladder with handrails, Vertical ladder, and Vertical ladder with side handrails, as shown on drawings.
7. Sit-down Entrance: With opaque plastic roto-molded double wall hood with opaque plastic panel barriers where shown on drawings, to include at minimum an overhead handhold.
   a. Color: Colors to be selected during submittal review.

8. Color-Coated Support Frame: Colors to be selected during submittal review.
9. Color-Coated Access, Handrails, and Handholds: Match support frame with color as selected during submittal review.

G. Freestanding Climbers: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 to 5 years old; 5 to 12 years old; or 2 to 12 years old as shown on drawings.
1. Products: as shown on drawings.
2. Jungle Gym Type Units: Climbers with galvanized metal pipe and tubing frames or punch steel and molded panels coated with PVC material such as: arched ladders, inverted rung arched ladders, vertical ladders, serpentine ladders, or staggered-stacked blocks as shown on drawings.
3. Theme Unit(s): Climbers with galvanized metal pipe and tubing frames supported by polyethylene theme panels designed for climbing action may have dinosaur theme climber, fire engine theme climber, nautical theme climber, storefront theme climber, or other theme type climber as shown on drawings.
4. Color-Coated Support Frame: Color to be selected during submittal review.

H. Sand Manipulating Equipment: Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 through 5 years old and the following:
1. Products: as shown on drawings.
2. Sand Box: Designed for containing sand at ground level.
   a. Box: One-piece unit fabricated from opaque plastic with integral bottom and not less than four raised sides with perimeter benches; opaque plastic lid; vinyl lid; elevated, opaque plastic roof; as shown on drawings.
   b. Box: Secured-in-place, weather-resistant made of containment barrier interconnected modular units, forming perimeter raised side/edge not less than 12 inches (305 mm) high, for containing sand; fabricated from opaque plastic and anchored with manufacturer's standard corrosion-resistant-coated metal or non-corrodible anchor stakes.
   c. Box: Wood products are not acceptable.

3. Accessible Sand Table: Elevated, three-dimensional, one-piece box designed for containing sand. Fabricate box from opaque plastic with integral bottom and not less than four raised sides with opaque plastic lid. Secure table and opaque plastic roof to support frame designed to be accessible to wheelchair users.
4. Sand Digger: Operable digger designed to dig and dump sand and rotate 360 degrees, consisting of steel pipe or tubing support frame and hand controls, steel sheet arms, and cast-aluminum seat and scoop; with oil-impregnated bearings at pivot points. This piece of equipment must be IPEMA Certified, no exceptions.
5. Accessible Sand Digger: Operable digger designed to dig and dump sand and rotate 360 degrees and to be accessible to wheelchair users, consisting of steel pipe or tubing support frame and hand controls, steel sheet arms, no seat, and cast-aluminum scoop; with oil-impregnated bearings at pivot points. This piece of equipment must be IPEMA Certified, no exceptions.
6. Sand Chute: Unit designed for pouring sand into and through funneling. Panel fabricated from opaque plastic and attached to upright support posts.
7. Colors: Colors to be selected during submittal review.

I. Talk Tubes: Pair, designed for talking through, fabricated from steel pipe or tubing and steel sheet metal, and connected by flexible sound tube.
   1. Products: location of talk tubes as shown on drawings.
   2. Colors: Colors to be selected during submittal review.

J. Signs or Signage: Manufacturer's standard sign panels, fabricated from: PVC and/or opaque plastic with graphics molded in or polyethylene with graphics molded in, attached to upright support posts and complying with the following:
   1. Products: As shown on drawings.
   2. Text: To include wording for welcome and age-appropriate rules and adult supervision requirement for all ages; safety rules; contact information for damage observed; manufacturer's identification and telephone number; and/or transfer point for accessibility. Provide sample of text for review.
   3. Colors: Colors to be selected during submittal review.

K. Composite Play Structure: Provide composite play structure assembled from manufacturer's standard modular-sized units, in arrangement indicated on Drawings. Provide all necessary components for a complete, coordinated structure, with bracing and connections designed for safe and secure anchoring, attaching, and joining of components and accessories. Comply with ASTM F 1487 and CPSC No. 325 requirements for range of users from 2 through 5, 5 through 12, or 2 through 12, years old and the following:
   1. Products: as shown on drawings.
   2. Main Frame Posts: Straight or Arched upright support posts fabricated from the following material(s) as shown on drawings. Profile and dimensions with permanent finish grade line marking or sticker furnished and installed at factory:

a. Aluminum Pipe or Tubing: Not less than 5-inch (127-mm) OD and not less than 0.125-inch (3-mm) thick wall.
b. Aluminum or Galvanized Steel Pipe or Tubing: Manufacturer's standard OD and wall thickness for secondary support frames of slides, tunnels, ramps, climbers and/or overhead activities.
c. Aluminum Pipe or Tubing and Polyethylene or PVC Plastic Composite Construction as shown on drawings.
d. Colors: Colors to be selected during submittal review.

3. Play Platform: Modular – hexagonal; rectangular; octagonal; square; equilateral triangle; 45-degree triangle, or extension of shape(s) and any combination thereof as indicated on Drawings.
   a. Cushioned Surfacing: Where indicated, provide topside platform surface covered with manufacturer's standard color PVC, non-slip, cushioned surfacing of thickness as specified.
   b. Deck Assembly: to provide a smooth, uniform joint free of gaps and cover plates that create a tripping hazard(s).
   c. Large Span Deck Assembly: must provide support from underside without post supports protruding above play surface or cover plates that create a tripping hazard(s).
   d. Colors: Colors to be selected during submittal review.

4. Activity Panel Play Component: Metal pipe or tubing and Opaque plastic panel as shown on drawings, attached to play structure, providing a protective barrier or attached at ground level to upright support posts.
   a. Graphics: Molded on panel or molded on activity disk.
   b. Colors: Colors to be selected during submittal review.
   c. Activity Type: Oval, three-dimensional, transparent plastic bubble; Round, three-dimensional, transparent plastic bubble; Round crawl hole; Abacus; Alphabet; Counter or storefront; Math; Mirror-polished, stainless-steel mirror; Sand chute; Spelling; Aluminum steering wheel; Molded-plastic steering wheel; Tic-tac-toe; Drums; Music Chimes; Maze; Theme such as nautical, space, racing, earth, insects, animals, etc.; table or bench as shown on drawings.

5. Balance Play Component: Metal balance beam: beam in a straight line; beam in a curved line; beam in a serpentine line; beam in a zig-zag line; and beam and parallel bar handrails in a straight line, with steel pipe or tubing support frame.
   a. Colors: Colors to be selected during submittal review.

6. Bridge Play Component: Rigid, Moving Suspension-type; flat or arched with protective barriers, handrails, and edge protection at each side; aligned along an angled, curved, or straight-ahead course, of configuration as illustrated on drawings.
   a. Form: Arched; Double-arched; or Level, horizontal - type frame designed for spanning platforms installed at the same height.

b. Form: Arched; Inclined-ramp; Accessible inclined-crawler-ramp; or Wheelchair-accessible inclined-ramp - type frame designed for spanning platforms installed at different heights.

c. Travel Surface: Rigid platform; Flexible belt; Flexible Cable Net, Flexible PVC coated chain cargo net; Suspended moving plank; Single moving plank suspended by chains; Boulder or Rock Style bridge.

d. Ridged bridges to have edge protection made of minimum ¼" thick steel plates that are minimum 2" high above bridge walking surface and to be coated with PVC as specified herewith. Edge protection must run full length of bridge on both sides.

e. Colors: Colors to be selected during submittal review.

7. Climber Play Component: Inverted-arch; Inverted-hump; Inclined; Corkscrew; Spiral; Upright or vertical Wave - type frame designed for climbing action aligned along an angled; curved; serpentine; straight up and down or wavy course.

a. Handholds: Fixed-in-place handholds consisting of parallel bars or polyethylene panels as called out and shown on drawings.

b. Hand and Footholds: Fixed-in-place hand and footholds for climbing, consisting of parallel bars; a series of climbing bars; a corkscrew or spiral coil; a helical coil; a ladder; a half-arch ladder; a side-by-side double half-arch ladder; a sine wave, snake, or tree with center support post; a double sine wave, snake, or tree fixed at right angles to each other with center support post; a series of regularly spaced horizontal rings or loops supported by post(s); interconnected loops; Corkscrew with center support post.

1) Ladder Rungs: Straight, Semicircular, U-shaped bars.

2) Cork Screw or Spiral Climbers to have a clearance of 10" minimum between coils as measured perpendicular from rung to rung without obstruction to allow for unobstructed sliding feature.

3) Protective barrier at a Plat Form entrance/exit shall have an opening with a maximum horizontal dimension of 15" (380mm) and a minimum vertical clearance dimension at opening of 60" (1520 mm) to allow for transition to and from platform.

c. Color: Colors to be selected during submittal review.

8. Climber Play Component PC: A panel, series of panels, stepped series of blocks, cylinders, or other three dimensional shapes, ramp, step ramp, wall and series of walls designed for climbing.

a. Hand and Footholds: to be integrally formed hand and footholds, or Metal pipe or tubing handholds.

b. Protective barrier at a Plat Form entrance/exit to Composite Structure shall have an opening with a maximum horizontal dimension of 15" (380mm) and a minimum vertical clearance dimension at opening of 60" (1520 mm) to allow for transition to and from platform.

c. Colors: Colors to be selected during submittal review.

9. Flexible-Climber Play Component: Non-rigid unit designed for climbing action along inverted-arch-shaped; inclined or vertical course with a handrail on each side.
   a. Hand and Footholds: Bar-and-chain-grid cargo net; Bar-and-chain ladder; Climbing chain fixed at both ends; Chain ladder fixed at both ends; Ladder with chain rungs; Climbing cargo rope net fixed at both ends.
   b. Protective barrier at a Plat Form entrance/exit to Composite Structure shall have an opening with a maximum horizontal dimension of 15 inches (380mm) and a minimum vertical clearance dimension at opening of 60 inches (1520 mm) to allow for transition to and from platform.
   c. Colors: Colors to be selected during submittal review.

10. Climber/Sliding Pole Play Component: Designed for climbing-up and sliding-down action on a straight, wavy metal pipe or tubing along a single, dual parallel or banister direction track with inclined or vertical pathway.
   a. Protective barrier at a Plat Form entrance/exit to Composite Structure shall have an opening with a maximum horizontal dimension of 15 inches (380mm) and a minimum vertical clearance dimension at opening of 60 inches (1520 mm) to allow for transition to and from platform.
   b. Color: Colors to be selected during submittal review.

11. Crawl Tube and Tunnel Play Component: A rotationally molded MDPE or HDPE plastic with transparent plastic inserts as called for on drawings with a tube or tunnel designed for crawling through, aligned along straight, curved, quarter-turn, half-turn, C-shaped, S-shaped, serpentine, squiggle course or with a directional off-set.
   a. Form: Arched Level or horizontal shape designed for spanning platforms installed at the same height from ground entrance to ground exit level.
   b. Form: Arched Inclined offset shape designed for spanning platforms installed at different heights from ground level to platform height or from platform to platform set at differing heights.
   c. Tube or Tunnel: Round with not less than 30-inch (760-mm) diameter, or Oval with not less than 30-inch (760-mm) minor diameter.
   d. Tube or Tunnel: must be fabricated with integral flanges for assembly, pre-drilled and aligned at factory, no field modifications to flanges will be acceptable. Flanges must be manufactured so that assembly is similar to a male/female connection; coupling type assemblies are not acceptable.
   e. Entrance and Exit Panels: Designed to permit access at an accessible height of 8 inches (200 mm) or less.
   f. Entrance and Exit Panels: Tube or Tunnel must assemble with flange onto ¾" solid compression-molded plastic HDPE panel; coupling type assemblies are not acceptable.

g. Vision and Ventilation Cutouts: As indicated on Drawings. To be factory cut, routed smooth and uniform in shape with smooth clean edges.
h. Window: Oval or Round with three-dimensional, transparent plastic bubble; dimensions and location as indicated on Drawings.
i. Graphics: as indicated on Drawings.
j. Colors: Colors to be selected during submittal review.

12. Overhead Play Component: Designed for pull-up and hand-over-hand upper-body action along overhead chinning bar, parallel bars.

    a. Component as shown and called on drawings.
    b. Pull-up bar to be 1 3/8" minimum outside diameter tubing.
    c. Parallel bars to be 2 1/4" minimum outside diameter tubing.
    d. Colors: Colors to be selected during submittal review.

13. Overhead Play Component: Designed for pull-up and hand-over-hand upper-body action along overhead: single, dual side-by-side parallel, track(s) aligned along angled, circular, curved, serpentine, straight-ahead, or wavy course.

    a. Form: Arch, Inverted-arch, Level, Horizontal, wave - type elevated frame designed for spanning above end supports or platforms installed at the same height; fabricated from a single bar or beam, or double bar or beam as shown on drawings.
    b. Form: Arched, Inclined, Wave - type elevated frame designed for spanning above end supports or platforms installed at different heights; fabricated from parallel bars, single bar or beam as shown on drawings.
    c. Form: support frame for overhead play components to be 2 1/4" minimum outside diameter.
    d. Form: overhead play components to be a minimum length of 96 inches **(2432 mm)** as measured from center of support posts to center of opposing support posts.
    e. Fixed Overhead Handholds: Fixed-in-place handholds consisting of metal pipe or tubing for parallel bars, straight ladder rung bars, semicircular ladder rung bars, U-shaped ladder rung bars, serpentine-shaped bar, ring holds, D-shaped holds, triangular-shaped holds, U-shaped holds.
    f. Movable Overhead Handholds: Handholds, each suspended by movable fitting permitting limited movement; fabricated from metal pipe or tubing ring holds, D-shaped holds, triangular-shaped holds, U-shaped holds.
    g. End Climbers: ascending/descending ladder as needed at one or both ends.
    h. Colors: Colors to be selected during submittal review.

14. Slide Play Component: Designed for sliding-down action along a straight-aligned, quarter-turn, half-turn or C-shaped, three-quarter-turn, full-turn spiral,

450 degree turn spiral, 540 degree turn spiral, S-shaped, squiggle-shaped descending chute with horizontal entrance transition platform and exit region. Provide roto-molded double wall PVC hoods with handholds and other positional aids at entrance for assisting transition from standing to sitting at entrance. Provide unit with properly secured assembly free of gaps at composite play structure and at grade exit secure end with intermediate and/or center support members, bracing, and connections as required to provide adequate strength of slide component.

a. Products: as shown on drawings.
b. Unit: Designed for sliding-down action along a straight-aligned, quarter-turn, half-turn or C-shaped, three-quarter-turn, full-turn spiral, S-shaped, or squiggle-shaped; descending chute with horizontal entrance transition platform and exit region. Provide roto-molded double wall hoods at entrance and roto-molded double wall chute at exit for assisting transition from standing to sitting at entrance and return to standing position at exit. Provide complete freestanding unit with elevated access and at-grade exit complete with stairs or ladders, enclosed entry platform, secure end, and intermediate or center support members, bracing, and connections. Equipment as shown on drawings.
c. Sliding Surface Configuration: Flat or curved to be inclined and/or Wavy as shown on drawings.
d. Sliding Surface Chute: Single, Double-parallel or side-by-side, three sides rail, Double-diverging, chutes as shown on drawings.
e. Slide Fabrication: Flat with integral, full-length side rails; U-shaped with integral, full-length side rails; Round tube or tunnel, ID not less than **30 inches (760 mm)**; Oval tube or tunnel, minor ID not less than **30 inches (760 mm);** formed into a one-piece slide from securely joined sections that assemble with flanges. Slide-in inserts similar to a coupling for assembly of slide sections are not acceptable.
f. Sliding Surface and Slide Rails: Made from rotationally molded MDPE or HDPE plastic, or molded HDPE plastic.
g. Assembly points of slides with sections or deck will not have any gaps. Gaps are defined as an opening that allows light to be visible through it.
h. Sliding Surface: Slide bed sections must be fabricated to insure that gaps do not exist at any given point through the full length of the connections upon complete assembly of sections.
    1) Color: PVC colors must match shade and color of all PVC components.

i. Sit-down Entrance: With Roto-Molded double wall PVC canopy or hood enclosure with an overhead handhold or combination of overhead and side handholds.
j. Window: Oval or Round three-dimensional, transparent plastic bubble; dimensions and location as indicated on Drawings.

1) Color: PVC colors must match shade and color of all PVC components.

k. Colors: Colors to be selected during submittal review. All PVC colors to match with any PVC component of the composite playground structure.

15. Track Ride Play Component: Designed for hold-on-by-hand upper-body action for moving down an overhead track aligned along angled, curved, serpentine, straight-ahead or wavy course.
    a. Track: Sloped in a straight or curved line - downward direction. Provide unit with single metal track or two parallel metal tracks with resilient rubber bumpers/stops at each track end. Equipment as illustrated on design.
    b. Roller Assembly: Trolley and wheels with sealed ball bearings.
    c. Overhead Handholds: Handholds, each connected to a trolley assembly, and fabricated from metal pipe or tubing in a D - shape.
    d. Entrance: Manufacturer's standard-type platform or end climber as shown on drawings.
    e. Landing: Manufacturer's standard-type platform or end climber as shown on drawings.
    f. Colors: Colors to be selected during submittal review.

16. Ladders, Step Ladders, Scrambler or Crawl Ramp as Play Structure Ingress/Egress Component: Designed to provide access to and travel between components, or from ground to component, aligned along angled, curved, spiral, straight-ahead, straight-up course spanning different elevations as illustrated on drawings.
    a. Handholds: Provide protective barriers and handrails or handrails and handholds on each side, as illustrated on drawings.
    b. Risers and Closure Plates: For closing vertical spaces between steps and multilevel platforms.

17. Accessible Platform Step or Stair, Ramp, Transfer Platform or Turn-around Platform.
    a. Handholds: Provide protective barriers with handrails or handholds on each side.
    b. Risers and Closure Plates: For closing vertical spaces between steps and multilevel platforms.
    c. Accessibility: Provide unit designed to allow access from wheelchair at ground to platform or platform to platform as illustrated on drawings.

18. Play Structure Access Component: Designed to provide accessible access to and travel between components or between ground and components at different heights.

a. Handholds: Provide protective barriers, handrails or handholds on each side as illustrated on drawings.
b. Risers and Closure Plates: For closing vertical spaces between steps and multilevel platforms.
c. Accessibility: Provide unit designed to allow access from wheelchair at ground to platform or from platform to platform.

19. Roof or Canopy Play Component: Arch, Barrel vault, Dome, Dome arch, Gable, Pagoda, Four-Square Hipped or Pyramid, Four-Square Hipped, Pyramid with Arched Dormers, Triangular Hipped, Hexagonal Hipped, or Umbrella.

    a. Roof or Canopy: Made from rotationally molded double wall MDPE or HDPE plastic, or molded HDPE plastic.
    b. Colors: Colors to be selected during submittal review. All PVC colors to match with any PVC component of the composite playground structure. Variations in color or shade are not acceptable.
    c. Colors: Colors to be selected during submittal review.

3.8 PLAYGROUND EQUIPMENT WARRANTY:

A. Warranty requirements for equipment and components.

1. 3 years warranty on all moving parts, minimum.
2. 15 years warranty on all plastics, minimum.
3. Lifetime warranty on Aluminum or Steel 5 inches diameter Post Frames.
4. Lifetime warranty on all steel elements.
5. Lifetime warranty on Cast Aluminum 'C' clamps.

B. Manufacturer warranty: warranty must be inclusive of replacement of any defective equipment and components.

Park Furniture Specification:

This will include Park Benches, Picnic Units, or Trash Receptacles and to be PVC (PLASTISOL) coated furniture.

General Description of Plastisol:

Plastisol is to be a liquid (free-flowing or highly viscous) vinyl dispersion that is fused by heat to form a solid end product. The plastisol must be consistent in firmness so that it is not hard as glass or excessively soft, and the finish must be glossy and not flat or contain a grainy surface. Plastisol must be formulated to produce a product that is applicable to information provided herewith.

Provided is a range of the physical properties that the Plastisols must be produced too:

- Tensile 750 - 3000 psi
- Elongation 100 - 500%
- Hardness 10 - 97 Shore A
- Viscosity 250 - 50000 cps #6 spindle, 20 rpms, 80°F
- Weight/Gallon 9 - 13 Lbs.

Plastisols must be formulated to resist chemical attack, weather ability, dielectric strength, fire resistance, abrasion resistance, and other properties as are applicable to park site conditions.

Processing

Plastisol must be processed by dip coating, rotational molding, slush molding, and knife coating as is performed by Manufacturer to meet with the specifications set forth herewith and as determined by the manufacturer.

Fabrication specifications are:

1. Plastic Coating - a consistent ¼" thick minimum coating of Plastisol that is heat-fused and permanently bonded to the steel.
2. Framework – to be coated with a baked-on polyester dry powder superior coating on Enhanced Conversion Coating that is on 99.99% Pure Zinc coating on Cold Formed Steel.
3. Framework – to be stable, reinforced construction with stainless steel and/or galvanized steel.
4. Bench Seats and Tops – to be fabricated from ¾" #9 expanded steel diamond mesh or 12 gauge perforated steel, all with rolled corners free of protrusions and entanglements. Reinforced edging to be provided by minimum 3/16" thick and 1 ½" wide steel stock to serve as support along edges of seats and tops.
5. Sizes and shapes of furnishings to be provided as called for on drawings.
6. Seating form of benches to be contoured for comfort.
7. Tops and Bench Seats to have Rounded edges for safety.
8. Hardware – all nuts, bolts, washers and lock washers to be stainless steel hardware.

9. Finishes – require having a minimum selection range of 18 colors for Plastisol and Paint colors.

Park Benches:

1. Forms and Shapes of Park Benches:
   b. Square shaped table tops and bench seats.
   c. Rectangular shaped table tops and bench seats.
   d. Octagonal shaped table tops and bench seats.
   e. Round/Circular shaped table tops and bench seats.
   f. Oval/Elliptical shaped table tops and bench seats.
   g. Shape and Form of park benches to be provided as called out on drawings.
2. Bench with Backrest:
   a. Frame must be fabricated to allow for in-ground mount installation or surface mounted by bolt down method through steel plate as required in drawings per field application.
   b. Frame must be minimum 2 3/8" diameter, 1/16" thick steel and formed to allow for mounting of bench seats. Minimum two frames are required for bench so that proper support is provided for seat. Frames must have assembly plates that are pre-drilled for installation of bench seats with full ¼" welds that are clean and free of slag or burn through. All steel surfaces must be cleaned and kept free of foreign matter prior to the application of paint finish.
   c. Color to be selected from manufacturer's available color pallet.
3. Bench without Backrest:
   a. Frame must be fabricated to allow for in-ground mount installation or surface mounted by bolt down method through steel plate as required in drawings per field application.
   b. Frame must be minimum 2 3/8" diameter, 1/16" thick steel and formed to allow for mounting of bench seats. Minimum two frames are required for bench so that proper support is provided for seat. Frames must have assembly plates that are pre-drilled for installation of bench seats with full ¼" welds that are clean and free of slag or burn through. All steel surfaces must be cleaned and kept free of foreign matter prior to the application of paint finish.
   c. Color to be selected from manufacturer's available color pallet.

Picnic Units: ***(Accessible Models)***

1. Frame Supports must be tubular steel with finish specified herewith and to include the following features:
   a. Frame must be fabricated to allow for in-ground mount installation or surface mounted by bolt down method through steel plate as required in drawings.
   b. Frame must be minimum 2 7/8" diameter, 3/16" thick steel and formed to allow for mounting of benches and table top. Minimum two frames are required for each picnic unit so that clear floor space is allowed for access by wheel chairs.

Frames must have assembly plates that are pre-drilled for installation of benches and table top, with full ¼" welds that clean and free of slag or burn through. All steel surfaces must be cleaned and kept free of foreign matter prior to the application of paint finish.

c. Color to be selected from manufacturer's available color pallet.

2. Benches and Table Tops requirements:
   a. Forms and Shapes as available for Benches above and noted on drawings.
   b. Bench Tops must be fabricated from minimum 3/16" thick expanded metal in a diamond or square pattern as specified and to have a 1 ½" wide ring along edge to provide support and rigidity for the bench seat. Manufacturer to provide frame supports on the underside of the bench as is required for installation onto tubular frame anchor plate(s).
   c. Table Tops must be fabricated from minimum 3/16" thick expanded metal in a diamond or square pattern as specified and to have a 1 ½" wide ring along edge to provide support and rigidity for the top. Manufacturer to provide frame supports on the underside of the bench as is required for installation onto tubular frame anchor plate(s) and to make top as rigid as possible.
   d. Table Tops must be fabricated in manner that ends do not extend more than 24" from tubular support frame.
   e. Plastisol coating to be provided as specified herewith with required finish.
   f. Color – sample of Manufacture colors needs be provided for selection.

3. Special Items – Game Tables may be required in project drawings and must be furnished as is applicable.

Trash Receptacles:

1. Tapered 32-gallon capacity fabricated from minimum 3/16" thick expanded metal in a diamond or square pattern.
2. 32-gallon minimum 3/64" thick plastic liner.
3. Lid, to be minimum 3/16" thick flat lid with 1 ½" wide ring along edge to assemble with top of trash receptacle, and a 14" diameter clear opening centered on lid.
4. In-ground mount steel Post Package made from minimum 2" diameter post with ¼" thick mounting plate, pre-drilled. Color – sample of Manufacture colors needs be provided for selection.

Installation:

Installation will comply with manufacturer's recommendations and in compliance with all applicable building codes and State and Federal mandates to include TAS and ADAAG.

Warranty:

1. Five-year limited Plastisol warranty.
2. Plastisol to be unaffected by common acid, alkalis, salts, acid rain, sewage or seawater.

3. Rust/corrosion-resistant
4. Free of cracks, peeling, warping or rotting.
5. Plastisol finish must be consistent and have a glossy appearance without any surface area that is flat in appearance or contain any grainy or porous surface. Any finishes found to be unacceptable will be replaced at no additional cost to the City.

Steel frames are to be finished as specified and warranted against defects for a period of five years.

BICYCLE RACK SPECIFICATION

CITY OF ENG. DEPT.
02 MAY 19 PM 2:56

SECTION 02871 - BICYCLE RACKS
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:
   1. Ground mounted bicycle racks.

B. Related Sections include the following:
   1. Division 2 Section "Bicycle Storage Lockers" for enclosed bike storage lockers.
   2. Division 3 Section "Cast-in-Place Concrete" for concrete mounting pads.
   3. Division 5 Section "Metal Fabrications" for pipe bollards to protect bicycle racks.
   4. Division Section "Earth Work" for site preparation.

C. Alternates: Work of this Section is affected by Alternates. Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.03 PERFORMANCE REQUIREMENTS

A Thermal Movements: Provide bicycle racks that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.04 SUBMITTALS

A Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.

B. Shop Drawings: Show fabrication and installation details, and attachments to other work. Include parking area plans and bicycle rack elevations.

C. Samples for Initial Selection: For units with factory-applied color finishes for each type of finish indicated.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples in manufacturer's standard size.

1. Full size bicycle rack, including inverted loop with specified custom infill panel as applicable and shown on drawings. Show method of finishing members at intersections. Samples need not be full height.

E. Warranties: Special warranties specified in this Section

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual with sufficient trained staff to install manufacturer's products according to specified requirements.

B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum five years experience.

C. Source Limitations: Obtain bicycle racks through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of bicycle racks and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

1 Do not modify intended aesthetic effects, as judged solely by Architect and Parks and Recreation Department (Owner), except with Architect's and Owner's approval. If modifications are proposed, submit comprehensive explanatory data to Architect and Owner for review.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes on exposed surfaces from damage by applying a temporary protective covering or wrapping before shipping.

B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other causes.

1.07 PROJECT CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

1.08 WARRANTY

A. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include vandalism.

1. Warranty Period: [1] year from date of Substantial Completion.

PART 2 – PRODUCTS

2.01 PRODUCTS DESIGN

A. Basis-of-Design Product: The design for bicycle racks is based on Inverted U-Rack, Vintage Racks, or Custom Racks as shown on drawings by Cycle-Safe, Inc., 4630 Ada Drive, Suite B, Ada, MI 49301, (888)-950-6531; fax (616) 954-0290, http://www.cyclesafe.com. Subject to compliance with requirements, provide the named product or a comparable product of equal or better quality by one of the following:

1. Creative Pipe, Inc.

2. Dero Bike Rack Co.
3. American Bicycle Security; Model.
4. Madrax, Inc.; Dura-Locker.
5. Saris Parking Products, Div. of Graber Products, Inc.

2.02 MATERIALS

A. Steel: Free from surface blemishes and complying with the following:
   1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
   2. Steel Pipe: Standard-weight Schedule 40 steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.
   3. Structural Tubing: Cold-formed round or square steel tubing complying with ASTM A 500 and as shown on drawings.
   4. Sheet: Commercial steel sheet complying with ASTM A-569/A 569M.

B. Stainless Steel: Free from surface blemishes and complying with the following:
   1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304, 316L.
   2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312 M, Grade TP 304 or 316L.
   3. Tubing: ASTM A 554, Grade MT 304, 316L.

C. Anchors, Fasteners, Fittings, and Hardware: Stainless steel from Manufacturer's standard, corrosion-resistant-coated or non-corrodible materials; commercial quality; tamperproof, vandal and theft resistant; concealed, recessed, and capped or plugged. Provide as required for bicycle rack assembly, mounting, and secure attachment.
   1. Tamper-Resistant Concrete Expansion Anchors: Carbon steel mushroom head, 3/8 by 3 inches (10 by 76 mm); provide "Spike" #5550 fasteners as manufactured by Powers Fasteners or approved equal. 3/8 x 4 inch Torx button head with tamper resistant pin.

D. Fasteners locking and securing method of hardware: provide J-B Weld type product of commercial quality or approved equal of same or better quality.

E. Non-Shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

F. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pour-able anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer for exterior applications.

G Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:
   1. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

H. Concrete Pads: Refer to Division 3 Section "Cast-in-Place Concrete."

2.03 BICYCLE RACKS

A. Frame: Steel, Stainless steel as shown on drawings and to match description called out.

B. Style: Arched inverted U-shaped loop or shape as indicated on Drawings, style as shown on drawings.

C. Pipe and/or Tube with Diameter and Size: Manufacturer's standard designs and layouts as indicated on Drawings or as indicated in a bicycle rack schedule made from Pipe stock as called out on drawings.

D. Overall Installed Height: of 36 inches (914 mm) or 38 inches (965 mm) as indicated on Drawings or as indicated in a bicycle rack schedule, height to be provided.

E. Overall Width: width of 24 inches (610 mm) or as indicated on Drawings or as indicated in a bicycle rack schedule.

F. Overall Depth: As indicated on Drawings or as indicated in a bicycle rack schedule.

G. Capacity: Designed to accommodate not less than six bicycles set as individual rack units or ganged groups to reflect numbers shown on drawings.

H. Artistic Infill Artwork: Custom design as indicated on drawings where is applicable.
   1. Fabricate artistic infill artwork panels from 1/4 inch (6 mm) thick steel plate. Cut shapes with computer-guided laser beam. Provide shop drawing for review and evaluation.

I. Horizontal Bar: Manufacturer's standard flat 3 inch (76.2 mm) wide by 1/4 inch (6 mm) thick steel plate as applicable, installed between uprights with bottom edge 18 inches (457 mm) above grade.

J. Accessories: Logo signage or Bike Parking ID Sticker as applicable and shown on drawings.

K. Installation Method: Cast in concrete –in-ground mount, Surface flange anchored at finished grade to substrate indicated on Drawings, or Rail-mounted and anchored at finished grade to substrate indicated on Drawings.

2.04 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

C. Pipes and/or Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain

cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Base plates: minimum **2-1/2 by 6-1/2 inch (190 mm) square** base plates of 3/8 inch (10mm) thick steel in accordance with ASTM A 36, with two 5/8 inch (15 mm) diameter mounting holes on each base plate, spaced equidistant between the upright pipe and edge of the base plate.

E. Base plate Rails: 1/2 by 3 inch (12.7 by 76.2 mm) inverted steel channels in 6 foot (1828 mm) or as illustrated and noted on drawings in specified dimensions. Fabricate baserails with 7/16 inch (11 mm) diameter mounting holes.

F. Steel and Iron Components: All Steel and Iron components must be Color coated. Bare metal steel or iron components are not permitted.

G. Exposed Surfaces: Polished, sanded, or otherwise finished; smooth all surfaces, free from burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

H. Factory Assembly: Assemble components in the factory to the greatest extent possible to minimize field assembly. Ship rail mounted racks knocked-down for field assembly. Clearly mark units for assembly in the field.

2.05 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 STEEL FINISHES

A. Steel Finish: Color coated.
   1. Color: Provide samples as made available by manufacturer. Match Architect's samples if selected accordingly or as selected by Architect from manufacturer's full range of colors.

B. Plastisol Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped, plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment and application.

   1. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 10/NACE No. 2 "Near White Metal Blast Cleaning."
   2. Apply manufacturer's standard primer.

3. Apply finish at coating manufacturer's recommended thickness [030 in. min.]. Plastisol is to be a liquid (free-flowing or highly viscous) vinyl dispersion that is fused by heat to form a solid end product. The plastisol must be consistent in firmness so that it is not hard as glass or excessively soft, and the finish must be glossy and not flat or contain a grainy surface. Plastisol must be formulated to produce a product that is applicable to information provided herewith.

Provided is a range of the physical properties that the Plastisols must be produced too:

- Tensile 750 - 3000 psi
- Elongation 100 - 500%
- Hardness 10 - 97 Shore A
- Viscosity 250 - 50000 cps #6 spindle, 20 rpms, 80°F
- Weight/Gallon9 - 13 Lbs.

Plastisols must be formulated to resist chemical attack, weather ability, dielectric strength, fire resistance, abrasion resistance, and other properties as are applicable to park site conditions.

C. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, copolymer-based thermoplastic powder coating designed for maximum mechanical performance, impact resistance and UV-stability, comply with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film of 2 mil thickness.

2.07 STAINLESS-STEEL FINISHES

A. Stainless-Steel Finish: Satin No. 4 finish.

B. Remove tool and die marks and stretch lines or blend into finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas with Installer present for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of bicycle racks, where required.

B. Install bicycle racks level, plumb, true, and securely anchored and positioned at locations indicated on Drawings.

C. Post Setting: Set cast-in posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set

plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

D. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of bicycle racks and 1 inch (20 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

E. Base plate Mounting: Where required, install steel tapered shims prior to anchoring in place. Fill gaps between base plate and substrate greater than 3/8 inch with non-shrink, non-metallic grout.

F. Rail Mounting: Fasten rails to concrete to create a free-standing array with anchors at each rail end. Shim and level as required to maintain installation tolerances.

G. Installation Tolerances: Install bicycle racks to comply with the following maximum tolerances:
   1. Location: Plus or minus 1/2 inch.
   2. Height: Plus or minus 1/4 inch.
   3. Alignment of Adjacent Units: Plus or minus 1/2 inch in ten feet; 1 inch over total length.
   4. Plumb: Plus or minus 1/4 inch.
   5. Level: Plus or minus 1/4 inch.

3.03 CLEANING AND PROTECTION

A. After completing bicycle rack installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

PLAY FIELD EQUIPMENT SPECIFICATION

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide play fields and equipment as shown and specified.
   The work includes:

   1. Play field equipment - Soccer Goals – 24' wide x 8'-6" high x 8' deep.
   2. Soccer Goal Nets.

B. Related work:
   1. Irrigation
   2. Sodding

1.02 QUALITY ASSURANCE

A. Comply with Section: Applicable Contract Conditions.
B. Contractor qualifications: Minimum of 5 years experience in installing this type of equipment or similar.
C. Materials and methods of construction shall comply with the following standards:

   1. Manufacturer's recommendations.

1.03 SUBMITTALS

A. Submit manufacturer's product data for each type of coating or equipment required, including finish indicated.
B. Upon materials and equipment acceptance, submit written maintenance instructions recommending procedures for maintenance of surfaces and equipment.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured products in manufacturer's original, unopened, and undamaged containers with labels intact and legible.
B. Store and handle manufactured products to prevent damage and deterioration.

1.05 PROJECT CONDITIONS

A. Do not begin play fields and equipment work before completion of final grading and surfacing.

PART 2 PRODUCTS

2.04 PLAY FIELD EQUIPMENT:

A. Soccer goals:

1. Manufacturer and model:

   a. Quality Industries Inc.
      Model number 5405 Permanent Soccer Goal.
   b. Quality Industries Inc.
      Model number 5406 Portable Soccer Goal.
   c. Quality Industries Inc.
      Model Number: 5413 Soccer Goal Net

3.06 PLAY FIELD EQUIPMENT

A. Assemble and install prefabricated soccer goals, in accordance with manufacturer's recommendations.
B. Install permanent soccer goals in concrete foundations 36" deep x 24" dia. footing.
C. Place foundation concrete and tamp for consolidation. Align posts both vertically and laterally. Hold in position during concrete placement and finishing operations.
D. Concrete shall be 3000 PSI and meet ASTM C-39 Compressive Tests.
E. Recess concrete foundation six inches (6") below finish grade at sport contact areas.

3.07 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all debris and equipment. Repair all damage resulting from equipment installation.

1. Remove excavated posthole soil from site.
2. Restore disturbed areas to existing condition.

Metal Shelter Standard

Metal Shelter requirements:

1. Metal Shelter must be all steel construction with vertical columns, roof steel frame, 18 gage minimum metal roofing panel and available in minimum of 12 colors for both frame and roof. All finished must be baked on enamel or powder coated and factory applied. Care must be taken during installation to insure that paint finish is not damaged

2. Metal Shelter must be anchored in method that does not produce any exposed bolts or anchors. Metal shelter must be set so that concrete pad is monolithic on surface.

3. Metal Shelter must be constructed to allow for installation of wiring, conduits and light.

4. Metal Shelter must have a copula on the top with an opening to allow for ventilation.

5. Metal Shelter must have flashing along the lower edges of the roof panels to insure that there are no sharp edges.

6. Metal Shelter frame must be clear and free of any and all sharp edges

7. Metal Shelter must have all welds applied by a certified welder.

8. Metal Shelter must have engineered drawings designed, stamped, signed and sealed by a Professional Engineer registered in the State of Texas. Drawings must be submitted for review and approval by Building Services and Permitting Department.

9. Metal Shelter footings must be constructed as required by Profession Engineer design.

10. Metal Shelter must be installed over a concrete pad or as required based on the application. Concrete pad must be designed by a Professional Engineer.

11. Metal Shelter must be assembled and installed per manufacturer recommendations.

12. Metal Shelter eaves will not be less than eight feet (8') above adjacent ground or concrete pad. Shelter height may be higher based on application.

Bleacher Specification:

Portable Bleachers.

Non-elevated, furnish a bleacher equivalent to Alum-A- Stands as manufactured by Dant Corporation, Louisville, Kentucky.

Model Number: Series X ALS-100

Number of Rows:	4
Overall Length:	15'-0" Length, 8'-0" Depth
Gross Seating Capacity:	40
	Net Seating Capacity: 36
Handrail System Rear & Sides:	not required
Handrail Side Rail To:	not required
Provide Portable Unit:	1 Unit (ALS/PU)
	Wheels 16" diameter
	Tongue 3" O.D. Pipe.

GENERAL CONSTRUCTION:

Frames shall be fabricated from extruded aluminum channels and tubes. The following minimum dimensions and characteristics shall prevail.

a. Verticals or Riser - 2 7/8" O.D. Tube.
b. Horizontal Braces.
c. Footrest Supports - 3"x2 7/8" Channel.
d. Cross Braces and Diagonals - 2 5/8" O.D. Tube Mill Finish.
e. All under structure components shall be 6061-T6 Alloy and have a mill finish, frames shall be factory assembled with 7/16" x 3 1/2" galvanized steel bolts. There shall be no welds.
f. Manufacturer shall install groundsills on each set of bleachers.
g. Beat Plank:
    i. Seats shall be 2" x 10" nominal extruded aluminum of 6063-T6 alloy,
    ii. Finish to be clear 204R1 ANODIZED,
    iii. Conforming to the Aluminum Architectural Standard AA-C22A31.
    iv. Seat boards shall attach to uprights with a maximum of one (1) 3/8 bolt.
h. Footboards:
    i. Footboards and walkways shall be 2" X 10" nominal extruded aluminum 6063-T6 alloy mill finished footboard shall securely attach to the frames without using nuts, bolts or clips.
i. End Caps All plank and handrail ends shall be covered with factory installed aluminum end caps.
j. Handrails to be aluminum.

Installation:

To be performed in accordance with and as recommended by manufacturer, equipment to be assembled and installed in compliance with all applicable building codes and State and Federal requirements to include TAS and ADA respectively.

3	15'	24+1	4' 11 5/8"	2'-0"
3	21'	34+2	4' 11 5/8"	2'-0"
3	27'	42+2	4' 11 5/8"	2'-0"
4	15'	32+2	6' 11 5/8"	2'-6"
4	21'	48+2	6' 11 5/8"	2'-6"
4	27'	58+2	6' 11 5/8"	2'-6"
5	15'	44+2	9'-5 15/16"	3'-0"
5	21'	56+4	9'-5 15/16"	3'-0"
5	27'	76+4	9'-5 15/16"	3'-0"

CHAIN LINK FENCING

PART 1 - GENERAL

Drawings and general provisions of the Project, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

Extent of chain link fence is indicated on drawings.

Product Data: Submit manufacturer's technical data, and installation instructions for metal fencing, fabric, and accessories.

1.1 SUMMARY

A. Furnish and install chain link fences and gates complete. Extent of chain link fences and gates is indicated on drawings.
B. This section includes the following:
C. Related sections specified elsewhere:

1.2 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Section.
B. Product data in the form of manufacturer's technical data, specifications and installation instructions for fence and gate posts; fabric, gates, gate operators and accessories.
C. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms gate swing, hardware and accessories.
D. Samples of initial selection of PVC color in form of manufacture's color charts or 6-inch lengths of actual fabric wire showing colors available. Include similar samples of polymer coating applied on posts, rails and accessories.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has at least five years experience and has completed as least ten chain link fence projects with same material and of similar scope of that indicated for this project with a successful construction record of in-service performance.
B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings and fastenings, from a single source.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for fences and gates shown on the drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

DIMENSIONS indicated for pipe, are outside dimensions, exclusive of coatings.

Available Manufacturers: Subject to compliance with requirements manufacturers offering products that may be incorporated in the work include the following:

Allied Tube and Conduit Corp.
American Fence Corp.
Anchor Fence, Inc.

2.1 STEEL FABRIC: Provide as indicated on the drawings.

A. Selvage: Knuckled on both selvages.

B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing in heights 12 feet and less in height to comply with Chain Link Fence Manufactures Institute (CLFMI) "Product Manual" and with requirements indicated below:

1. Mesh and Wire Size: 2-inch mesh, 9 gage.
2. Coating: galvanized.
3. Galvanized coating industrial grade zinc.

2.2 FRAMING AND ACCESSORIES:

A. Round member sizes are given in actual outside diameter (OD) to the nearest thousands of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade size in inches. The following indicates these equivalents all measured in inches:

Actual OD	NPS Size	Trade Size
1.315	1	1-3/8"
1.660	1-1/4	1-5/8"
1.900	1-1/2	1-7/8"
2.375	2	2-3/8"
2.875	2-1/2	2-7/8"
3.500	3	3-1/2"
4.000	3-1/2	4"
4.5	4	4-1/2"
6.625	6	6-5/8"
8.625	8	8-5/8"

B. Type 1 Round Posts: Standard weight Schedule 40 (Sch. 40) galvanized-steel pipe conforming to ASTM F 1083 according to heavy industrial requirements of ASTM F 669. Group IA, with minimum yield strength of 25,000 psi., not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows.

B. Type 1 Round Posts: continued.

Actual OD	Weight (lb/ft)	NPS Size
1.315	1.68	1
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2
3.500	7.58	3
4.000	9.11	3-1/2
4.5	10.79	4
6.625	18.97	6
8.625	28.55	8

2.3 STEEL FRAMEWORK, GENERAL:

A. Top Rail: manufacturer's longest lengths (17-21 feet) with swedged-end or expansion-type coupling, approximately 6" for joining. Provide rail ends or other means for attaching top rail securely to each gate, corner, pull and end post.
B. Middle Rail: manufacturer's longest lengths (21 feet) provide mechanical saddle cut ends and perfect fit length rails to be welded in place with full all around welds, cleaned primed and coated with zinc based paint; attaching middle rail securely to each gate, corner, pull and end post by welding in place.
C. Bottom Rail: manufacturer's longest lengths (21 feet) provide mechanical saddle cut ends and perfect fit length rails to be welded in place with full all around welds, cleaned primed and coated with zinc based paint; attaching bottom rail securely to each gate, corner, pull and end post by welding in place. Set minimum of 3" above finished grade and maximum of 6" above finished grade.
D. Top, Middle and Bottom Rails: Round Steel: 1.900-inch OD Type 1 steel Pipe.
E. Line Posts for Fabric Heights 6 feet and below: 2.375-inch OD Type 1 steel pipe.
F. Terminal, Corner and Pull Posts fabric heights 6 feet and below: 3.5-inch OD Type 1 steel pipe.
G. Gate Posts for fabric heights 6 feet and below: 4.5-inch OD Type 1 steel pipe.
H. Line Posts for Fabric Heights 7 to 10 feet: 2.875-inch OD Type 1 steel pipe.
I. Terminal, Corner and Pull Posts for Fabric Heights 7 to 10 feet: 4.5-inch OD Type 1 steel pipe.
J. Gate Posts for Fabric Heights 7 to 10 feet: 6.625-inch OD Type 1 steel pipe.
K. Line and Terminal Posts (backstops) for Fabric Heights above 10 feet: 4.5-inch OD Type 1 steep pipe.

2.4 WIRE TIES:

A. Provide 9 gage galvanized steel wire to tie fabric to posts and braces, to match fabric core material. Tie wires to be at 12 inches on center on all posts and rails and with double looped pigtails on both ends. Do not leave sharp protruding edges.
B. Provide 9 gage hog rings to tie fabric to tension wire where applicable.

POST BRACE ASSEMBLY:

Manufacturer's standard adjustable brace at end and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable turnbuckle.

STRETCHER BARS:

One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretcher bar for each end post, and 2 for each 'corner and pull post.

STRETCHER BAR AND TENSION BANDS:

A. ¾ inch wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft. Set space at nothing over 15" on center, to secure stretcher bars to end, corner, and pull posts.
B. Tension Bands: 0.074-inch thick (14 gage) minimum.
C. Brace Bands: 0.105-inch thick (12 gage) minimum.

CONCRETE:

A. Provide concrete consisting of Portland cement, ASTM C 150, aggregates, ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi using at least 6 sacks of cement per cu. yd., 1" maximum size aggregate, maximum 3" slump, and 2% to 4% entrained air.
B. Footing for Terminal, Line, Pull, Gate, and End Posts for fabric heights below 10 feet to be 12-inch diameter in size, 3'-3" deep, with a tapered cap to shed water. Tapered cap to be from 3 to 6 inches above finished grade and footing to be poured in a tube form to obtain a consistent finished appearance.
C. Footing for Terminal, Line, Pull, Gate, and End Posts for fabric heights below 10 feet to be 12-inch diameter in size, 3'-3" deep, with a tapered cap to shed water. Tapered cap to be from 3 to 6 inches above finished grade and footing to be poured in a tube form to obtain a consistent finished appearance.
D. Footing for Terminal and Line Posts (backstops) for fabric heights above 10 feet to be 18-inch diameter in size, 5'-3" deep, with a tapered cap to shed water. Tapered cap to be from 3 to 6 inches above finished grade and footing to be poured in a tube form to obtain a consistent finished appearance. Where applicable this footing may be integral with concrete stem wall (concrete curb).

FITTINGS AND ACCESSORIES:

A. Material: comply with ASTM F 626. Mill-finished galvanized iron or steel to suit manufacturer's standards.
   1. Steel or Iron: unless specified otherwise, hot-dip galvanized pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A90.

B. Line Post Caps: Provide weather tight closure cap for each post of heavy-duty industrial grade steel products with galvanized finish. Provide line post with eye caps to receive top rail.

C. End or Terminal Post Caps: Provide weather tight closure cap for each post of heavy-duty industrial grade steel products with galvanized finish.

D. Rail End Caps: do not provide weather tight closure cap at terminus of top rail. Rail to be welded in place with full, complete weld.

GATES:

A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to insure proper gate operation and attachment of fabric, hardware and accessories.
   1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top, intermediate and bottom of frame with tie wires.
   2. Bracing: Install diagonal cross bracing consisting of 5/16-inch diameter adjustable length truss rods on gates to insure frame rigidity without sag or twist.

B. Swing Gates: Comply with ASTM F 900.
   1. Steel Gates up to 8 feet wide:
      a. Gates up to 6 feet high: Fabricate perimeter frames of 1.660-inch minimum OD Type 1 steel pipe.
      b. Gates over 6 feet high: Fabricate perimeter frames of 1.900-inch minimum OD Type 1 steel pipe.
   2. Steel Gates from 8 feet to 10 feet wide:
      a. Gates up to 6 feet high: Fabricate perimeter frames of 1.900-inch minimum OD Type 1 steel pipe.
      b. Gates over 6 feet high: Fabricate perimeter frames of 2.375-inch minimum OD Type 1 steel pipe.

C. Gate Hardware: Provide galvanized heavy duty industrial grade steel hardware and accessories for each gate according to the following:
   1. Hinges: Size and material to suit gate size, no-lift-off type, offset to permit 180-degree gate opening.
      a. Provide 2 hinges for gates less than 6 feet height and 4 feet wide.
      b. Provide 3 hinges for gates greater than 6 feet in height or 4 feet wide.

C. Gate Hardware: continued -

2. Latch: Latch to permit operation from either side of gate, with padlock eye as an integral part of latch.
   a. Forked type required for pedestrian gates
   b. Plunger-bar type required for vehicular (double) gates. Set sleeve guide in concrete footing to accept plunger when gate is in closed position.
3. Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gates leaves to be locked with a single padlock.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Do not begin installation and erection before concrete footings (or concrete stem wall/curb) is completed and set in ground for minimum of 7 calendar days, unless otherwise permitted.

B. Excavation: Holes for posts to be 12" minimum diameters (except 18" diameter for backstops) in firm, undisturbed or compacted soil.

C. Unless otherwise indicated, excavate hole depths approximately 3" lower than post bottom.

3.2 SETTING POSTS: Set posts in footing.

A. Place concrete around posts and vibrate or tamp for good, consistent, consolidation of concrete. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

B. Extend concrete footings 3" to 6" above grade and trowel to a crown to shed water.

C. Concrete footings to have a consistent smooth finish on crown and exposed surfaces.

3.3 TOP RAILS:

Run rail continuously between posts and weld at both ends using continuous welds. Provide top rail with either swedged-end or expansion-type coupling, approximately 6" for joining. Tack weld, clean, prime and coat with zinc based paint.

3.4 CENTER AND BOTTOM RAILS:

Provide Center (intermediate) and Bottom rails throughout. Cut rails to exact length to sit between posts with a maximum play of ¼" after mechanically cut saddle ends are performed. Install in one piece between posts and flush with post on fabric side. Use continuous welds for this assembly method. Upon completion of welds, clean off splatter, welds, prime and coat with a zinc based paint.

3.5 BRACE ASSEMBLIES:

Install braces so posts are plumb when diagonal rod is under proper tension as applicable.

3.6 FABRIC:

Leave fabric as close to finish grade as possible with a maximum gap of 2 inches allowed. Insure that fabric has knuckle salvaged at both top and bottom ends, unless otherwise indicated. Install fabric on security side or play side of fence. Pull fabric taut and tie to posts, and rails as noted above and anchor to framework so that fabric remains in tension after pulling force is released.

3.7 STRETCHER BARS:

Thread through or clamp to fabric 4" on center, and secure to posts with metal bands spaced at 15" on center maximum.

3.8 TIE WIRES:

A. Use U-shaped 9 Gage steel wire (no aluminum wire), conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least 2 full turns (pigtail). Bend ends of wire to eliminate hazard to persons or clothing.
B. Tie fabric to line posts, with wire ties spaced 12" on center.
C. Tie fabric to rails and braces, with wire ties spaced 12" on center.

3.9 FASTENERS:

A. Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Secure properly do not leave nuts loose.
B. Tack weld nuts to bolts to secure properly, clean, prime and coat with zinc based paint at completion.
C. Bolts may have peen ends or score with reads to prevent removal of nuts with prior approval from Parks and Recreation Department only.

3.10 GATES:

A. Install gates plumb, level and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjustment hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level and secure.
B. Gates and Gate Operators: After repeated operation of completed installation equivalent to 3 days use by normal traffic, readjust gates and gate operators and controls for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

3.11 DEMONSTRATION

A. Instruct the Owner's personnel on proper operation and maintenance of gate operators.

3.12 TOUCH-UP PAINTING AND CLEANING

A. Galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.
B. Site clean up will be performed to remove all construction debris such as: wire ties, wire scraps, concrete splatter, concrete waste, welding rods, and pipe scraps.
C. Site clean up to include restoration of turf and landscape materials to original conditions.

END OF SECTION 02830

Park Trail Lighting Standard

Lighting Guidelines:

1. The Developer shall furnish and install trail lights whether within the corporate limits or within the extraterritorial jurisdiction. Such trail lights shall comply with the city of El Paso lighting ordinance found at Chapter 19.16.30 and Chapter 18.18 of the El Paso Municipal Code.

2. Trail lighting placed within the trail right of way, or within a public easement, shall provide an average lumen level of at least 0.6 lumens and a horizontal illumination at any point on the trail of at least 0.4 lumens. The interval spacing between poles shall not exceed 300 feet, and bollards shall be spaced as to meet the required lumen levels.

3. The Developer shall have the option of providing metal poles, concrete poles, or aluminum bollards to achieve the necessary lighting to meet the required lumen levels.

4. Trail corridor lighting shall not be required where earthen trails are provided nor where corridors are located in public right-of-way and street lighting is provided. Otherwise lighting may be required by the Director of Parks and Recreation or designee in accordance with the Parks Facilities Standards, the DSC and the provisions of the Dark Skies Ordinance section of Title 18.

	Required Spacing	**Pole Type**	**Lamp Type**	**Height**
Trails	At intervals of not more than three hundred feet	Metal-direct burial Metal-Breakaway poles at street intersections	100 watt minimum high pressure sodium	30 feet
Trails	At intervals of not more than fifty feet	Aluminum Bollards	100 watt minimum high pressure sodium	3-4 feet
Trails	At intervals of not more than three hundred feet	Concrete direct burial	100 watt minimum high pressure sodium	30 feet

Trail Lighting Options:

Trail Lighting shall be provided with either standard pre-stressed concrete poles, illuminated bollards or through EPECo street lighting contract as noted below. Coordinate with Parks and Recreation Department staff for site specific requirements. All necessary components to include: electrical service, meter, electrical panel, conduit, wiring, photo cell, timer and other items required to make system fully operational.

1. EL Paso Electric Company (EPECo) Lighting Standard:
   A. EPECo Lights along Trail:
      i. Poles: poles must be steel Direct Bury Street Light Pole type.
      ii. Luminaire: standard 100 Watt HPS lamps as provided by EPECo.
      iii. Power Supply: provide power through underground installation of conduit with necessary wiring.
      iv. Placement: install light poles 300 feet maximum distance from each other.
   B. EPECo Lights provided within street right-of-way intersecting with Trail:
      i. Poles: poles must be steel Break Away Street Light Pole type.
      ii. Luminaire: standard 100 Watt HPS lamps as provided by EPECo.
      iii. Power Supply: provide power through underground installation of conduit with necessary wiring.
      iv. Placement: install light poles 300 feet maximum distance from each other.

2. Standard Illuminated Bollards along Trail:
   A. 36" tall Illuminated Bollards must be one-piece aluminum casting type bollard. See Kim Lighting cut-sheet for reference of type and style.
   B. Luminaire: standard 100 Watt HPS lamps.
   C. Power Supply: provide power through underground installation of conduit with necessary wiring and control equipment.
   D. Placement: install bollards at each street intersection and then along Hike/Bike Trail to maintain lumen level noted.

3. Standard Pre-Stressed Concrete Poles with Lights:
   A. Lights provided along Trails:
      i. Poles: poles must be 30 feet tall, Pre-Stressed Concrete Direct Bury Pole type, see Ameron cut-sheet for reference of type and style.
      ii. Luminaire: minimum 100 Watt MH lamps as available: see Vandalume or Flood Light type models.
      iii. Power Supply: provide power through underground installation of conduit with necessary wiring and control equipment.
      iv. Placement: install light poles 300 feet maximum distance from other lights within Hike/Bike Trail boundaries.

Park Area Lighting Standard

Park Area lighting must be provided as noted below, coordinate with Parks and Recreation Department staff for site specific requirements. All necessary components to include: electrical service, meter, electrical panel, photo cell, timer and other items required to make system fully operational.

Park Area Lighting:

Lights for general open area of the park will be provided in the following manner:

1. Poles: poles must be 30 feet tall, Pre-Stressed Concrete Direct Bury Pole type, see Ameron cut-sheet for reference of type and style.

2. Luminaire: minimum 250 Watt Metal Halide (MH) lamps as available: see Vandalume or Flood Light type models.

3. Power Supply: provide power through underground installation of conduit with necessary wiring and control equipment.

4. Placement: install light poles 300 feet maximum distance from each other.

Park Perimeter Lighting Standard

Park Perimeter lighting must be provided as noted below, coordinate with Parks and Recreation Department staff for site specific requirements. All necessary components to include: electrical service, meter, electrical panel, photo cell, timer and other items required to make system fully operational.

Perimeter Lighting:

Lights within street right-of-way along perimeter of park site will be provided through contract with El Paso Electric Company (EPECo) and in the following manner:

1. Poles: poles must be steel Break Away Street Light Pole type.
2. Luminaire: provide dual standard 100 Watt HPS lamps as provided by EPECo.
3. Power Supply: provide power through underground installation of conduit with necessary wiring and control equipment.
4. Placement: install light poles 300 feet maximum distance from other lights within street right-of-way abutting park perimeter.

Athletic Field Lighting

Specification

Provided herewith are minimum performance is based on some of the minimum recommendations of Texas Amateur Athletic Federation. These minimum performance specifications are for baseball (softball) field and soccer field lights.

1. **Light Levels**

   Ball field - **Initial:** 62 foot candles infield / 37 foot candles outfield
   Maintained: 50 foot candles infield / 30 foot candles outfield
   Soccer field - **Initial:** 62 foot candles
   Maintained: 50 foot candles

2. **Uniformity or Smoothness and Quantity**

   A. The standard sets maximum differences allowed in levels on both infield and outfield. It is measured as a ratio between highest and lowest light readings. This is important because uneven lighting can create visual illusions for the players. Objects appear to change speed when traveling through unevenly lighted areas. Uniformity rations can be maintained through proper aiming logic in the design and by maintaining proper fixture alignment.
   Uniformity/Smoothness - Infield minimum to maximum ratio 1:1.5
   Outfield 1:1.5

   B. The change in the quantity of horizontal foot candles shall not be more than 10 percent per 10 feet over the entire playfield.

3. **Aiming Angles, Glare Control, Pole Location and Height**
   These items combined to provide a safe, playable field. Meeting the minimum pole heights and aiming angles assure that no fixture becomes a source of glare for players. Adequate attention to these standards provides for the safety of the participants and ease of viewing for spectators.

4. **Security Lighting**
   There shall be sufficient lighting in and around athletic facilities to prevent unsafe and inappropriate actions. The parking areas, major areas utilized for passage, and areas immediately bordering the facilities should be lit to an average of approximately two-foot candles. Care should be given to eliminate dark shadowed areas.

5. **Trespass Light Control and Glare Controls**
   To control wasted spill light and reduce glare the fixtures must be fitted with a combination of internal or external photometric features that result in effective reductions in off-site spill and glare.

6. **Off-Site Maximum Light Levels**
   The maximum light level at any point 150' from the playing field shall not exceed 0.80 foot candles. The light shall be measured with the meter aimed at the brightest light bank.

7. **Method of Measuring light Quantity**
   The light meter shall be held 36" above the playing field surface with the sensing surface horizontal to the ground. The light meter shall be correctly calibrated.

8. **Aiming Recapture Device**
   Light fixtures shall have a positive latching device for each luminaire on the assembly. The device shall provide for automatic repositioning of the aiming after re-lamping.

9. **Electrical Box**
   The electrical box shall be located approximately 10' above grade on each pole. This box shall contain ballasts, capacitors, and a thermal magnetic breaker/disconnect device, grounding lug and individual breaker for each fixture.

10. **NEMA 3R Rated Electrical Box**
    The electrical box shall be a NEMA 3R rated gasket sealed enclosure to house the ballasts, capacitors, fuses, thermal magnetic breakers and distribution lugs.

11. **Identification of Electrical Components**
    Enclosed wiring, ballasts and capacitors shall be labeled with permanent marking for easy identification.

12. **Grounding Lug within Electrical Box**
    One 10 gauge grounding wire shall be provided within the electrical box which is rigidly fastened to the enclosure. There shall also be provided a provision for a ground terminal of sufficient size to permit connection of the grounding conductors from the capacitors.

13. **UL Listing**
    The lighting equipment shall have a UL listing for all electrical components as an entire system and as an individual component.

14. **National Electric Code**
    The lighting equipment shall meet the National Electric and local code.

15. **Insulation and Ground Resistance**
    A. The insulation resistance of entire system, including all electrical components shall be above 100 mega ohm tested with 1000v megger.
    B. The ground resistance for maxi system shall not exceed more than 15 ohms.
    C. The ground resistance of remaining electrical system shall meet NEC Code.

16. Conductor Installation

A. All main down conductors and all bonding conductors shall maintain a horizontal or downward coursing path, free from "U" or "V" (down and back up) pockets. No bend of any conductor shall form an included angle of less than 90 degrees nor shall it have a radius bend of less than 8".

B. The wiring from the electrical box to the pole top shall be a factory wired, labeled and tested wire harness that is continuously spiral wound, wrapped in Mylar, and enclosed inside a plastic sheathing.

C. The wires shall be color coded and match other wiring.

D. The wire harness shall be supported at the top of the pole by a stainless steel wire mesh grip. There shall be not more than 13 conductors supported by a single wire mesh grip.

E. The wire mesh grip shall be mechanically attached to a welded hook inside of the pole. The manufacturer is responsible for providing all necessary attachment hardware.

17. Lighting Contactor Cabinet

The manufacturer shall provide a factory-assembled Lighting Contactor Cabinet (LCC). The LCC shall be factory assembled and wired by a UL listed panel builder and shall be a NEMA 4 rated gasketed enclosure.

The electrical panel shall have the following components:	***Qty.***
A. Electromagnetic electrically held contactor with 120 volts coil, shall be GE, Square D or Seimen's.	**2**
B. Capacitor back-up time clock Paragon, model #7004-120.	**1**
C. Two step down transformers Primary 480/277, secondary 120 volts, 1 KVA and 2 KVA each. 1 KVA is for control and 2 KVA for outlet.	**1**
D. **ON/OFF** push button vandal resistance/proof.	**1**
E. SPDT switch with MANUAL, OFF and AUTO position.	**1**
F. Decoder for Maxi system.	**1**
G. 24 volts relay for Max system 5A, 2NO, 2NC	**1**
H. Hour meter.	**1**
I. 20A GFCI outlet mounted on the panel.	**1**

J. Breakers shall be GE, Square or Seimen's, one main breaker, two branch circuit breaks for Electromagnetic contactors, one each for trans-formers primary and secondary, one each for control and outlet, 2 each, 277/120v spare breakers. As required.

K. Any other component required for proper functioning of electrical power and control circuit of the lighting system.

18. Lamps

Lamps shall be 1500 watts metal halide and shall meet ANSI designation. Fixtures that utilize horizontally inserted lamps will not be accepted.

19. Cabinet Labeling

Each enclosure shall contain control and power wiring schematics as well as project-specific control schematics. Each cabinet shall be permanently labeled to match the field diagrams, pole identification, breaker schedule, and other applicable components.

20. Electrical Load Balance

The electrical load among the three phases shall be balanced.

21. Warranty and Long Term Service Requirements

All equipment provided by the lighting manufacturer must be **warranted by a comprehensive 10-year warranty and service package.** All warranty packages must be equal to this standard in every respect and detail. Proof of a lighting manufacturer's ability to meet this requirement must be approved as part of the approval process. A copy of the warranty and service requirements shall be included in the specifications booklet.

Warranty must include replacement of lamp, ballast, socket, breaker, fuses, transformer, wiring, cleaning of reflectors and lens, and maintaining the design F.C.

22. Penalties for Non-Conformance

All lighting manufacturers must guarantee performance for light levels, uniformities, specifications related to spill and glare, delivery of product and assembly/erection in wiring. Failure to meet light level uniformities and warranty will result in a penalty of $100 per day until specifications/warranty are met. In addition, the lighting manufacturer will be responsible for all costs associated with modifying the system to achieve at the specified performance. The warranty work shall be completed within 72 hours after notice from the owner excluding weekends and city holidays.

23. Document Required for Approval of Bid

All manufacturers wishing to bid on this project shall deliver a submittal package. The submittal package shall consist of the following information.

- Cut sheets of each proposed fixture.
- Photometric reports of each proposed fixture from an independent testing laboratory. In house generated photometric reports will not be acceptable.
- Computer generated light level calculations showing compliance with the specifications. Include off-site spill calculations at 150' from field for both horizontal and vertical spill light values for review.
- Cut sheets of the lighting contactors and cabinet.
- Cut sheets of all proposed lamps.
- Structural calculations for the pole base/foundation and pole when loaded with the proposed fixture quantity, including future fixtures.

- Detailed description of the 10-year warranty, service and re-lamping program. Include description of how the lighting manufacturer will deliver the required products and services, provide a sample contract that states in detail exceptions and conditions, and provide proof of insurance policy coverage.

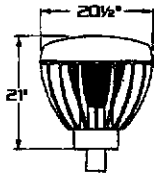
Written letter of guarantee is required to be submitted prior to release on shop drawings for manufacturing of lighting equipment. Letter must state that all performance specifications and requirements will be provided as part of the finished constructed work. Any and all necessary design and construction modifications must be fully detailed in letter and shop drawings and any deficient work must be corrected and completed within 30 days after notice from the owner, all corrective work is required to be performed to insure that completed project complies with these specifications.

AREA AND TRAIL LIGHTING EQUIPMENT CUT-SHEETS

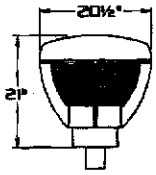
Pages 115 - 126

VNDL

(400 WATT MAX.)

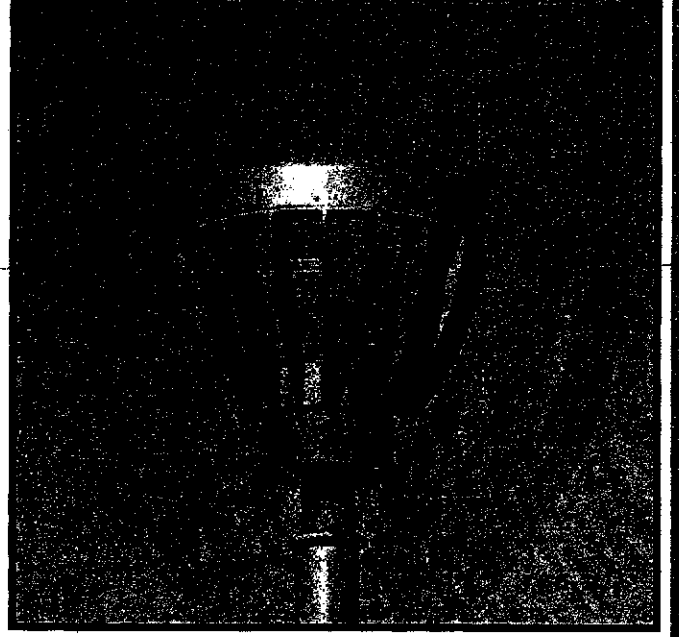


VNDL



VNDLF

E.P.A. VNDL- 1.65
VNDLF-1.65



SPECIFICATIONS

LUMINAIRE: HOUSING AND HOOD ALL HEAVY WALL DURABLE CORROSION RESISTANT. CAST ALUMINUM CONSTRUCTION.

OPTICS: CLEAR POLYCARBONATE PRISMATIC REFRACTOR PROVIDES TYPE II OR TYPE V LIGHT DISTRIBUTION

LAMP HOLDER: MEDIUM OR MOGUL BASE PORCELAIN WITH LAMP LOCKING SHELL

LAMP: (BY OTHERS)

BALLAST: H.P.F./C.W.A. AUTOTRANSFORMER, -20° STARTING TEMPERATURE. ELECTRICAL COMPONENTS ARE MOUNTED TO A REMOVABLE BALLAST TRAY BALLAST IS EQUIPPED WITH FACTORY INSTALLED QUICK DISCONNECT PLUG

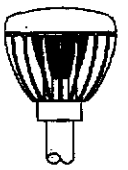
FINISH: POLYESTER POWDER COAT-STATE OF THE ART 20 PSI PRESSURE POWER WASH AT 140° TEMPERATURE INCORPORATES FOUR STEP IRON PHOSPHATE PROCESS TO CLEANSE AND PRETREAT THE METAL SURFACE FOR MAXIMUM PAINT ADHESION. ELECTROSTATICALLY APPLIED TEXTURED POLYESTER POWDER TOPCOAT IS BAKED AT 400° TEMPERATURE FOR MAXIMUM HARDNESS AND EXTERIOR DURABILITY

U.L. Listed for wet location

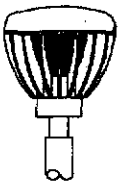
USA

B10-1

MOUNTING STYLES



☐ PTA

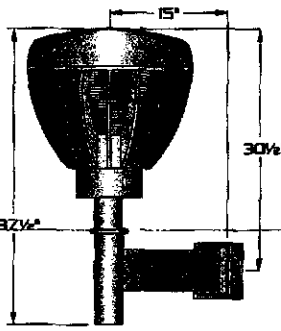


☐ PTB

PTB27-TO FIT OVER 2 7/8" O.D. TENON

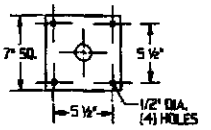
PTB23-TO FIT OVER 2 3/8" O.D. TENON

WALL MOUNT

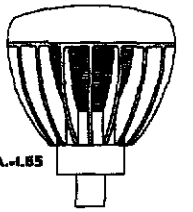


EXTRUDED ALUMINUM ARM AND CAST ALUMINUM WALL BRACKET ASSEMBLY PROVIDED WITH BUILT IN GASKETED WIRE ACCESS FOR FIXTURE/SUPPLY WIRE CONNECTION

WALL PLATE

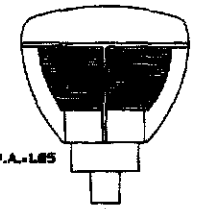


LAMP SIZE: 50 - 400 WATT



E.P.A.=1.65

VNDL



E.P.A.=1.65

VNDLF

CORROSION RESISTANT, DURABLE CAST ALUMINUM

POLYCARBONATE OR ACRYLIC LENS.

SYMMETRIC OR ASYMMETRIC LIGHT DISTRIBUTION.

ORDERING INFORMATION

MODEL NO.: VNDL	OPTICS	WATTAGE TYPE VOLTAGE	MOUNTING	FINISH	OPTIONS

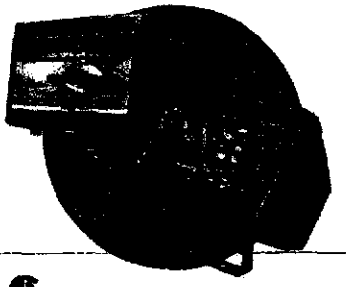
MODEL NO.:	OPTICS	LAMP			MOUNTING	FINISH	OPTIONS
V N D L	☐ TYPE II II ☐ TYPE V V	WATTAGE	TYPE	VOLTAGE	 ☐ PTA ☐ PTB23 (TO FIT 2 3/8" O.D.) ☐ PTB27 (TO FIT 2 7/8" O.D.) WALL MOUNT ☐ W M	☐ DARK BRONZE DBM ☐ MEDIUM BRONZE MBM ☐ BLACK BKM ☐ WHITE WTM ☐ SILVER SLM SEE PAGE 3 FOR ADDITIONAL COLORS	☐ HOUSE SIDE SHIELD 90° HS 90° 135° HS 135° 180° HS 180° ☐ ACRYLIC REFRACTOR TYPE II ACRII ☐ ACRYLIC REFRACTOR TYPE V ACRV ☐ PHOTO CELL + VOLTAGE (EXAMPLE: PC120V) PC+V ☐ SINGLE FUSE (120V, 277V) SF ☐ DOUBLE FUSE (208V, 240V) DF
		☐ 400	☐ HPS	☐ 120			
		☐ 250	☐ MH	☐ 208			
		☐ 200	☐ MV	☐ 240			
		☐ 175		☐ 277			
		☐ 150		☐ 480			
		☐ 100		☐ MT			
		☐ 75					
		☐ 70					
		☐ 50					

USA ARCHITECTURAL

B10-2

LARAMIE 400

DECORATIVE FLOOD



Features

- Use for lighting signs, facades, large area security and accent applications.
- Die cast aluminum housing and door. Twin screw closeure provides positive seal.
- Tempered, impact resistant clear glass lens.
- Steel yoke (LFM-Y), or cast aluminum knuckle (LFM-K) mounting.
- Wide, uniform beam from one piece hydroformed reflector with coverage four times set back distance.
- Metal halide, Pulse start, HPS and Electronic metal halide systems available
- Five standard finishes: Bronze, Black, Gray, White and Platinum.
- Lamps inlcuded with fixture.
- CSA certified to UL 1598 for use in wet locations.
- EPA - Effective Projected Area is 1.9 sq. ft.

Ordering Information

Example: LFM - K - 400H - 3 - BZ - P120

	Series	Mount	Wattage Source	Volts	Finish	Options

Series
- LFM — Laramie Flood Medium

Mounting
- Y — Yoke Mount
- K — Knuckle Mount for 2 3/8" tenon

Wattage/Source

Pulse Start Metal Halide
- 150P — 150W
- 250P — 250W
- 320P — 320W
- 400P — 400W

Metal Halide
- 175H — 175W
- 250H — 250W
- 400H — 400W

HPS
- 150S — 150W
- 250S — 250W
- 400S — 400W

Electronic MH
- 150E — 150W

Fluorescent
- 120F — 120W

Voltage
- V — 5 Tap (250, 400W MH or HPS Only) (120, 208, 240, 277, 480V)
- 3 — Quad - Tap* (120, 208, 240, 277V) (standard on Electronic MH/ Flourescent)
- 5 — 480V
- E — 220/240V 50Hz (standard on Electronic MH/ Flourescent)
- X — No Ballast

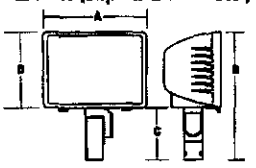
Finish
- BZ — Bronze
- BL — Black
- GR — Grey
- WH — White
- PS — Platinum

Options
- P(000) — Button Photocontrol (replace X with voltage: 120, 208, 240, 277)
- F(000) — Fusing (replace X with voltage: 120, 208, 240, 277, 480, 347)
- QST — Time delay quartz (stand by system less DC bayonet base lamp)
- EM — DC Bayonet socket only (for remote power by others)

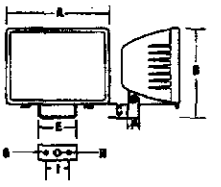
Replacement lens is 264-0358-9903

Dimensions

LFM-K (slipfits 2 7/8" O.D)



LFM-Y

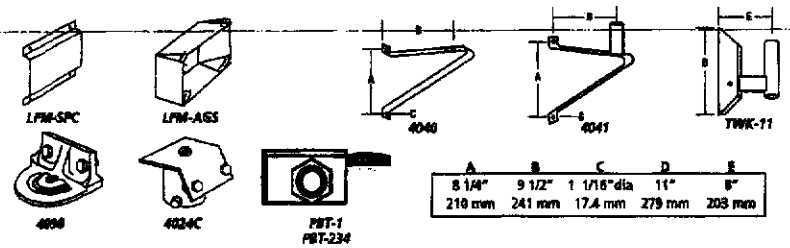


	A	B	C	D	E	F
LFM-K	17.38"	21.06"	9.1"	12.5"	-	-
	441 mm	535 mm	231 mm	317 mm	-	-
LFM-Y	17.38"	14.7"	3"	12.5"	6"	2"
	441 mm	373 mm	76 mm	317 mm	152 mm	51 mm

LARAMIE 400

Accessories - Order Separately

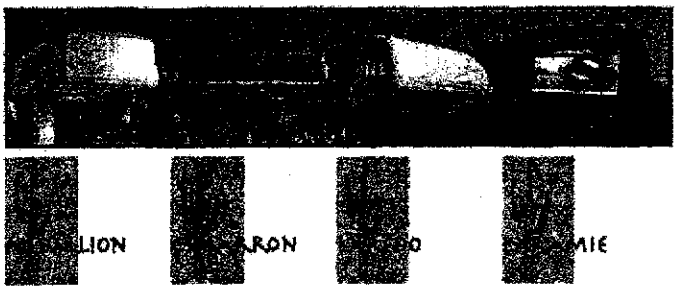
Catalog Number	Description
LFM-SPC	Polycarbonate shield
LFM-AGS	Glare shield - black
LFM-GP	Ground post - black
PBT-1	Button photocontrol 120V
PBT-234	Button photocontrol 208, 240, 277V
4024C	2 3/8" O.D. slipfitter for yoke units - bronze
TWK-11	Wall bracket with 2 3/8" O.D. tenon - bronze
4040	Steel angle bracket for LFM-Y, bronze
4041	Steel angle bracket with 2 3/8" O.D. tenon for LFM-K, bronze
4090	Heavy-duty cast iron crossarm fitting for horizontal trunnion, bronze Lektrocote®



A	B	C	D	E
8 1/4"	9 1/2"	1 1/16"dia	11"	8"
210 mm	241 mm	17.4 mm	279 mm	203 mm

STYLING

Laramie® is designed to be part of the Southwestern Series from Hubbell and Spaulding Lighting. The soft corners and decorative ribs tie Laramie to the Hubbell Outdoor Laredo, full cutoff wallpacks and the Spaulding Lighting Cimarron and Medallion full cutoff pole mounted area luminaries. Each of these units offer rugged cast aluminum construction and outstanding performance with lead-times and pricing that provide a solid value for the owner.



The Southwest family of products from Hubbell Outdoor Lighting and Spaulding Lighting is now available, giving you a consistent look in all areas of your next application.

Outdoor Lighting

MAGNULITER® MH SERIES

Cat. #		Approvals
Job	Type	

HUBBELL® Outdoor Lighting

APPLICATIONS

- General purpose floodlighting.

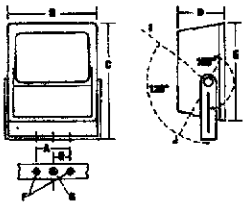
SPECIFICATIONS

- Die cast aluminum housing with low 2.3 EPA.
- Die cast aluminum door with bottom hinge and two Hubbell Gard® screw closures. Tempered glass lens seals with silicone gaskets to frame and housing. Door pre-drilled for accessories.
- Steel yoke with three-hole mounting pattern (MHP) or 2⅜" O.D. cast aluminum slipfitter (MHK). MHK has knuckle wiring chamber for splice or button photocontrol installation.
- The parabolic reflector can produce a wide NEMA 5/6 beam or tighter NEMA 3 beam, depending on finish. See ordering information for exact beam spreads offered. Socket is horizontal and mogul base.
- An easy service electrical Powr-Pan® ballast tray allows simple maintenance. All ballasts are HPF and are available in Quad-Tap®, Tri-Tap® and 480 volt. For 50 Hz ballast, consult factory.
- Available in bronze, black, and gray powder paint finishes.

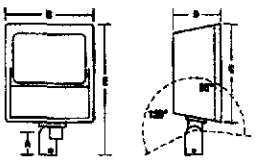
LISTINGS

- UL 1598 listed and CSA certified for use in wet locations.

MHP



MHK



	A	B	C	D	E	F	G	H	I	J
MHP	3⅛"	16⅜"	20⅛"	9"	17⅞"	17/32"	⅞"	1 9/16"	12" R	8⅝" R
	79 mm	416 mm	511 mm	229 mm	454 mm	13 mm	22 mm	40 mm	305 mm	219 mm
MHK	5½"	16⅜"	25½"	9"	17⅞"					
	140 mm	416 mm	648 mm	229 mm	454 mm					

ORDERING INFORMATION

ORDERING EXAMPLE

MH	P	0400	H	3	6	8	F(1)
Series	Mounting	Wattage	Source	High Power Factor	Beam	Voltage	Options

MHP/MHK SERIES

Catalog Number	Catalog Number	Photometry	Watts	Weight		EPA	
MHP	MHK[1]	NEMA/IES					
Trunnion Mount	Slipfitter Mount	H° x V°		lbs	kg	ft²	m²
		METAL HALIDE					
MHP-0400H-336	MHK-0400H-336	3(44°) x 3(37°)	400	32	14.5	2.3	.22
MHP-0400H-360	MHK-0400H-360	5(83°) x 5(86°)	400	32	14.5	2.3	.22
		HIGH PRESSURE SODIUM					
MHP-0400S-236	MHK-0400S-236	5(73°) x 3(32°)	400	43	19.5	2.3	.22
MHP-0400S-260	MHK-0400S-260	6(114°) x 6(108°)	400	43	19.5	2.3	.22

1 MHK slipfitter 2⅜" O.D.
NOTE: Lamps are not included. All ballasts are HPF and Quad-Tap® 120/208/240/277V. For 480V, change last digit 6 to 8. For Tri-Tap® 120/277/347V, change last digit 6 to 9.
For 220/240V 50 Hz, consult factory. Order mounting accessories separately.

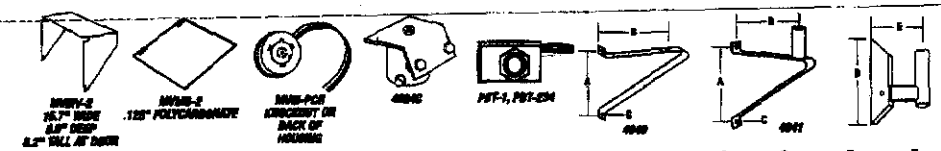
ORDERING INFORMATION

OPTIONS (add appropriate suffix)

Catalog Number	Description
-CFB	Charcoal Filter Breather
-F(XXX)	Fusing - single 120/277/347V; double 208/240/480V; fuse included (specify voltage)
-PCR(XXX)	Twist-Lock® Photocontrol Receptacle, specify voltage (photocontrol ordered separately)
-SO(XXX)	16/3 jrt-wired S.O. Cord - replace X with cord length desired: 3 - 3 ft.; 6 - 6 ft.; 12 - 12 ft.; specify voltage; not available in knuckle style mounting
-L	Unit with Lamp (shipped separately - not installed)
-WG	Gray Leldrocote® finish
-WB	Black Leldrocote® finish

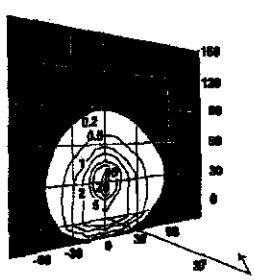
ACCESSORIES (order as separate part #)

Catalog Number	Description
MVM-2	Aluminum Top Visor, 6" deep, bronze finish
MVMS-2	.125" Polycarbonate Shield
MVM-PCR	Photocontrol Receptacle Kit (order PTL twistlock cell separately)
4040	Steel Slipfitter for MVM, mounts over 2⅜" OD tenons
PST-1	Button Photocontrol 120 volt (knockout on back & door)
PST-234	Button Photocontrol 208, 240, 277 volt
4040	Steel Angle Bracket for MVM, bronze finish
4041	Steel Angle Bracket with 2⅜" OD tenon for MVK, bronze finish
TWE-11	Steel Wall Bracket with decorative 2⅜" OD tenon for MVK, bronze finish

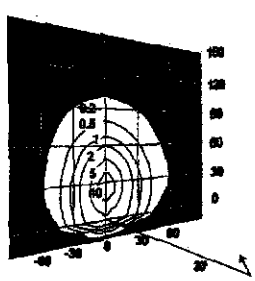


A	B	C	D	E	F
8¼"	9½"	11/16"dia.	11"	8"	8"
210 mm	241 mm	17.4 mm	279 mm	203 mm	203 mm

PHOTOMETRICS For additional photometric information and IES downloads, visit our web site at www.hubbell-lig.com



MAGNULITER MHP
MHP-0400H-33X



MAGNULITER MHP
MHP-0400H-36X

PHOTOMETRIC REPORTS

Catalog Number	Report #
MHX-0400H-36X	[illegible]
MHX-0400H-33X	[illegible]
MHX-0400S-26X	[illegible]
MHX-0400S-23X	[illegible]

Due to our continued efforts to improve our products, product specifications are subject to change without notice.

Outdoor Lighting

Hubbell Outdoor Lighting • 101 Corporate Drive • Spartanburg, SC 29303 • PHONE: 864-599-6000
For more information visit our web site: www.hubbell-lig.com

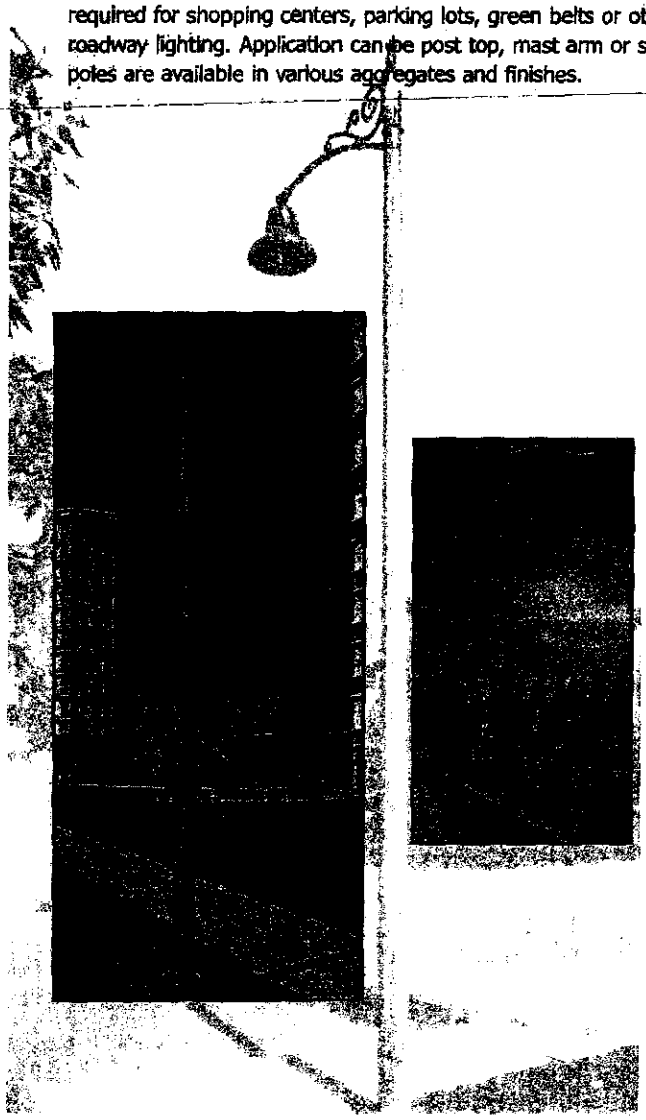
Copyright © [illegible] All Rights Reserved [illegible] Printed in USA

AMERON INTERNATIONAL

Centrecon Series

"M" Medium Octagonal Pole - Embedded

Ameron Centrecon Series "M" prestressed concrete lighting poles provide the light pattern required for shopping centers, parking lots, green belts or other areas requiring decorative and roadway lighting. Application can be post top, mast arm or side mounted. These strong, durable poles are available in various aggregates and finishes.



General Information

Ameron's Centrecon Series poles are symmetrically tapered spun-cast, prestressed concrete shafts for either base mounted or embedded installations to provide dense, high strength, centrifugally cast concrete with high-tensile, solid steel prestressing wires, uniformly wrapped with spiral welded wire cage at a controlled pitch for torsional reinforcement. Ameron poles conform to applicable sections of ACI, AASHTO, ASTM and UBC standards.

Surface Treatment

The concrete shafts are lightly blasted to expose the texture and beauty of the natural and terrazzo aggregates while maintaining sharp definition of details and patterns.

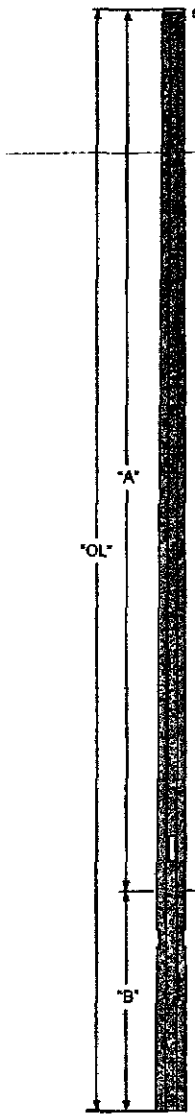
Colors and Finishes

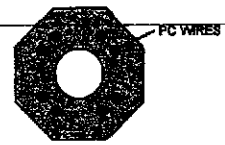
Standard, pre-formulated and custom aggregate colors are available. See separate aggregate sheet for details. Ameron offers Amershield ™, a premium graffiti-resistant coating, plus an assortment of durable sealers and protectants that further enhance colors, protect the concrete surface and aid in the removal of graffiti.

AMERON INTERNATIONAL

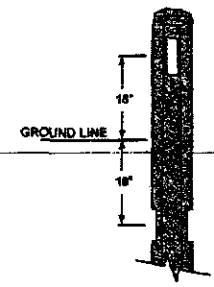
Centrecon Series

MEO - Medium Embedded Octagonal Pole





SHAFT CROSS SECTION DETAIL



ELEVATION

EMBEDDED STYLE - ORDERING INFORMATION

CATALOG NUMBER	POLE HEIGHT "A"	BASE O.D	EMBEDDED DEPTH "B"	OVERALL LENGTH "OL"	ULTIMATE G.L. MOMENT (FT. LBS.)	WEIGHT (LBS.)	MAXIMUM EPA/MPH (SQ FT)* 80	90	100
MEO-3	9'-10"	6-13/16"	4'-3"	14'-1"	15,450	380	14.0	10.5	8.0
MEO-5	16'-5"	7-1/2"	4'-3"	20'-8"	16,450	690	13.0	10.5	8.0
MEO-5.5	18'-0"	7-7/8"	5'-0"	23'-0"	17,000	720	13.0	10.0	7.5
MEO-6	19'-7"	8"	4'-3"	23'-10"	17,440	750	12.0	9.0	6.0
MEO-7	23'-0"	9-3/8"	4'-7"	27'-7"	19,030	900	10.5	8.0	4.5
MEO-7.5	24'-7"	8-9/16"	4'-11"	29'-6"	19,910	980	9.5	6.0	3.5
MEO-8	26'-3"	8-13/16"	4'-11"	31'-2"	20,790	1,100	8.5	5.5	3.0
MEO-8.5	27'-11"	9"	4'-11"	32'-10"	21,660	1,250	7.5	4.5	2.0
MEO-9	29'-6"	9-1/4"	5'-3"	34'-9"	22,540	1,300	6.0	3.5	1.0
MEOX-10	32'-10"	9-3/4"	5'-7"	38'-5"	30,900	1,500	11.0	8.0	4.0
MEOX-10.5	34'-5"	10"	5'-11"	40'-7"	32,500	1,600	10.0	7.0	3.0

*EPA based on post top mounting. Consult your representative for other attachment methods and increased load capacity requirements.

Notes:

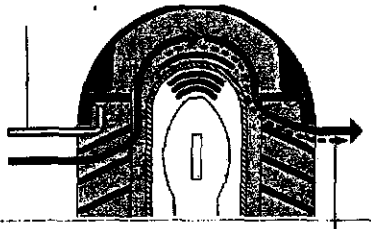
SPECIFICATIONS
Use Centrecon Specifications.

LUMINAIRE MOUNTING
See Technical-Mounting Options Section for more information

COLORS & FINISHES
See Color Selection Guide

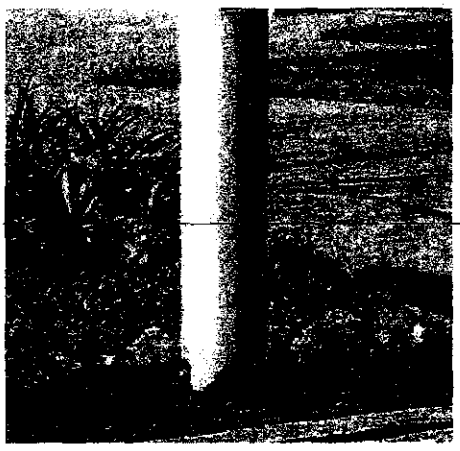
ANTI-GRAFFITI & SEALER
Optional Coatings available for added protection

Manufacturer reserves the right to alter the product design without prior notice. Consult Ameron or authorized representative for additional information. 1/02



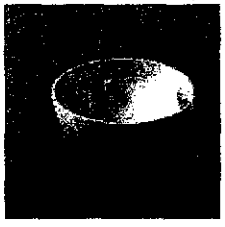
Air Cooling

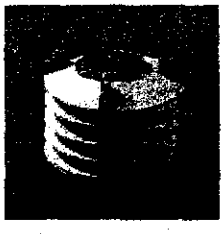
Natural air currents provide flow-through ventilation, cooling the exterior metal surfaces and interior optical compartment, thereby minimizing excessive heat build-up.



Vandal Resistant Construction

Luminaire components are heavy-wall aluminum castings. The louver module is a one-piece casting which provides greater strength than individually stacked louvers



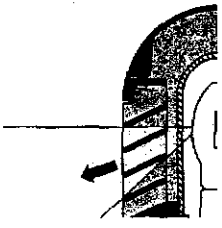


Shadowless Lighting

Internal flutes in the glass lamp enclosure eliminate shadows by refracting light around structural supports and vertical louvers.

65° Louver Angle

Compact glass lamp enclosure allows deep horizontal louvers with a high angle for greater light throw. Close vertical spacing eliminates direct viewing of the light source above horizontal, ensuring glare-free, efficient illumination. The louver also produces total source cutoff above 90°. The high-angle light throw provides excellent light uniformity and wide fixture spacing.

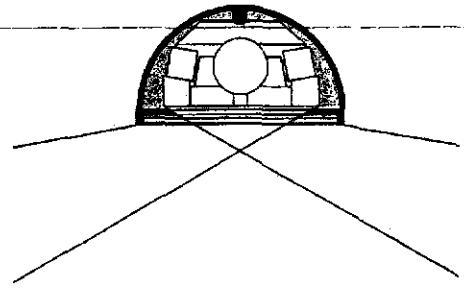


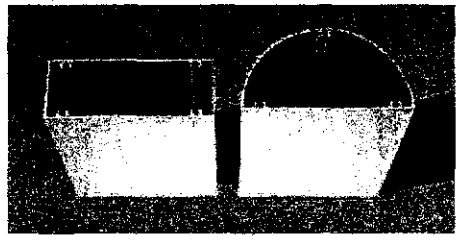
Internally fluted, tempered and gasketed glass lamp enclosure.

KIM LIGHTING

Heavy-wall Cast Aluminum Heads

Site Lightforms fixtures are specifically designed and engineered to combine contemporary form with rugged vandal-resistant construction. Low level luminaires are often subject to abuse because of their proximity to pedestrian traffic. To combat this, all fixture heads are heavy-wall one-piece aluminum castings. Site Lightforms use concealed mechanical head-to-shaft connections for greater strength and clean detailing.



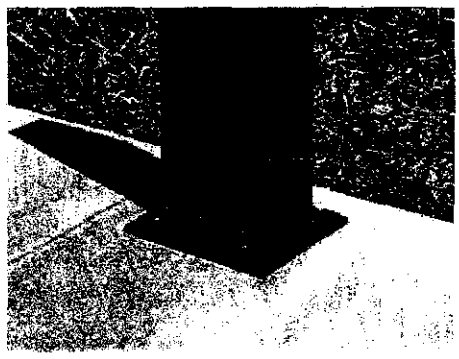


One-Piece Extruded Aluminum Shafts

To achieve a clean sharp-cornered architectural appearance with superior strength, all Site Lightforms shafts are one-piece heavy-wall aluminum extrusions. Integral mounting tracks are incorporated for mechanical attachment of the head and base, which provides superior strength over welding.

Low Profile, High Strength Base

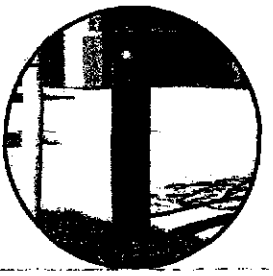
The Site Lightforms mounting base is unique in the lighting industry, combining superior strength with a low-profile design. The shaft-to-base attachment is by concealed bolts threaded into the shaft extrusion. Kim tests show this method to be twice the strength of a welded connection. Anchor bolts are provided with couplings, allowing standard black stainless steel bolts to secure the base and eliminate unsightly protruding anchor bolts.



Complimentary wall mounted Site Wallforms are available on page 888.

KN-VRB1

KimNOW!® Vandal Resistant Bollard 100MH



Specifications

Top Cap: One-piece aluminum casting ⅜" minimum thickness, secured to louvers by concealed allen screws in keyhole slots. For relamping access, allen screws shall not require complete removal.

Louvers: One-piece aluminum casting with vertical support ribs at 90° intervals. Horizontal louver blades shall have a 1¾" depth, a 65° upward pitch and provide light source cutoff above horizontal. Louver casting shall be secured to shaft by four internal tie rods.

Lamp Enclosure: One-piece tempered molded glass with internal flutes and full gasketing at bottom edge.

Socket: Porcelain medium base socket rated 4KV

Fixture Head: Allows flow-through ventilation around and above the lamp enclosure.

Shaft: One-piece extruded aluminum, .125" wall thickness with a heavy cast aluminum twist-lock anchor base concealed within the shaft. Concealed set screws shall lock shaft onto the cast anchor base.

Ballast: High power factor ballasts are mounted to the anchor base and are factory prewired. Wiring shall be supplied from the socket for field connection to the prewired ballast components. Starting temperatures are -20°F.

Anchor Bolts: Four ⅜" x 10" + 2" zinc plated L-hooks, each with two nuts, washers and a rigid pressed board template.

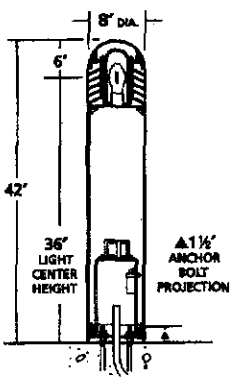
Finish: Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness, applied over a Titanated Zirconium conversion coating; 2500 hour salt spray test endurance rating

CAUTION: Fixtures must be grounded in accordance with national, state and/or local electrical codes. Failure to do so may result in serious personal injury.

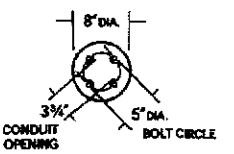
Listings and Ratings		
UL cUL 1598	-	25C Ambient
IP46 Rated	CE	ISO 9001:2000
CO = Cut Off		

Dimensions

KN-VRB1 Models
100 Watt Metal Halide
Medium Base Lamp



Base Plan



KIM LIGHTING

Refer to pages 858-859 for Kim Lighting's Theory of Relativity

Ordering Information

Catalog Number:

Fixtures provided with the following lamp:

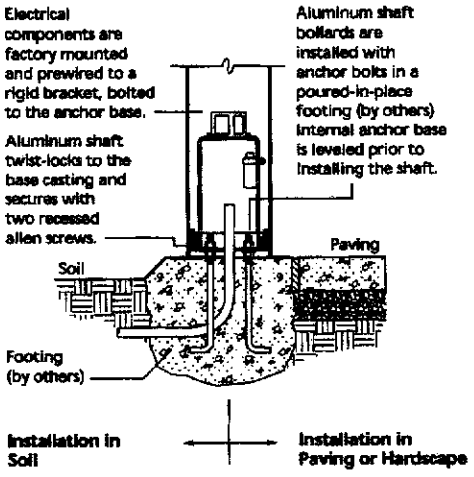
100MH - 100W Coated Universal ED17 Metal Halide 120/208/240/277 Volt Ballast

See photometrics on page 887.

See lamp and electrical data on page 902.

Lamp	Color	Fixture Order Number
100MH	Dark Bronze	KN-VRB1-60DB
	White	KN-VRB1-60WH

NOTE: All fixtures provided with multi-tap ballasts for 120, 208, 240 and 277 Volt operation, factory pre-wired for 277 Volt connection. Connection to other voltages completed in field by installer.

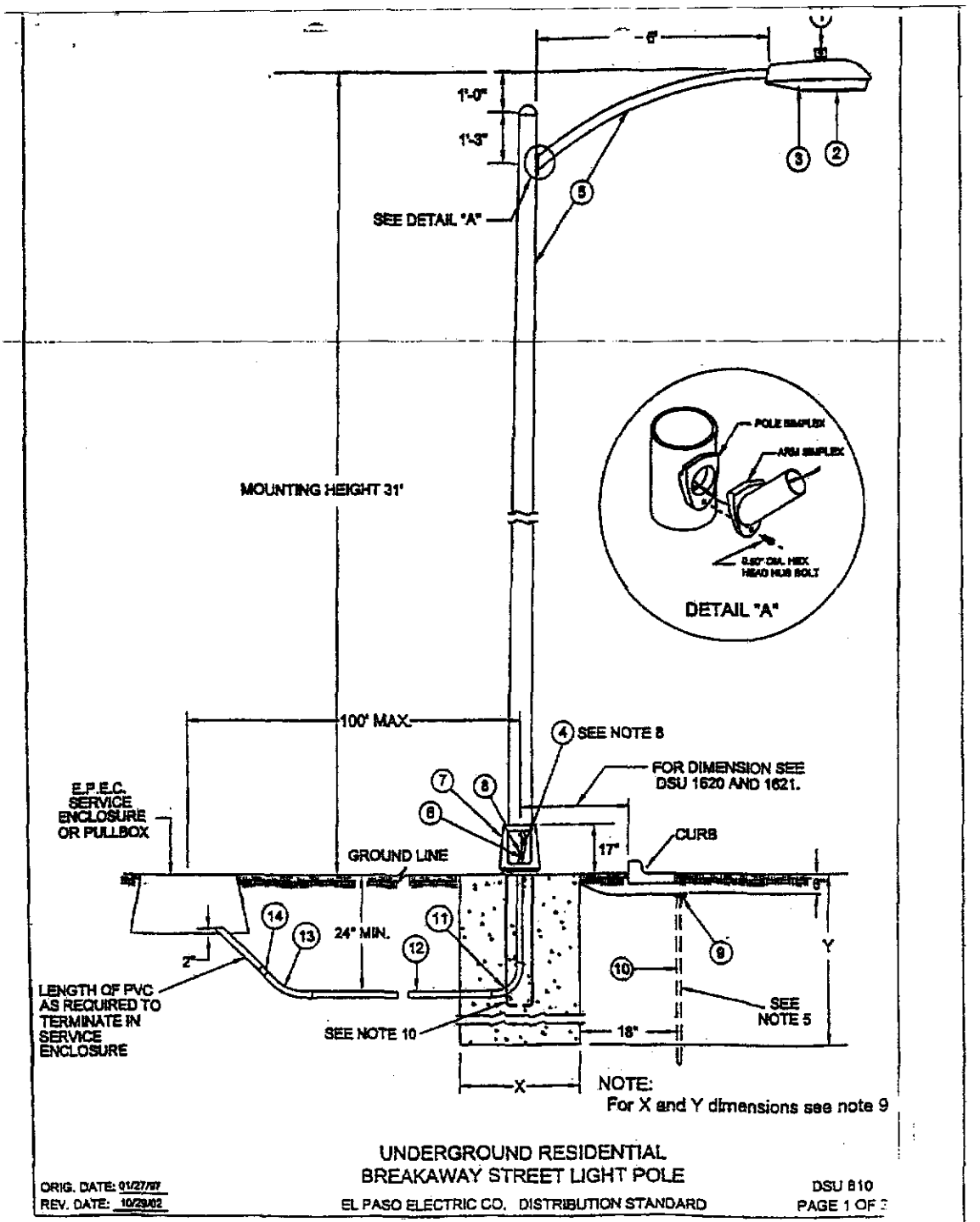


KIM LIGHTING

EL PASO ELECTRIC COMPANY STREET LIGHTING

CUT-SHEETS

Pages 128 - 149


1'-0"
1'-3"
SEE DETAIL "A"
MOUNTING HEIGHT 31'
DETAIL "A"
100' MAX.
SEE NOTE 8
FOR DIMENSION SEE DSU 1620 AND 1621.
E.P.E.C. SERVICE ENCLOSURE OR PULLBOX
GROUND LINE
CURB
17"
24" MIN.
2"
LENGTH OF PVC AS REQUIRED TO TERMINATE IN SERVICE ENCLOSURE
SEE NOTE 10
18"
SEE NOTE 5
Y
X
NOTE:
For X and Y dimensions see note 9
UNDERGROUND RESIDENTIAL
BREAKAWAY STREET LIGHT POLE
ORIG. DATE: 01/27/97
REV. DATE: 10/29/02
EL PASO ELECTRIC CO. DISTRIBUTION STANDARD
DSU 810
PAGE 1 OF 2

ITEM No.	DESCRIPTION	STOCK/DSU No.	Qty.	C/U Code	MACRO Code
1	PHOTO CELL, 240 V - SEE NOTE 1	21-225	1	LCOBRAHD	LSTEELUG
2	HPS LAMP, 100W	21-065	1		
3	LUMINAIRE, 100W H.P.S.	21-335	1		
4	SLEEVES, #12-10	05-140	2		
5	STEEL POLE 31' STREET LIGHT	09-300	1	L31STLUG	
6	CABLE, #10, 2 CONDUCTOR	13-600	40'	L2C#10S	
7	ALUMINUM TRANSFORMER BASE	21-511	1	LTBASE	
8	BREAKAWAY FUSES 30 AMP	21-250	2	LBRKFUSE	
9	5/8" GROUND ROD CLAMP	07-461	1	LGRNDROD	
10	5/8" X 10' CU BONDED GROUND ROD	08-625	1		
11	1" PVC 90 DEGREE ELBOW	17-297	1	LEL901	
12	1" PVC CONDUIT	17-299	AS REQ	LPVC1	
13	1" PVC 45 DEGREE ELBOW	17-298	1	LEL451	
14	1" PVC COUPLING	17-296	1	LCPLG1	

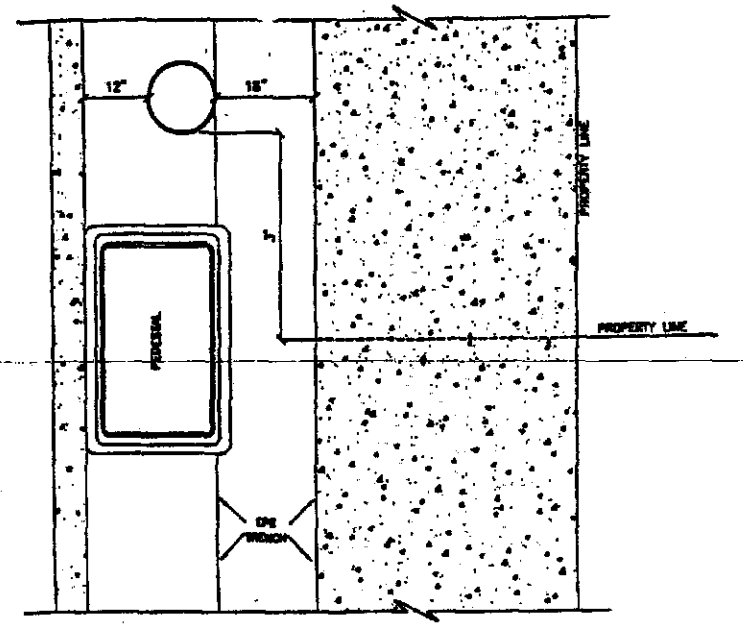
15 Add 2 - 10 amp fuses

NOTES:

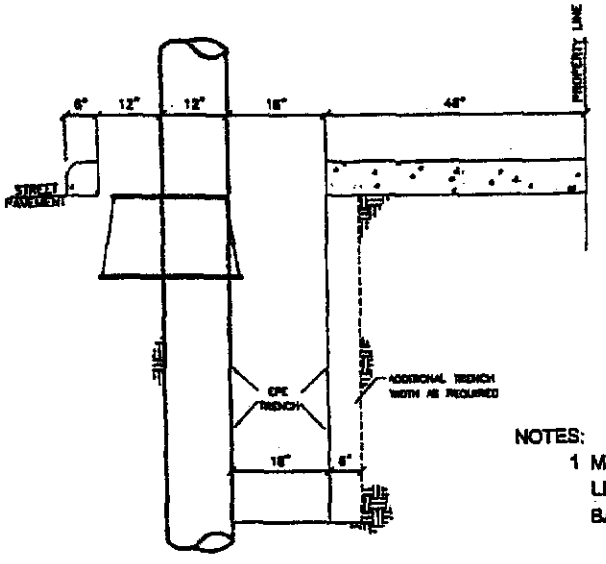
1 MOUNT SO THAT PHOTO CELL IS FACING NORTH.
2 INSTALLATION MUST COMPLY WITH LOCAL CODE REQUIREMENTS.
3 STEEL POLE TO HAVE A BREAKAWAY BASE AS REQUIRED BY THE CITY OF EL PASO.
4 POLE SHALL BE GROUNDED AS REQUIRED BY N.E.C. LATEST EDITION.
5 A GROUND ROD MUST BE USED.
6 LOCK WASHERS MUST BE INCLUDED ON ALL ANCHOR BOLTS.
7 FOR ANY CLARIFICATION, EXCEPTIONS OR QUESTIONS REGARDING THIS STANDARD, CALL THE EL PASO ELECTRIC COMPANY DISTRIBUTION DESIGN DEPARTMENT.
8 ITEM # 4 SLEEVES AND ITEM # 6 CABLE, ARE LOCATED INSIDE STEEL POLE.
9 FOUNDATION DIMENSIONS ARE AS FOLLOWS:

	DIAMETER: (X)	DEPTH: (Y)
NORMAL SOIL	24"	72"
ROCKY SOIL	24"	60"

10 4 - ANCHOR BOLTS WITH 4" HOOKS, THREAD END GALVANIZED 1" DIA. X 36" LONG, EACH BOLT FURNISHED WITH 2 HEX NUTS AND 2 FLAT WASHERS ARE SUPPLIED WITH THE STEEL POLE.
11 ON STREETS WHERE SIDEWALK IS ADJACENT TO CURB, STREET LIGHT POLE SHALL BE INSTALLED IN THE SIDEWALK NEXT TO PROPERTY LINE. 36 INCHES ADA REQUIREMENT FROM BACK OF CURB TO FACE OF POLE MUST BE MET.



AERIAL VIEW



FRONT VIEW

NOTES:

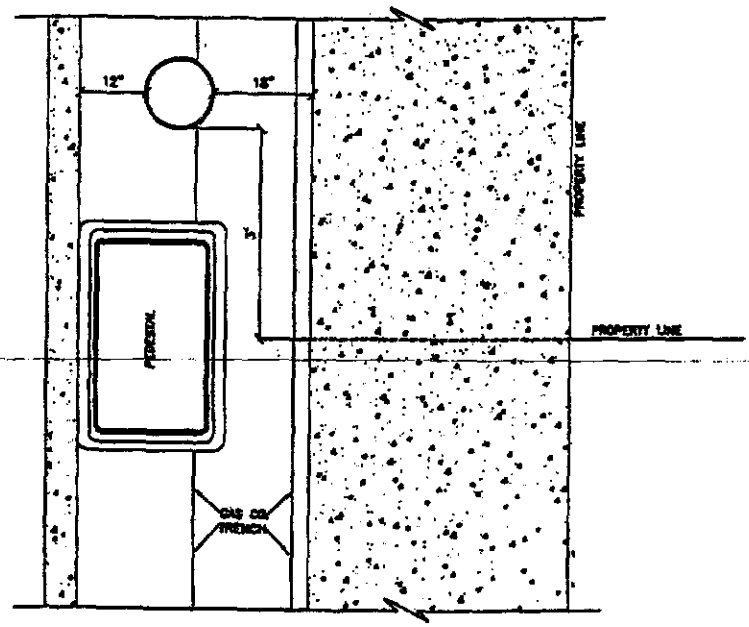
1 MINIMUM LOCAL RESIDENTIAL STREET LIGHT POLE DISTANCE IS 12" BEHIND BACK OF CURB.

TYPICAL (PRIMARY) TRENCH LOCATION ON LOCAL RESIDENTIAL STREET

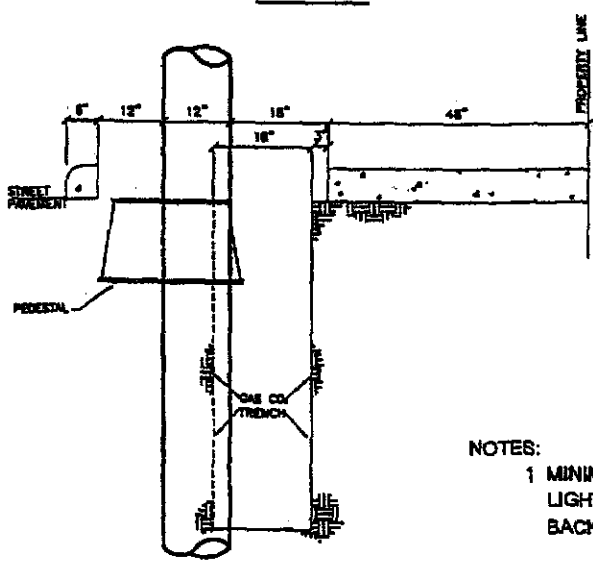
ORIG. DATE: 10/29/02
REV. DATE: _____

EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 1620
PAGE 1 OF 2



AERIAL VIEW



FRONT VIEW

NOTES:

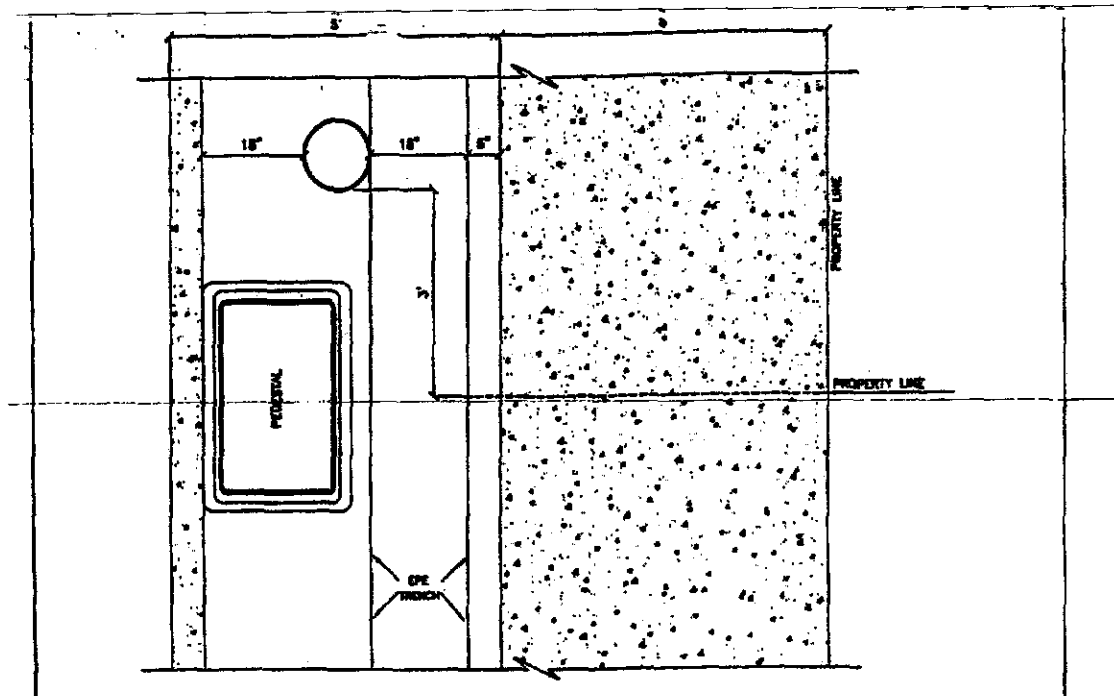
1 MINIMUM LOCAL RESIDENTIAL STREET LIGHT POLE DISTANCE IS 12" BEHIND BACK OF CURB.

TYPICAL (GAS COMPANY) TRENCH LOCATION ON LOCAL RESIDENTIAL STREET

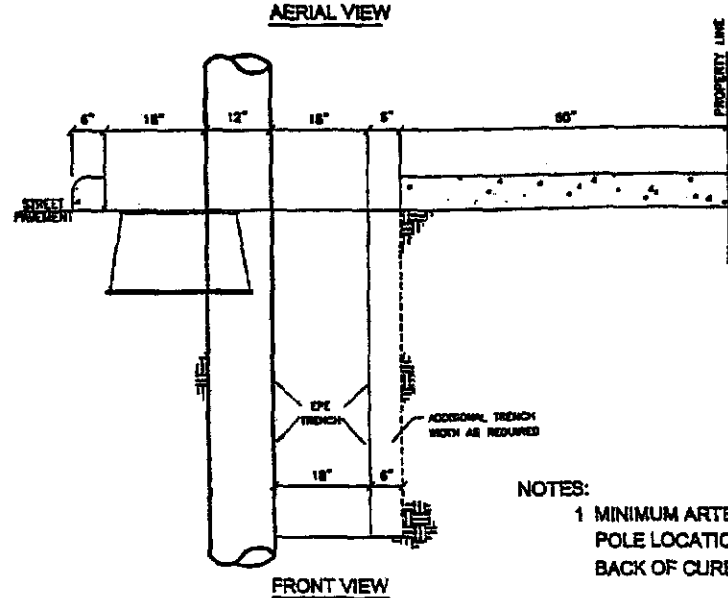
ORIG. DATE: 11/03/93
REV. DATE: 10/24/02

EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 1520
PAGE 2 OF 2



AERIAL VIEW



FRONT VIEW

NOTES:

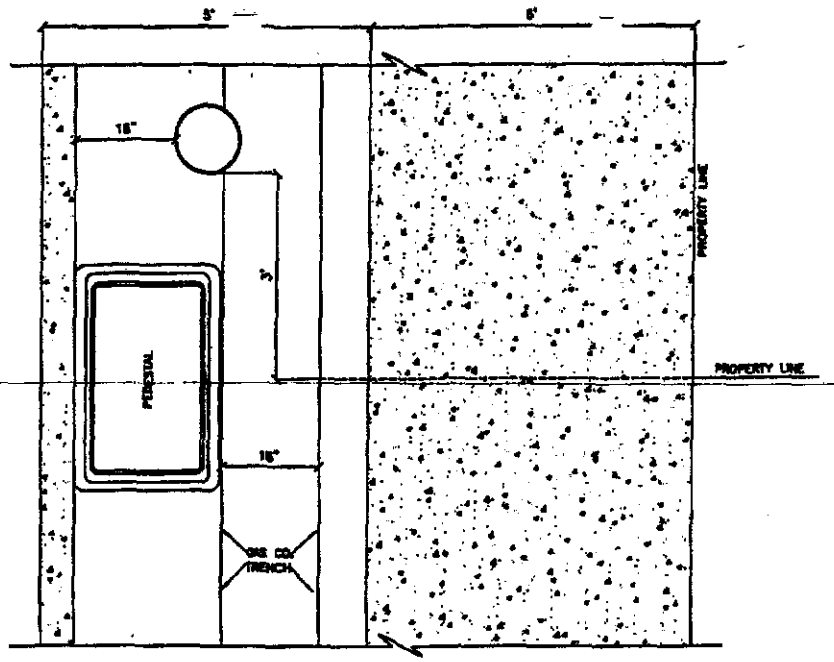
1 MINIMUM ARTERIAL STREET LIGHT POLE LOCATION IS 18" BEHIND BACK OF CURB.

TYPICAL (PRIMARY) TRENCH LOCATION ON ON ARTERIAL STREET

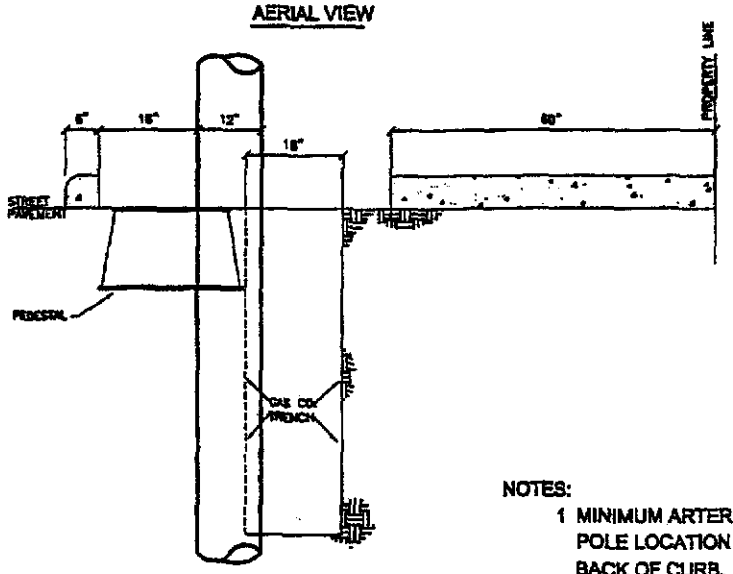
ORIG. DATE: 10/29/02
REV. DATE: _____

EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 1821
PAGE 1 OF 2



AERIAL VIEW



FRONT VIEW

NOTES:

1 MINIMUM ARTERIAL STREET LIGHT POLE LOCATION IS 18" BEHIND BACK OF CURB.

TYPICAL (GAS COMPANY) TRENCH LOCATION ON ON ARTERIAL STREET

ORIG. DATE: 11/03/83
REV. DATE: 10/24/02

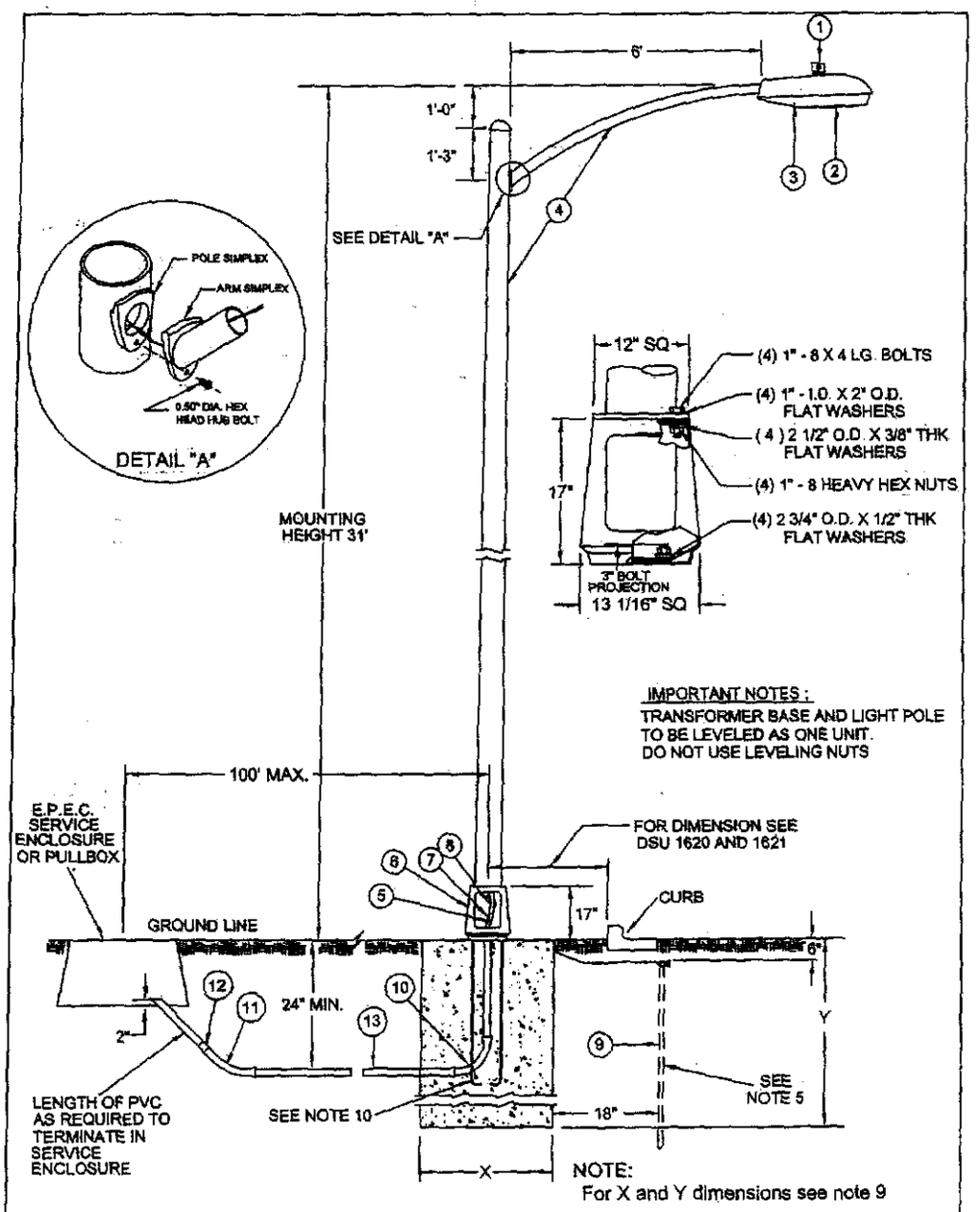
EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 1621
PAGE 2 OF 2

Street Lighting Standards Information Packet

The following information contains construction standards, material standards and equipment specifications for City of El Paso street lights that are maintained by the El Paso Electric Company. If additional information is required, please contact the EPE Distribution Standards Group at (915) 547-5711.

EL PASO ELECTRIC COMPANY DISTRIBUTION STANDARDS	Description CONSTRUCTION AND MATERIAL SPECIFICATIONS FOR STREET LIGHTING	Appr.	Rev.06/28/05
			08/07/03


6'
1'-0"
1'-3"
SEE DETAIL "A"
POLE SIMPLEX
ARM SIMPLEX
0.50" DIA. HEX HEAD HUB BOLT
DETAIL "A"
MOUNTING HEIGHT 31'
12" SQ
(4) 1" - 8 X 4 LG. BOLTS
(4) 1" - I.D. X 2" O.D. FLAT WASHERS
(4) 2 1/2" O.D. X 3/8" THK FLAT WASHERS
(4) 1" - 8 HEAVY HEX NUTS
(4) 2 3/4" O.D. X 1/2" THK FLAT WASHERS
17"
3" BOLT PROJECTION
13 1/16" SQ
IMPORTANT NOTES :
TRANSFORMER BASE AND LIGHT POLE TO BE LEVELED AS ONE UNIT.
DO NOT USE LEVELING NUTS
100' MAX.
E.P.E.C. SERVICE ENCLOSURE OR PULLBOX
FOR DIMENSION SEE DSU 1620 AND 1621
CURB
GROUND LINE
24" MIN.
2"
6"
Y
SEE NOTE 5
LENGTH OF PVC AS REQUIRED TO TERMINATE IN SERVICE ENCLOSURE
SEE NOTE 10
18"
X
NOTE:
For X and Y dimensions see note 9
UNDERGROUND RESIDENTIAL
BREAKAWAY STREET LIGHT POLE
ORIG. DATE: 01/27/97
REV. DATE: 06/28/05
EL PASO ELECTRIC CO. DISTRIBUTION STANDARD
DSU 810
PAGE 1 OF 2

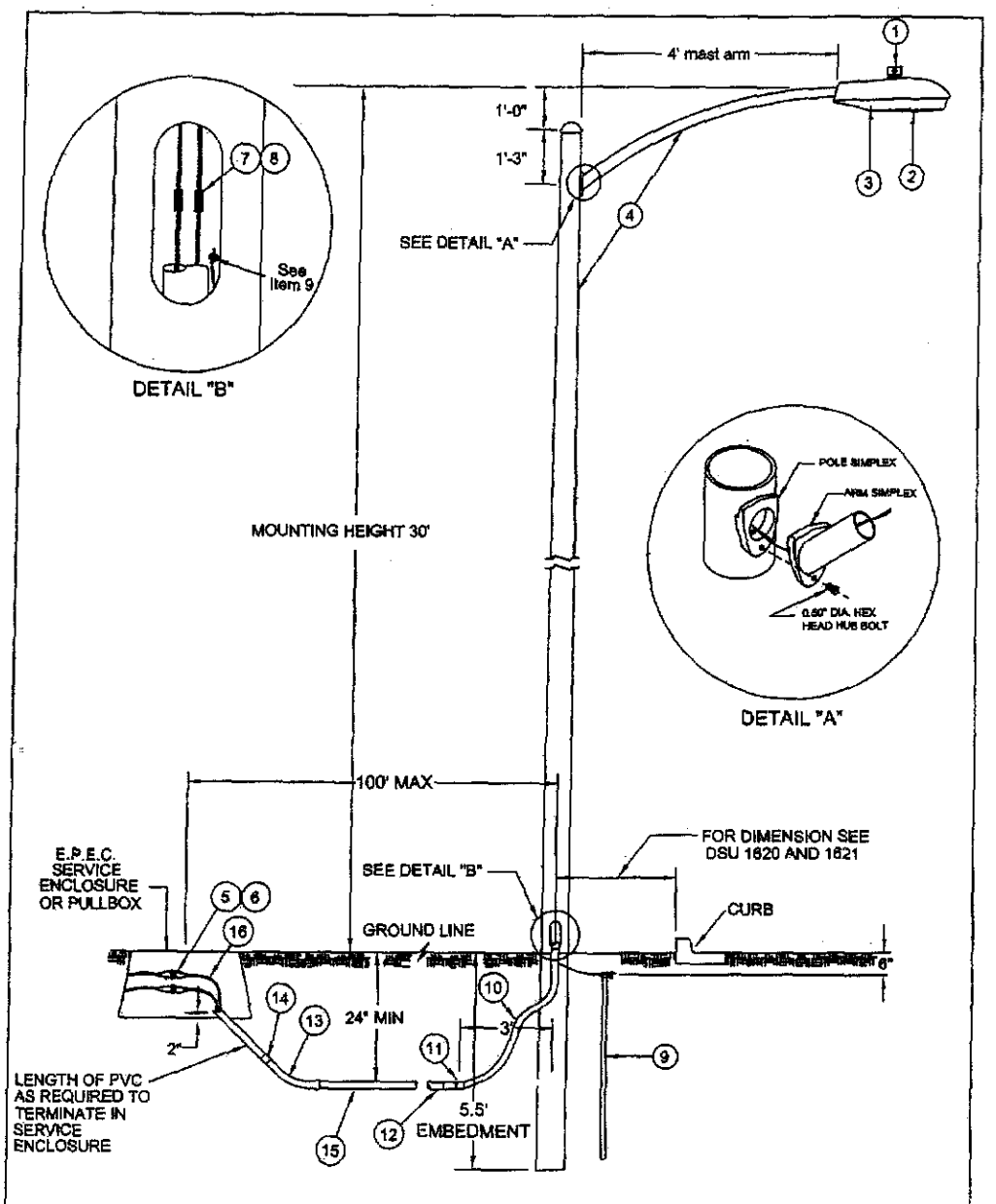
ITEM No.	DESCRIPTION	STOCK/DSU No.	Qty.	C/U Code	MACRO Code
1	PHOTO CELL, 240 V - SEE NOTE 1	21-225	1	LCOBRAHD	LSTEELUG
2	HPS LAMP, 100W	21-085	1		
3	LUMINAIRE, 100W H.P.S.	21-335	1		
4	STEEL POLE 31' STREET LIGHT	09-300	1	L31STLUG	
5	CABLE, # 2 CU SOLID, 600V, RED	13-702	80'	LC#12CU	
6	ALUMINUM TRANSFORMER BASE	21-611	1	LTBASE	
7	BREAKAWAY FUSES 30 AMP	21-250	2	LBRKFUSE	
8	CURRENT LIMITING FUSE	21-240	2	LFUSE10A	
9	5/8" X 10" CU BONDED GROUND ROD	08-626	1	LGRNDROD	
	5/8" GROUND ROD CLAMP	07-461	1		
	TRANSFORMER GROUND CLAMP	04-100	1		
	# 4 BARE COPPER WELD	12-106	6'		
10	1" PVC 90 DEGREE ELBOW	17-297	1	LEL901	
11	1" PVC 45 DEGREE ELBOW	17-298	1	LEL451	
12	1" PVC COUPLING	17-296	1	LCPLG1	
13	1" PVC CONDUIT	17-299	AS REQ	LPVC1	

NOTES:

1 MOUNT SO THAT PHOTO CELL IS FACING NORTH.
2 INSTALLATION MUST COMPLY WITH LOCAL CODE REQUIREMENTS.
3 STEEL POLE TO HAVE A BREAKAWAY BASE AS REQUIRED BY THE CITY OF EL PASO
4 POLE SHALL BE GROUNDED AS REQUIRED BY N E C LATEST EDITION
5 A GROUND ROD MUST BE USED
6 LOCK WASHERS MUST BE INCLUDED ON ALL ANCHOR BOLTS
7 FOR ANY CLARIFICATION, EXCEPTIONS OR QUESTIONS REGARDING THIS STANDARD, CALL THE EL PASO ELECTRIC COMPANY DISTRIBUTION DESIGN DEPARTMENT
8 CONCRETE FOUNDATION DIMENSIONS ARE AS FOLLOWS:

	DIAMETER: (X)	DEPTH: (Y)
NORMAL SOIL	24"	72"
ROCKY SOIL	24"	60"

9 CONCRETE FOR FOUNDATION SHALL BE 3000 PSI. 3/4" ROCK AGGREGATE AND HAVE A 5" SLUMP.
10 4 - ANCHOR BOLTS WITH 4" HOOKS, THREAD END GALVANIZED 1" DIA. X 36" LONG, EACH BOLT FURNISHED WITH 2 HEX NUTS AND 2 FLAT WASHERS ARE SUPPLIED WITH THE STEEL POLE.
11 ON STREETS WHERE SIDEWALK IS ADJACENT TO CURB, STREET LIGHT POLE SHALL BE INSTALLED IN THE SIDEWALK NEXT TO PROPERTY LINE. 36 INCHES REQUIRED FROM BACK OF CURB TO COMPLY WITH AMERICAN DISABILITY'S ACT AND LOCAL CODES



DIRECT EMBEDDED STANDARD
FOR RESIDENTIAL STREET LIGHTING

ORIG. DATE: 09/19/03
REV. DATE: 06/28/05

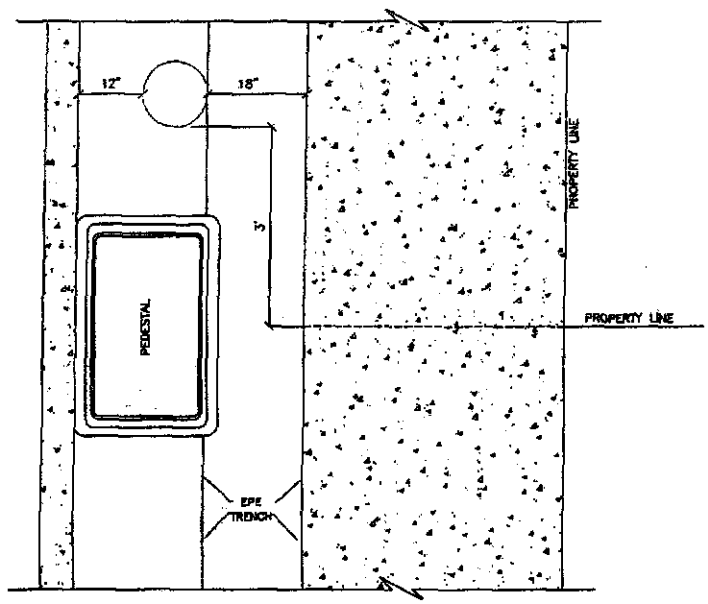
EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 815
PAGE 1 OF 2

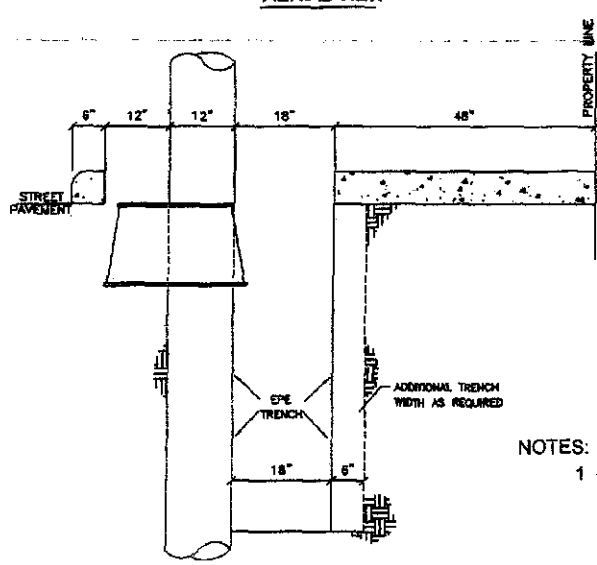
ITEM No.	Direct Embedded SL Standard	STOCK/DSU No.	Qty.	C/U Code	MACRO Code
1	PHOTO CELL, 240 V - SEE NOTE 1	21-225	1	LCOBRAHD	LSTLDEUG
2	HPS LAMP, 100W	21-085	1		
3	LUMINAIRE, 100W H.P.S.	21-335	1		
4	D. E. STANDARD, 34' 6" WITH 4' MAST ARM	09-310	1	L34STLUG	
5	FUSE 10A	21-240	2	LFUSE10A	
6	FUSEHOLDER - 30A -SUBMERSIBLE	21-246	2	LFUSEHSB	
7	COPPER CABLE, #12, SOLID, 600V, RED	13-702	70'	LC#12CU	
8	BUTT SPLICE, # 12 - # 12	05-140	2	LSLV1210	
9	5/8" X 10" CU BONDED GROUND ROD	08-626	1	LGRNDROD	
	5/8" GROUND ROD CLAMP	07-461	1		
	TRANSFORMER GROUND CLAMP	04-100	1		
	# 4 BARE COPPER WELD	12-106	6'		
10	1" PVC FLEX CONDUIT	21-527	6'	LPVCFLX1	
11	1" PVC FLEX CONDUIT FITTING	21-214	1	LFLXFIT1	
12	1 " PVC FEMALE ADAPTER	17-295	1	LFADAPT1	
13	1" PVC 45 DEGREE ELBOW	17-298	1	LEL451	
14	1" PVC COUPLING	17-296	1	LCPLG1	
15	1" PVC CONDUIT	17-299	AS REQ	LPVC1	
16	COPPER CABLE, #12, SOLID, 600V, RED	13-702	AS REQ	LC#12CU	

NOTES:

1. MOUNT SO THAT PHOTO CELL IS FACING NORTH
2. INSTALLATION MUST COMPLY WITH LOCAL CODE REQUIREMENTS
3. FOR ANY CLARIFICATION, EXCEPTIONS OR QUESTIONS REGARDING THIS STANDARD, CALL THE EL PASO ELECTRIC COMPANY DISTRIBUTION DESIGN DEPARTMENT.
4. ON STREETS WHERE SIDEWALK IS ADJACENT TO CURB, STREET LIGHT POLE SHALL BE INSTALLED IN THE SIDEWALK NEXT TO PROPERTY LINE 36 INCHES REQUIRED FROM BACK OF CURB TO COMPLY WITH AMERICAN DISABILITY'S ACT AND LOCAL CODES



AERIAL VIEW



FRONT VIEW

NOTES:

1 MINIMUM LOCAL RESIDENTIAL STREET LIGHT POLE DISTANCE IS 12" BEHIND BACK OF CURB

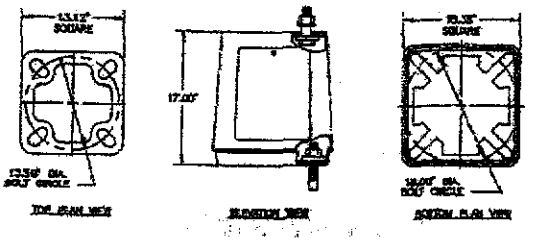
TYPICAL EL PASO ELECTRIC TRENCH LOCATION
ON LOCAL RESIDENTIAL STREET

ORIG. DATE: 10/29/02
REV. DATE: 12/04/02

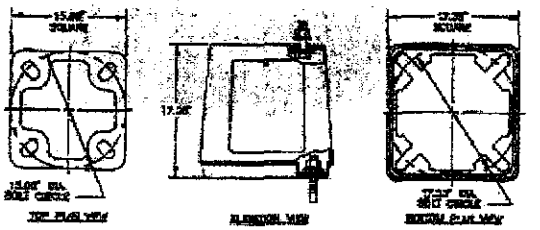
EL PASO ELECTRIC CO. DISTRIBUTION STANDARD

DSU 1620
PAGE 1 OF 2

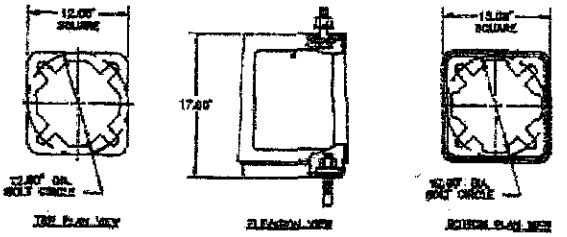
COMMENTS	EPEC STOCK NO.	MANUFACTURER & CATALOG NUMBER VALMONT
ALUMINUM BASE	21-608	M093
ALUMINUM BASE	21-610	M098
ALUMINUM BASE	21-611	M104



21-608



21-610



21-611

GENERAL NOTES

1. Bases shall be AASHTO & FANA approved.

EL PASO ELECTRIC COMPANY Material Standards	Description BREAKAWAY BASES FOR STREET LIGHTING	Appr.	Rev.
		page 1 of 1	21-608

COMMENTS	EPEC STOCK NO.	MANUFACTURER & CATALOG NUMBER CARLON
1" DIA.	21-214	LT43F

GENERAL NOTES

1. Straight Conduit Fitting shall be used with flexible non-metallic conduit for direct embedded Street Light.
2. Straight Conduit Fitting shall be used with Street Light Standard G&I 09-130.

EL PASO ELECTRIC COMPANY	Description	Appr.	Rev.4/2004
Material Standards	CONDUIT FITTING	page 1 of 1	21-214

EL PASO ELECTRIC COMPANY

SPECIFICATIONS FOR DISTRIBUTION POLES

1.0 SCOPE

1.1 These specifications cover wood poles, 35 feet through 55 feet in length, to be used on the El Paso Electric Company distribution system. The material, size, quality, conditioning, treatment, manufacture, and handling of these wood poles are specified herein (G&I #'s 009-030 through 009-055).

1.2 Wood Poles furnished by a supplier or manufacturer under this specification shall conform to the latest edition of the American National Standards Institute (ANSI) "Specifications and Dimensions for Wood Poles" (ANSI No. 05.1), or its successors unless otherwise specified herein.

1.3 The preservative treatment processes of wood poles furnished under this specification shall conform to the latest editions of specifications, herein referenced, that are issued by the American Wood-Preserves Association (AWPA).

2.0 SIZES AND CLASSES

The following are standard sizes and classes:

LENGTH	CLASS	STOCK #	LENGTH	CLASS	STOCK #
30'	4	09-030	45'	4	09-045
35'	4	09-035	45'	1	09-046
40'	4	09-040	50'	2	09-050
40'	1	09-041	55'	2	09-055
40'	2	09-042			

3.0 WOOD SPECIES AND FIBER STRESS VALUES

All distribution poles supplied under these specifications shall be cut from live Southern Pine or coastal Douglas Fir timber, and shall conform to ANSI 05.1 latest revision except as herein modified.

The following table shows the designated fiber stress values for wood at groundline.

	GENUS AND SPECIES	FIBER STRESS
Douglas Fir, Coast	*Pseudotsuga menziesii*	8000 psi
Pine, Southern	*Pinus echinata, Pinus elliottii*	8000 psi

3.1 Rate of Growth

All poles will have a rate of growth according to ANSI 05.1. Sec. 5.1.4.

4.0 DEFECTS

Physical defects that are prohibited, permitted and limited shall be those outlined in ANSI 05.1 SEC 5.2, 5.3, and 5.4 respectively.

4.1 Knots

4.1.1 The diameter of any single knot and the sum of knot diameters in any one-foot section shall be in accordance with Table 2 ANSI 05.1 latest edition.

4.2 Shape

A pole may have a single sweep subject to the following limitations:

For all size poles, a straight line joining the surface of the pole from the butt to the center of the pole at the top, shall not be more than one third of the diameter from the centerline of the pole at the point of measurement. For double sweep the poles shall be subject to ANSI 05.1 section 5.4.

4.2.1 Short Crooks

Short crooks that are within any section of 5 feet or less in length, and that are more than 2" off the centerline of the crooked section are prohibited.

4.2.2 Uneven Contour

Poles shall have a smooth and even surface. Barber poles shall not be allowed.

4.3 Splits and Checks

Splits or through checks either through or in line with the bolt holes are prohibited.

4.4 Soundness

Whenever there is any evidence of decay such as softness of wood fibers, sponginess or brownish discoloration, even though there may be no definite areas of breakdown in the wood fibers, the material shall be rejected.

5.0 MANUFACTURING REQUIREMENTS

5.1 Trimming

Overgrown knots and branch stubs shall be machine trimmed. The depth of the machine cut shall not exceed one-quarter inch except at knot whorls and clusters where the circumference between these defects will not be reduced by more than one inch. Encased knots shall be drained.

5.2 Framing

All poles shall be completely framed before treatment as shown in Figure I.

5.3 Marking

All distribution poles shall be marked as shown in Figure II.

6.0 CONDITIONING

6.1 All poles shall be conditioned prior to treatment by steam conditioning or kiln drying in accordance with AWPA C1, and C4 latest revision.

6.2 Kiln drying

6.2.1 The average Moisture Content of any lot of poles shall be within 30% plus or minus 3% measured as described in AWPA M2 latest revision.

6.2.2 The moisture content of any pole shall be within 30% plus or minus 5% when measured with a moisture meter at a depth of 2 inches. The moisture content will be considered to be the average of three measurements. The three measurements will be taken at the following locations: At groundline (10% of length + 2'), five feet from top, and midpoint between the first two.

6.3 Steam Conditioning (Southern Pine only)

The steam temperature employed shall not exceed 245 degrees Fahrenheit. The time duration for poles with specified circumferences of 37.5 inches or less at 6 feet from the butt shall not exceed 17 hours and for poles with specified circumferences larger than 37 5 inches at 6 feet from the butt shall not exceed 20 hours

7 0 TREATMENT

7 1 Preservative

All poles shall be treated using the following preservative

Pentachlorophenol ("Penta") type A as specified by AWPA P8, in heavy solvent in accordance with AWPA P9

7.2 Process

All poles shall be treated by the Rueping Empty Cell Process in accordance with AWPA C1 and AWPA C4 latest revision

7 3 Retention

7 3.1 Preservative retention shall be in accordance with AWPA C4 The minimum values shall be as follows:

	Southern Pine	Coastal Douglas Fir
Pentachlorophenol	0 45 pcf	0 6 pcf

Analysis shall be by zone assay possible only after 20 sample borings All borings shall be filled with fully-treated, tight-fitting plugs

7.4 Penetration

Penetration levels in inches of wood and/or percent of sapwood shall be as follows:

Treatment	Southern Pine	Coastal Douglas Fir
Penta	3 50 " or 90 %	0 75 " or 85 % up to 1 60 "

7 5 Physical condition

After treatment the pole shall be clean and free of bleeding or sludge deposits

8.0 INSPECTION

8.1 Inspection of the plant equipment, treatment and preservative by either the purchaser, or representative, shall be in accordance with AWPA M2 latest revision.

8.2 Inspection by the purchaser, or representative, does not release the supplier of the responsibility of furnishing material in accordance with these specifications.

8.3 A written inspection report shall be forwarded to the Standards Section for each load delivered.

9.0 LOADING AND SHIPMENT

9.1 Poles shall be delivered on self-unloading trucks unless otherwise noted on the purchase order.

9.2 Any pole damaged during loading, transportation or unloading is the responsiblity of manufacturer.

10.0 REJECTION

10.1 The rejection of any part of a shipment or lot may be cause for the entire shipment or lot to be rejected.

10.2 Rejected material will be promptly replaced or refunded, at the discretion of EPEC

10.3 All expenses incurred by EPEC as a result of material rejection shall be the responsiblity of the manufacturer and/or distributor

11.0 ORDERING

11.1 The manufacturer will supply, at the time of bidding, a written statement that the bid product complies with all requirements set herein.

11.2 Purchase Orders will specify the quantity, wood species, treatment, class and length of poles

11.3 Any pole not described in Section 2.0 of this specification shall be considered an exception and handled according to Section 12.0

12.0 EXCEPTIONS

Any and all exceptions to this specification shall be submitted in writing prior to the bid to:

El Paso Electric Company

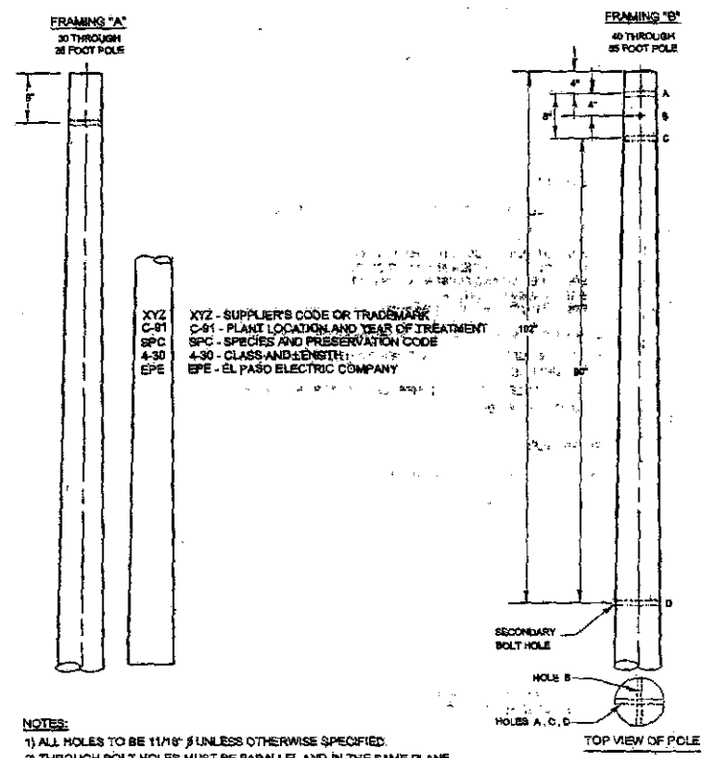
Distribution Support-Standards

Post Office Box 982

El Paso, Texas 79960

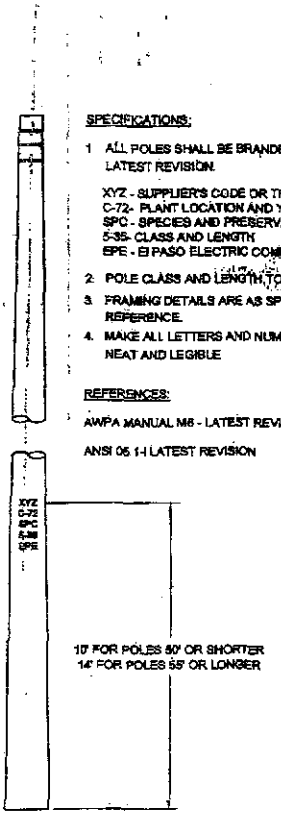
Standards Engineer _____ DATE 3/2002

Distribution Support Supervisor _____ DATE 3/2002



NOTES:
1) ALL HOLES TO BE 11/16" ϕ UNLESS OTHERWISE SPECIFIED.
2) THROUGH BOLT HOLES MUST BE PARALLEL AND IN THE SAME PLANE.
3) POLES TO BE BRANDED PER DSO 606, "POLE BRANDING SPECIFICATIONS"
(SEE DETAIL "A")

FIG I



SPECIFICATIONS:

1. ALL POLES SHALL BE BRANDED ON THE FACE PER ANSI 05.1 - LATEST REVISION.

   XYZ - SUPPLIER'S CODE OR TRADEMARK
   C-72- PLANT LOCATION AND YEAR OF TREATMENT
   SPC - SPECIES AND PRESERVATION CODE
   5-35- CLASS AND LENGTH
   EPE - EI PASO ELECTRIC COMPANY
2. POLE CLASS AND LENGTH TO BE BRANDED ON POLE BUTT.
3. FRAMING DETAILS ARE AS SPECIFIED AND COVERED BY REFERENCE.
4. MAKE ALL LETTERS AND NUMERALS NOT LESS THAN 5/8" HIGH, NEAT AND LEGIBLE

REFERENCES:

AWPA MANUAL M6 - LATEST REVISION

ANSI 05.1-I LATEST REVISION

FIG II