

Falcon School District 49
Technical Guide for New Construction Including Additions and Remodeling
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DIVISION 2 - SITEWORK GENERAL

I. GENERAL

- A. Drainage and Wind Protection. A drainage plan for the site shall be prepared by an Engineer experienced in such work and conforming to local regulations. Particular attention should be given to surface and ground water including seasonal fluctuations, and to physical properties of construction materials with regard to expansion and contraction. Past experience has indicated that adequate attention has not always been given to the above-mentioned problems. The School District has concerns about high winds, including loss of roofing and roof gravel, and building damage due to soil movement. The site must maintain EPA Storm Water Phase II standards and adhere to the district Phase II Plan commitments.
- B. Soil Conditions. Due to economies involved, the School District has the premise that, in general, the ground floor slab of all structures will be located on compacted fill, and that fill will developed from on-site materials insofar as possible. In cases of expansive or poor soil, structural floor slabs are to be used, where recommended by the Soils Engineer.
- C. Vehicular Traffic. Safety at all schools and safety on playgrounds is of first consideration. Auto, truck, and bus traffic patterns should be designed so as not to become a hazard to the students. Where possible, separate bus drop-off areas from auto drop-off areas. All signs, signals and markings on school property shall conform to the "Uniform Traffic Control Device Manual," published by Colorado Department of Highways, Planning and Research Division. Service traffic of all types shall be held to an absolute minimum on school grounds. The site should be developed so that student traffic does not cross or go through service traffic lanes.
- D. Playgrounds. For protection of children, avoid wherever possible: steep slopes, open drainage swales and retaining walls. Provide a means to exclude autos, buses, and motor scooters from all playground areas, and provide protected access ways at normal lines of pedestrian traffic. Prohibited equipment includes merry-go-rounds and tube slides. Shading is required. For preschool areas, comply with the Colorado Department of Health and Human Services requirements.
- E. Utilities. For all projects, water, gas, electric, data, communications, fire alarm, security and sewer should extend to and be capped at face of building to allow for connection of temporary classrooms. Such temporary classrooms should not be located in areas of probable additions. Show area for location of temporary classrooms (24' x 60' typical size and approximately a 150' x 150' pod complex) on DD submittal and final construction documents. For schools that are not built to ultimate capacity in the initial phase, size on-site utilities to allow for ultimate capacity. Provide for enclosures at meters, transformers, and remote readers, as required by utility company. Separate water metering is required for irrigation systems and cooling towers.
- F. Fire Lanes. Conform to local Fire Department rules for provision of any paved or unpaved lanes for fire truck access and for temporary fire lanes to be maintained during construction. Include confirmation of fire hydrant locations along with other fire safety requirements.
- G. Visual Screening. Include visual screening, where possible, of the delivery, transformer, meters, and trash dumpster areas, in harmony with the building design. Screening around the dumpster should not exceed 40" in height.

II. DESIGN, GRADING AND EXCAVATION

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- ◆ Contractor must order utility locates and District Facilities Department locates for all underground work.
 - ◆ All site work must comply with U.S. EPA MS-4 Stormwater Regulations.
- A. Design Analysis. A preliminary and final design analysis of site engineering should be submitted to the governing agencies and copied to the Facilities Department. At a minimum show pertinent calculations for the following:
1. Surface Drainage. Detention areas and discharge points.
 2. Subsurface Drainage (if required), footing drains, underfloor drainage system.
 3. Estimated water and sewer demands used in sizing pipe connections to city mains.
 4. Include a site plan showing existing and finish grades for entire site.
 5. All other requirements of the local jurisdiction.
- B. Site Grading.
1. All finish grades should be designed to provide positive drainage away from the buildings and into approved drainage systems.
 2. The design of surface drainage should be based on water run-off using the Rational Method:
 - a. Maximum hourly rainfall in inches to be expected in ten years or as required by each city's wastewater control division.
 - b. Ratio of runoff to rainfall:

Pavement and roofs	0.90*
Turf area	0.40*

*Unless stipulated otherwise by local jurisdiction
 3. The following slopes are desirable in the design of finish grades:
 - a. From outside face of building wall to a distance of 10 feet: 3% (minimum)
 - b. Parking areas: 1% for asphalt; 3% for gravel
 - c. Playground areas: 1% to 2%
 - d. Lawn areas: 15% maximum. Maximum lawn slopes of 15% need to be maintained so a riding mower can be used on all grass areas to maintain mowing efficiency.
 - e. All play fields at elementary sites need to be blue top graded with hubs set to a maximum spacing of 20 ft. apart. Both types of fields should have positive drainage that will carry water off the turf surface to a drainage area
 - f. All Athletic Fields should be graded within 0.1 inches using either GPS or laser grading techniques
 - g. All disturbed area should utilize techniques to prevent soil erosion
 4. Where retaining walls are necessary, they should be held to a minimum height.
 5. Whenever possible roof drains should be conducted through concealed pipes to the city storm sewer system. If a storm sewer is not available, consult with the city's wastewater management division for acceptable methods of surface drainage.

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6. Give consideration to finish site materials other than grass on north side of buildings, berms, and other locations where maintenance is costly and difficult.
 7. Avoid berm slopes, which make rider-driven machine mowing difficult.
 8. Parking lots should be designed for positive drainage. Drain toward curbs where possible so that water will collect out of traffic patterns.
 9. Plantings, trees, and edges should be regional native plants; simple and capable of minimum maintenance and should be drought-tolerant. Trees and plantings should have a separate watering zone.
- C. Excavation. Where existing sites were used for residential purposes prior to acquisition by the School District, basement, or foundation structures may be encountered during excavation operations. All such obstructions should be removed as required for the proper construction of this facility, as part of the Contract. The Architect should include sufficient information on the drawings to indicate locations of previous construction.
- D. Drilled Caissons. (If required)
1. The Owner will employ a soils engineer to provide continuous on-site observation of the pier drilling, steel reinforcement, and concrete placement
 2. The estimated elevation of the pier bottoms shall be shown on the drawings. The soils engineer will verify and approve depth of all holes prior to concrete placement. If actual site conditions differ from those indicated by the drawings, the unit cost overrun and underrun figures indicated on the bid form will be applied to establish any extra due to the Contractor or credit due the Owner due to changes in depths of piers. Unit prices for pier overruns shall not exceed underruns by more than 20%. Adjustment in the contract price will be made by change order upon completion of drilled pier operations.
 3. The Contract will include drilling, de-watering, and casing where required.
 4. Compaction Standards. The Owner will employ a soils engineer to assist in obtaining required compaction standards. Consult the soils investigation report for suggested compaction standards for this project.
- F. Miscellaneous.
1. Loading Dock. Loading dock should be designed to avoid blocking traffic, access roads or drive areas. Loading dock facilities for middle and senior high schools shall consist of a platform raised 4 feet above the service drive to allow truck equipment with power gates to unload conveniently. Loading facilities for elementary schools shall consist of a concrete slab raised 6" above the service drive unless site conditions are such that a 4' high loading dock can be conveniently provided without excessive additional cost. Canopies over loading docks are to be high enough to allow clearance for 11'-6".
 2. Where areaways occur, provide with curb at least 6" above grade level. Opening shall be covered with steel grating.
 3. Provide a 3' wide concrete apron adjacent to the outside wall of the buildings wherever lawn or planting areas occur.

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4. Repaving of cuts through existing concrete or asphalt by the appropriate utility provider for gas and electrical service should be included in the work under the construction Contract.

III. SITE IMPROVEMENTS

A. Concrete Walks, Curbs, and Gutters.

1. Existing concrete walks, curbs, and gutters outside property lines shall be protected and if damaged shall be replaced by the Contractor in accordance with requirements of the local jurisdiction in which damage occurs.
2. Outside of property lines, walks, curbs, gutters, aprons, etc., should be constructed in accordance with each local jurisdiction's requirements.
3. Within property lines, pedestrian walks should be constructed of 4" thick, 3000 psi concrete with fiber-mesh reinforcement.
4. Concrete for vehicular use shall utilize appropriate welded wire mesh reinforcement and the thickness shall be 6". All concrete design mixes shall be submitted for review and approval.
5. Control joint should be provided in exterior concrete flatwork as follows:
 - a. Between building and walks.
 - b. Wherever concrete is confined, for example, from building to curb.
6. If at all possible, avoid any outside steps, or make additional provision for handicapped ramps.
7. Install sections of flattened curb along parking lot perimeters in strategic areas so snowplows can push snow out of the parking lot without damaging curbs or equipment. Consult District Facilities Department to determine these areas.

B. Playground Areas.

1. Comply with Consumer Protection Safety Commission (CSPC) rulings and standards for playground equipment. Review current standards for mats, safety surfaces and drain tiles.
2. Comply with Americans with Disabilities Act (ADA) standards for playground access.
3. Do not use metal slides, tube crawlers, merry-go-rounds pea gravel or river rock in playground areas.
4. Provide 12" deep safety surfacing with rubber mats under swings and at outlet of slides.
5. Playground equipment such as basketball backstops, softball backstops, and fun hoops (preferred replacement for tetherball posts) may be included in the construction contract. Play structures, swings, and slides are customarily planned and purchased by the School District. Exact requirements will be defined on an individual project basis.

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6. In paved playground areas requiring installation or tetherball posts or any other posts, specifications should require that paving be completed before poles are installed.
7. Paving shall comply with State of Colorado Department of Highways, Standard Specifications for a Road and Bridge Construction. Edges shall abut concrete curbs. If paved area is elevated from surrounding grounds, provide a positive means of carrying the run-off from the area so banks are not eroded. Refer to section IV – asphalt paving.
8. Provide access to all paved areas for sweepers and snow removal equipment.
9. Pre-School: Need a removable section of fencing to allow machinery access for future removal of playground equipment.

C. Vehicular Parking Areas.

1. Automobile parking areas should be paved in accordance with state standards.
2. Painted striping designation of parking stalls including handicapped will be a part of the construction contract and should be shown on the site plan drawing.
3. Layout of parking spaces should be based on 9' x 20' stalls and 22' aisles. Provide adequate spaces and curb cuts and ramps designed for the handicapped.
4. Where speed bumps occur, they shall be painted yellow. Speed bumps are discouraged due to snow removal issues. Consult the District Facilities Department for approval of speed bump locations.
5. Precast or recycled concrete or recycled plastic wheel stops, where necessary, should be furnished and installed as part of the contract, but avoid where possible due to difficulty of snow removal.
6. Provide an area for bicycle parking at a suitable location. Verify with Owner whether fencing is required.

IV. ASPHALT PAVING

- A. Tests and Testing. All materials identified at the start of the job as those to be used on the project by the Contractor are subject to testing during construction by an independent testing laboratory. All testing in this section shall be in accordance with the General Conditions of the Contract.

The Owner will employ a Soils Engineer to control excavation and fill for subgrade beneath pavements and to verify base course materials, placement methods, and compaction.

- B. Inspection. All work performed under this contract is subject to the inspection and approval of the Owner and Architect. Specific inspections should be required and called for by the Contractor on the following elements of work:

Protection of adjacent property
Staking and establishment of elevations
Establishment and compaction of subgrade
Placement and compaction of base course, primecoat, and bituminous wearing surface

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Final inspection

The Contractor should obtain approval of each element of work listed above in sequence of its completion and before proceeding with the next item. Failure to secure approval of these inspections in sequence of completion shall be just cause for the removal of all elements not previously approved.

- C. Compaction. The subgrade, whether it is undisturbed earth, fill or base course, should be compacted as required by the soils report and as defined under the Earthwork section of the specifications. In no case, shall it be less than 95% of maximum density. The entire area on which the paving is to be placed should be investigated by the Contractor with particular reference to the compaction required. A density test in front of drainage, utility and storm water areas is needed. After piping is installed a 2nd density test is to be done prior to installation of base course of asphalt.
- D. Pavement Construction. The necessary work items to construct the pavement structure, including preparation of subgrade, base course, bituminous wearing course, etc., shall be designed and specified to conform with, at minimum, the State of Colorado Department of Highways, Standard Specifications for a Road and Bridge Construction.
- E. Clean-Up. Immediately after completion of the work, the entire site shall be cleaned of any debris and excess paving materials, to the complete satisfaction of the Owner. Using outer areas of school property as a disposal area is unacceptable.
- F. Guarantee. In addition to guarantees as specified elsewhere, the Contractor shall repair or restore to first class condition any portion of the paving in which creeping, shoring, cracking, softening, settling or other defects that are due to improper placing or defective materials appear or become apparent within one year from date of acceptance. All workmanship and materials necessary for any repairs shall be in complete accordance with the requirements of these specifications for the original work.

V. FENCING

- A. Construction Fence. Existing sites (adjacent to existing schools): Chain link or other fencing approved by Facilities Department for the Contractor's use around the construction site to isolate school activities from the construction area will be furnished, installed and removed by the Contractor. Verify location before installation.

New Sites: Construction fencing should be furnished and installed to protect contractor's materials and equipment, and to control access to the construction area. Consult with the Architect and Owner for location before installation.

- B. Permanent Fence - Requirements for permanent fencing for playground, etc., vary from project to project. Location and extent of fencing will be determined as a part of the site development. In all cases, gates must be provided that are wide enough for snow removal equipment and eliminate driving over sod to access playgrounds
- C. Suggested Fencing Materials. All fence materials **shall** be steel, galvanized by the hot dip process.
 - 1. All posts should be Schedule 40 pipe.
 - 2. Fabric: 9 gauge wire, 2" mesh, knuckled top and bottom. Furnish one piece fabric width for fencing up to 12' high. Place fabric on outside of line posts.

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3. Line Posts: 1 1/2" nom. (1.9" O.D.) space at 10' O.C. unless shown otherwise.
 4. Terminal Posts: 2" nom. (2.375" O.D.) for end, corner and pull posts.
 5. Gate Posts: 2 1/2" nom. (2.875" O.D.) for single gate. 3" nom. (3.5" O.D.) for double gates.
 6. Top Rail: 1 1/4" nom. (1.66" O.D.) manufacturer's longest lengths, with 6" long expansion type couplings at each joint. Provide means to securely attach top rail to each post, such as welding.
 7. Center Rail: 1 1/4" nom. (1.66" O.D.) locate between each terminal post (end, corner and gate) and the nearest line post. Attach securely to each post.
 8. Truss Rods: 3/8" dia. rod with anchor and turnbuckle fittings. Install diagonally from top of all terminal posts to bottom of nearest line post and diagonally each way in all gates.
 9. Tension Bars: Minimum cross section 1/4" x 3/4," one piece lengths equal to fabric height.
 10. Tension Clamps: 14 gauge x 1" spaced at 15" O.C. maximum.
 11. Tension Wire: 9 gauge wire. Install entire length at bottom edge and 2' above bottom edge of fabric. Wire to be continuous between terminal posts.
 12. Fence Fasteners: 12 gauge wire. Space 12" O.C. on line posts and 24" O.C. on rails and braces.
 13. Post Tops: Weather tight closure cap with opening for top rail, one cap for each post.
 14. Gates, Swinging:
 - a. Frames: 1 1/2" nom. (1.9" O.D.) for all perimeter members and intermediate members if perimeters are over 8' apart. Frames shall be welded and joints painted with zinc based paint.
 - b. Fabric: 9 gauge wire, 2" mesh, knuckled top and bottom, attached to frame with tension bars and clamps same as for fence.
 - c. Hinges: Malleable iron, non-lift-off type, 180° swing, one pair for each gate to 6' height. Provide 1 1/2 pair for gates over 6' height.
 - d. Latches: Fork type for single gate, plunger-bar for double gates. Operation either side, integral padlock eye, plunger-bar strike set in concrete.
- D. Recommended Installation Procedure. Fence installation should not proceed until finish grading has been completed in areas where fence is to be installed.

All post holes should be 9" diameter and excavated to 30" depth. Post spacing should be measured parallel to the ground. Posts should be set in min. 2500 psi concrete 24" below finish grade. Vibrate or tamp concrete around each post. Check each post for vertical and top alignment and maintain in proper position until concrete has set.

Install fabric to maintain approximately 2" between bottom selvage and finish grade. Install tension wire by weaving through the fabric or tying to the fabric at 24" O.C. Tie tension wire to each post. Twist all tie wire at least 2 full turns and bend back to prevent hazard.

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Attach all hardware to provide security against removal or breakage.

When complete all fencing shall be plumb and true to line.

- E. Gas Meter Enclosure. Provide a fenced enclosure with gate and top around the gas meter, in accordance with local utility provider requirements.

VI. LANDSCAPING

A. Materials.

1. Analyze the organic content of the existing soils and recommend amendments if necessary. The Owner will contract separately for these services.
2. Specify Organic content of soils to be used for the project
3. Subsoils. Imported materials for landscaped areas shall be specified as to acceptable organic content.
4. Topsoil. Lawn areas should have a minimum 4" topsoil installed and should be fine graded to finish elevations. Sodding and landscaping will be included in the contract unless otherwise directed. Avoid narrow grass areas – less than eight (8') feet wide and use of plantings in narrow islands, etc. Refer to local regulations and guidelines in effect for drought-resistant plantings. Turf areas should be limited to play areas and fields. Drought-resistant landscape designs should apply to all other areas. Consider the cost and use/benefits of artificial turf products for playgrounds, play areas, and fields.
5. Seed Counts. Recommend three (3) seeding applications for all non-native seeded turf areas. Review turf seed count specifications with Owner prior to application.
6. Building Perimeter. Consult with District Facilities Department regarding the use of mulches, breeze, landscape finish materials and drought-tolerant plantings. If mulches are used, do not specify matting materials. Mulches shall be at least 4" deep (below grade level).
7. Aggregates. Breeze material is acceptable for landscaping. Cobble is prohibited. Rocks shall be encased in concrete or over 100# each.

VII. IRRIGATION SPECIFICATIONS

A. Materials.

1. General. All materials throughout the system shall be new and in perfect condition. After award of the contract and prior to beginning work, the Contractor shall submit for approval six copies of the complete list of materials that he proposed to install. Quantities of materials and equipment need not be included. No deviations from the specifications shall be allowed.
2. Separate irrigation meters are required. Contractor shall coordinate with the Architect and Owner to install separate metering devices acceptable to the local water provider to distinguish irrigation water consumption from general building construction.
3. Plastic Piping. All main line pipe 3" and smaller shall be Schedule 40, Type 1120-1220 polyvinyl chloride (PVC) pipe and shall conform to CS-256-63.

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- a. All mainline and lateral lines should be schedule 40 PVC
 - b. No galvanized iron pipe should be used for risers
 - c. All valves should be Rain Bird plastic valves. Brass can be used if there is a pressure concern that would damage a plastic valve
4. Plastic Fittings. Schedule 40, polyvinyl chloride (PVC) standard weight as manufactured by Sloane, Lasco, or approved equal.
5. Solvent Cement. Compatible with PVC pipe and of proper consistency.
6. Sprinkler Head Risers. Schedule 40 galvanized iron pipe or Sch. 80 PVC for riser. Pipe shall be cut in a standard pipe cutting tool with sharp cutters. Ream only to full diameter of pipe and clean all rough edges or burrs. Cut all threads accurately with sharp dies. Not more than three (3) full threads shall show beyond fittings when pipe is made up. Assemblies shall be as detailed.
7. Automatic Controllers. The sprinkler controller shall be manufactured by Automate Logic and shall be an extension of the districts' building automation system.. Consult with Owner regarding the system specifications.
8. Remote Control Valves. The automatic remote control valve shall be a globe pattern electrically activated, 150 psi rated. Cylolac and glass filled nylon plastic construction. Diaphragm shall be of polyurethane material. Solenoid shall be 3.5 watt, 24 volt A.C. with waterproof-molded coil capable of being removed from the valve with turning coil and twisting wire. Valve shall be equipped with a hand operated flow control stem, a manual bleed plug, and all internal parts shall be serviceable from top of valve without removing the body from the line. Pressure loss at 30 GPM shall not exceed 7.0 psi.
9. Control Wires. 24 volt solid wire UL approved for direct burial in ground. Minimum wire size: 14 gauge.
10. Sleeves for Control Wires. Under all walks and paving and where indicated on drawings, PVC 1200-160 psi plastic pipe or galvanized heavy wall steel conduit.
11. Sprinkler Heads. Radius 45' to 67': The full and/or part circle sprinklers shall be gear driven rotary, in-ground type and designed with an integral check valve for control of line drainage. Water distribution shall be via two (2) nozzles mounted in a 1 1/2" diameter stainless steel nozzle turret. The dual nozzles shall elevate 2-3/8" when in operation. Retraction shall be achieved by a heavy-duty stainless steel retract-spring. The sprinkler shall have a riser seal and wiper.
 - a. Rotation shall be accomplished by sealed oil packed gear assembly isolated from the water supply.
 - b. The drive assembly and nozzle turret shall move up and down as an integral unit.
 - c. The sprinkler housing shall be of high impact molded plastic with a 1" IPS connection. The sprinkler shall have a large strainer so as to prevent nozzle clogging.
 - d. The sprinkler shall be so constructed that drive assembly, screen, and valve are accessible through the top of the sprinkler without disturbing case installation.
 - e. The sprinkler shall be manufactured by Rainbird, Buckner, or approved equal.
 - f. All heads in the play field areas shall have rubber caps.
12. Sprinkler Heads. Radius 4' to 15': The sprinkler shall be of the fixed spray type designed for in-ground installation. Sprinkler heads should be installed final sod grade height not finish dirt grade height. Approx. 1" higher than dirt grade.

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- a. The nozzle shall be comprised of one orifice at two radius ranges and shall be adjustable from full on to full off. The nozzle shall elevate 3 inches when in operation. Retraction shall be achieved by a heavy duty stainless steel spring. The nozzle piston shall have a smooth external surface operation in a resilient guide. A riser wiper shall be included in the sprinkler for continuous operation in the presence of sand and other foreign material.
 - b. Coverage shall be either full or part circle. The part circle coverage shall be available in arcs of 90°, 120°, 180°, 240° and 270°. Also included shall be special patterns including an end strip and center strip nozzle configuration. Nozzle delivery shall be such as to allow part-circle patterns to match full circle patterns in precipitation rates. The body of the sprinkler shall be constructed of non-corrosive heavy duty Cylolac. A filter screen shall be in the nozzle piston. All sprinkler parts shall be removable through the top of the unit by removal of a threaded cap.
 - c. The sprinkler shall be manufactured by Rainbird, Hunter, Toro, or approved equal.
 - d. All heads in play field areas shall have rubber caps.
 - e. Pop ups should be manufactured by Rain Bird 1800 series.
 - f. No Toro irrigation equipment is to be used.
13. Shrub Bubbler. The sprinkler shall be of the flood bubbler type. The sprinkler shall be constructed of non-corrosive heavy duty Cylolac. Flow shall be adjustable by means of a stainless steel throttle screw on top of the unit. Serviceable screen shall be included to prevent foreign material from entering sprinkler. The sprinkler shall be manufactured by same manufacturer as balance of sprinkler heads. This sprinkler shall not be placed on risers above ground level.
14. Service Saddles. Shall be Smith-Blair double strap, all bronze. Anything more than that service saddle should be eliminated.
15. Quick Coupling Valves. Shall be as noted on drawings.
16. Backflow Preventer. Shall be compatible with local plumbing codes and should be Febco type only.
17. All irrigation systems shall be separately metered.

B. Design

1. Provide for a year-round water source near ball fields for winter watering of the infields. This needs to be a separate line that will not be blown out with the other irrigation lines and must be deep enough to avoid freeze issues.
2. Consult District Facilities Department for current irrigation practices and system control.

C. Installation.

1. Excavating and Trenching:
 - a. Trenches shall be made wide enough to allow a minimum of 6 inches between parallel pipe lines. Trenches for pipe lines shall be made of sufficient depths to provide the minimum cover from finish grade as follows:
 - (1) 18" minimum cover over main lines.
 - (2) 12" minimum cover over control wires from controller to valves.

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- (3) 12" minimum cover over lateral lines to heads.
 - b. Maintain all warning signs, shoring, barricades, flares and red lanterns as required by the Safety Orders of the Division of Industrial Safety and any local ordinances.
- 2. Pipe Line Assembly:
 - a. Install remote control valves where shown and group together where practical; place no closer than 12 inches to walk edges, buildings, and walls.
 - b. Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent with a non-synthetic bristle brush.
 - c. Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.
 - d. Make all connections between plastic pipe and metal valves or steel pipe with threaded fittings using plastic male adapters.
 - e. Main line shall be graded to drain without using a pressure system to blow out lines if automatic drain valves are utilized. Coordinate with Owner for use and layout of automatic drain valves.
 - f. Automatic drain valves should be used where lateral line will not drain back to main line.
 - g. Drain valves shall be accessible without digging.
 - h. Control valves shall be grouped in one location where possible and installed in valve boxes for protection and access.
 - i. In-line anti-siphon check valves shall be installed to prevent drain down of large portion of the system to a single point.
- 3. Sprinkler Heads:
 - a. Install all sprinklers as detailed on drawings using PVC swing joints.
 - b. Use pipe joint compound on galvanized iron fittings.
- 4. Closing of Pipe and Flushing Lines:
 - a. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
 - b. Thoroughly flush out all water lines before installing heads, valves and other hydrants.
- 5. Hydrostatic Tests:
 - a. Center load piping with small amount of backfill to prevent arching or slipping under pressure.
 - b. Apply a continuous and static water pressure of 60 psi (high schools should be tested at 90 psi) when welded plastic joints have cured at least 24 hours and with the riser capped as follows:
 - (1) Main lines and submains to be tested for 12 hours.
 - (2) Lateral lines to be tested for 2 hours.
 - c. Repair leaks resulting from test.
- 6. Automatic Controllers. The irrigation system will be controlled by the District's Building Automation System (BAS). All equipment shall be compatible with the BAS (see Division 15, Controls)
- 7. Automatic Control Wiring:

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- a. Install control wires, sprinkler mains and laterals in common trenches wherever possible.
 - b. Install control wires at least 18" below finish grade and lay to the side and below main line. Provide looped slack at valves and snake wires in trench to allow for contraction of wires. Tie wires in bundles at 10' intervals.
 - c. Control wire splices will be allowed only in runs more than 500 feet. Connections shall be as detailed.
 - d. All wire passing under existing or future paving, construction, etc., shall be encased in plastic or galvanized steel conduit extending at least 12" beyond edges of paving or construction.
8. Backfill and Compaction:
- a. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish.
 - b. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to a minimum of 90° density.
 - c. Compact trenches in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.
 - d. Dress off all areas to finish grades.
9. As-built Drawings and System Demonstration: Field prints should be provided until appropriate As-built drawing can be completed. Require that the sprinkler installer furnish fully revised and accurate as-built drawings of the piping, heads, and control wiring. The installer shall satisfactorily demonstrate coverage, operation, and sequencing of zones by scheduling a meeting with the Owner's Maintenance Department to review the as-built drawings and fully demonstrate the completed system. A second meeting shall then be scheduled as a follow-up to the first, for the purpose of answering questions and troubleshooting. In addition, the installer shall participate with Owner's Maintenance Staff to start-up and shut down the system in the course of the first season of operation. As-builts shall be issued on prints and AutoCAD files submitted. .

VIII. SITE SIGNAGE

Aluminum traffic and pedestrian control signs shall be as shown on the drawings. Mount signs on perforated 2 1/2" square galvanized steel posts. Install posts in sleeves set in concrete.

IX. SITE IDENTIFICATION SIGN

A freestanding site identification sign, appropriate to the building design and budget, shall be included in the contract for new buildings. Photovoltaic power for front or remote signage is encouraged, preferred.

X. TENNIS COURTS

The District recognizes that the sub-surface development for new tennis courts is critical for maintenance of a quality playing surface. The design shall include careful analysis and preparation of the sub-grade and, where possible, post-tensioned concrete courts are to be utilized. Coordinate positive site drainage away from courts in all directions. Contractor shall be responsible for installing wind screening materials.

XI. EXTERIOR BLEACHERS

Aluminum bleachers shall have a clear anodized finish with manufacturers standard aluminum non-slip seat and footboards. Guardrail system shall be included at rear and each side to meet IBC and ADA standards.

XII. BICYCLE RACKS

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ADDENDUM 1

AAA Ribbon Rack Model No. RB11 or approved substitute. Hot dipped galvanized finish in ground anchor mount.

XIII. EXTERIOR BASKETBALL BACKSTOPS

Porter Model No. 00164-334, or approved substitute, with No. 00223-000 goal on painted aluminum fan bank.

<<<<END OF DIVISION 2>>>>