

1 General

- .1 Considerations:** There are various considerations that need to be addressed in selection of materials for site work applications. These include:
 - .a Public Safety
 - .b Durability
 - .c Maintenance

2 Products

.1 Concrete Walks & Drive Aisles

- .a Minimum width 5 feet.
- .b 4-inch thickness, 3,000 psi for pedestrian traffic.
- .c 6-inch thickness, 4,000 psi for vehicular traffic, reinforced with wire mesh or rebar.

.2 Equipment Pads

- .a Air-conditioning compressors, transformers and other ground supported equipment shall be installed on concrete pads and neatly fenced or screened with landscaping materials so that they are not visible from the adjacent property and so that the sound transmission to neighboring properties is minimized.

.3 Wheel Stops & Bollards, Pipe Barriers

- .a Install wheel stops at all parking spaces where stalls are located less than 6' from curb and at locations without curbs; minimum 2 anchors per wheel stop.
- .b Parking stalls perpendicular to integral curb sidewalks.
- .c Bollards: Provide 6" diameter unpainted galvanized steel pipe with top no less than 54" above grade and bottom set in concrete not less than 42" below grade. Cover bollard with plastic protective sleeve with foam liner pre-finished in high visibility caution yellow color.
- .d Pipe Barriers:
 - i. Use: Protection of exposed utility lines adjacent to road ways and parking areas.
 - ii. Material: Provided minimum 3" diameter steel pipe barriers with welded and ground joints. Install in section not exceeding 20' in length, or provide for thermal expansion at 20' intervals.
 - iii. Finish: Paint with High Performance Paint, Color to be selected by design consultant and approved by owner.

.4 Concrete Paving

- .a Paving Design: Subject to recommendations of the geotechnical engineer. Sidewalks shall be a minimum of 4" thick. Concrete used in vehicle areas shall be no less than 6" thick.
- .b Typically used for loading and service docks, dumpster pads and aprons, garage aprons, repair bays, equipment pads and fire stations from apparatus bays to street.
- .c Colorants: Not preferred.
- .d Ramps must receive broom finish to comply with ADA requirements.

.5 Asphalt Paving

- .a Paving Design: Subject to recommendations of the geotechnical engineer.
- .b Use for vehicle traffic areas, tennis courts, basketball courts or walkways, depending on use and location.

.6 Concrete Curb & Gutter

- .a All curbs shall be standard concrete curb and gutter.

.7 Brick Or Concrete Pavers

- .a Used as accent materials at walks and plaza areas at high profile locations.

.8 Walkways/Playground Equipment Surfaces

- .a Wood Chips: Used only for non-ADA accessible trail surfaces.
- .b Sand: Used for volleyball courts.
- .c Rubber Surface Products: Used for playground surfaces.
- .d Natural Crushed Stone: Used in park pathways.
- .e Wood Decking: Used at foot bridges and at historic locations.
- .f Recycled waste wood fiber and polyethylene plastic (Trek Board).

.9 Reinforced Concrete Pipe

- .a Storm Drainage Piping: ASTM C-76, Class III.
- .b Fittings may be joined with flexible plastic joint material, or preformed gasket joints complying with AASHTO M-198-B.
- .c Storm drainage grates and frames per NCDOT Standards.

.10 Screen Walls

- .a Owner preference is that screen walls have metal coping caps.
- .b Dumpster/Recycling screen walls.
- .c If masonry screen walls are used to shield ground mounted mechanical equipment (ie: air cooled chillers) ensure that they comply with the height restrictions enforced by the local municipality zoning ordinances.
- .d If roof top mechanical equipment must be screened to comply with local municipality zoning ordinances, ensure that the design and shop drawings if applicable are approved by the municipality prior to authorizing this scope of work to proceed.

.11 Liquid Propane Storage Tanks

- .a Piping on the exterior of the building and serving a Liquid Propane system shall be copper as described in Division 23 "HVAC".
- .b Above ground storage tanks to be located away from adjacent structures and structure it is serving by a distance as determined by the Authority Having Jurisdiction.
- .c Storage tanks located below grade are to be located in an accessible vault and located away from adjacent structures and structure it is serving by a distance as determined by the Authority Having Jurisdiction.

.12 Termite Control

- .a Preferred Product: Consultant proposed, owner approved.

.13 Irrigation

- .a Products: The Toro Company; Rain Bird Sprinkler Mfgr.
- .b Backflow Preventers: As required by authorities having jurisdiction.
- .c Hot Box: Provide at exterior above ground piping and valve assemblies.

.14 Landscaping General:

- .a Landscaping shall comply with minimum nursery standards.
- .b County preference is the use of native plant species.
- .c Turf Grass: Common Bermuda or Tall Fescue.
- .d SOD: Variety as approved by the Owner.
- .e Deciduous Trees: Container grown or Balled and Burlapped.
- .f Deciduous Shrubs: Container grown or Balled and Burlapped.
- .g Coniferous and Broadleaf Evergreens: Container grown or Balled and Burlapped.
- .h Mulch: 4" – 5" pine straw or 3" – 4" triple shredded hardwood.
- .i Soil Amendments: Compost; fertilizer/lime as determined by soil tests.
- .j Tree Protection Fencing: Comply with requirements of authorities having jurisdiction.

.15 Chain Link Fencing

- .a Fabric: No. 11 gauge core size, PVC coated steel wire, 2-inches diamond woven mesh.
- .b Line Posts: 2.375-inch O.D. PVC-coated, galvanized piping.
- .c Terminal, Corner and Gate Posts: PVC-coated, galvanized piping, size as determined by fencing height.
- .d Top Rails: 1.66-inch O.D. PVC-coated, galvanized piping.
- .e Provide weather-tight closure caps on all posts, same material as posts.

.16 Wood Fencing

- .a Material: Pressure-treated lumber.

.17 Retaining Walls:

- .a Cast-in-place concrete designed by Designer's structural engineer.
- .b Segmental gravity retaining walls with soil reinforcement, with wall and soil reinforcement components subject to testing by Owner's testing agency.

.18 Gates

- .a Use: Park entrances, dumpster and/or service yards.
- .b Tubular Steel: Galvanized or painted with high performance coatings.
- .c Tubular Aluminum: Natural finish.
- .d Chain Link: Use only in concealed areas.
- .e Infills: Perforated steel, wire mesh.

.19 Metal Railings

- .a Galvanized or stainless steel.

.20 Flags and Flagpoles

- .a Flagpoles to be used when approved by owner.
- .b Two Flags and two flagpoles are allowed per building site. Allowable flags are the United States of America and the State of North Carolina flags.
- .c Material: Provide one-piece cone tapered aluminum flagpoles fabricated from seamless extruded tubing with a minimum wall thickness of 3/16", height determined by designer and approved by owner.
- .d Foundation Tube: Manufacturers standard corrugated steel foundation tube with minimum .064" nominal wall thickness. Provide with 3/16" steel bottom plate and support plate; ¾" diameter, steel ground spike, and steel centering wedges welded together. Provide flashing collar of same material and finish as flagpole.
- .e Finial Ball: To be determined by owner.
- .f External Winch System with Lockable Protective Cover: Manually operated winch with control stop device and stainless steel cable halyard.
- .g Above grade lighting on Photo-Cell to be provided at all flagpoles.
- .h Flagpole must be easily accessed via sidewalk/path.

.21 Pavement Markings

- .a Thermoplastic/high visibility paint per NCDOT Standards.

.22 Play Ground Equipment

- .a All playground equipment shall meet current CPSC and IPEMA safety standards.
- .b All materials shall be structurally sound and suitable for intended use and safe play. Durability shall be ensured on all aluminum and steel parts by the use of time-tested coatings such as zinc plating, zinc-nickel plating, powdercoating, PVC-coating, etc. Colors shall be specified by the WCPSS.
- .c Posts:
 - i. All aluminum posts are to be 4.5" to 5" outside diameter with .118" minimum thickness and manufactured from extruded tubing conforming to ASTM B-221. Minimum yield strength shall be 35,000 psi and minimum tensile strength (min): 38,000 psi
 - ii. All steel posts shall be 4.5" to outside diameter, 11 gauge (.120") galvanized round tubing, manufactured to ASTM A-500 Grade B tolerances from cold-formed steel conforming to ASTM A-569 Sheet Spec for steel coil. Minimum yield strength shall be 50,000 psi and minimum tensile strength shall be 55,000 psi. The exterior surface is hot dip galvanized, chromate conversion coated, and a clear high performance organic polymer is applied. The inside diameter has 81% minimum zinc rich primer capable of providing excellent rust protection and fabrication characteristics. All coatings are applied inside and out after welding for superior corrosion protection throughout. Exterior surface galvanizing zinc purity is 99% or per ASTM B-6 high grade and special high grade. Galvanizing coverage shall demonstrate the ability to exceed 1000 hours salt spray corrosion exposure in accordance with ASTM B-117. Internal surface zinc rich 81% minimum zinc dust content in organic resin, as per ASTM F-1234, Section 5.2.4, Type D.

- iii. Physical fitness climbing equipment posts shall be 3.5" outside diameter, 13 gauge (.095") galvanized round tubing, manufactured minimum to ASTM A-500 Section II tolerances from cold-formed steel conforming to ASTM A-569 Sheet Spec for Steel Coil Minimum yield strength shall be 50,000 psi and minimum tensile strength shall be 55,000 psi. The exterior surface is hot dip galvanized, chromate conversion coated, and a clear high performance organic polymer is applied. The inside diameter has 81% minimum zinc rich primer capable of providing excellent rust protection and fabrication characteristics. All coatings are applied inside and out after welding for superior corrosion protection throughout. Exterior surface galvanizing zinc purity is 99% as per ASTM B-6 high grade and special high grade. Galvanizing coverage shall demonstrate the ability to exceed 1000 hours salt spray corrosion exposure in accordance with ASTM B-117. Internal surface zinc rich 81% minimum zinc dust content in organic resin, as per ASTM F-1234, Section 5.2.4, Type D.
 - iv. All posts shall be powdercoated to specified color. (See Powdercoat Section 4.3 for more detail.) or hot dipped galvanized steel.
 - v. All posts shall have a "finished grade marker" positioned on the post, required for correct installation and the top of the protective surfacing.
 - vi. Top caps for posts shall be aluminum (plastic caps are not acceptable), and Powdercoat finished to match the post color. All caps shall be factory installed and secured in place using aluminum or stainless steel self-sealing rivets.
 - vii. A molded low-density polyethylene cap, with drain holes, may be pressed onto the bottom end of the post at the factory to increase the footing area. Crushed or dimpled bottom post ends are not acceptable.
 - viii. Arch posts shall be of one continuous piece construction. Arch posts shall be 4.5"-5" O.D. aluminum or steel with a powdercoated finish. There shall be no welds or additional pieces mechanically fastened to manufacture the arch.
- .d Fasteners:
 - i. Primary fasteners shall be tamperproof in design, and stainless steel per ASTM F-879.
 - ii. Manufacturer to provide special tools for pinned hex fasteners.
 - iii. Fasteners shall be corrosion resistant, theft resistant and shall meet or exceed ASTM Standards.
- .e Powdercoating:
 - i. All metal components to be powdercoated shall be free of excess weld and spatter.
 - ii. Powdercoating shall be electrostatically applied and oven cured. Average thickness shall be 3-5 mils. and shall be Super Durable TGIC or Standard TGIC polyester powdercoat. (Any other finish is not acceptable).
 - iii. Super Durable TGIC polyester powder shall be specially formulated for optimum U.V. stability and glossiness and shall meet or exceed ASTM Standards for: Adhesion (D-3359B), Hardness (D-3363), and Impact (D-2794), and Salt Spray Resistance (B-117).
- .f PVC Coating
 - i. All metal components to be PVC-coated shall be thoroughly cleaned in a hot phosphatizing pressure washer, then primed with a clear acrylic thermosetting solution.

- ii. Primed parts shall be preheated prior to dipping in U.V. stabilized, liquid poly vinyl chloride, then salt cured.
 - iii. The finished coating shall be between 80-100 mils. thick and have a textured or matte finish.
- .g Decks:
 - i. Decks shall be manufactured from a single piece of low carbon minimum 11 GA hot rolled sheet steel conforming to ASTM specification A-569. The sheet shall be perforated and reinforced as necessary to ensure structural integrity.
 - ii. The unit shall be PVC-coated.
- .h Rotationally Molded Poly Parts:
 - i. These parts shall be molded using low-density polyethylene (high density polyethylene is not acceptable) with a tensile strength that meets or exceeds ASTM D-638 and with color and UV-stabilizing additives.
 - ii. Wall thickness may vary by product from .187" (3/16") to .312" (5/16").
 - iii. At least 4 standard colors must be available from which to choose.
- .i Polyethylene Parts:
 - i. These parts shall be manufactured from polyethylene that has been specially formulated for optimum U.V. stability and color retention.
 - ii. Products shall meet or exceed: Density, ASTM D1505, and Tensile strength, ASTM D638.
 - iii. Various solid colors shall be available as well as various two-color options.
- .j Clamps:
 - i. All clamps, unless otherwise noted, shall be aluminum alloy.
 - ii. Clamps must attach securely "around the post", not bolt directly through the post. The clamp design must be shown as part of the playground submittal for approval.
 - iii. Each functional clamp assembly shall have an appropriate number of half clamps and shall be fastened to mating parts with fasteners and hardware that meets or exceeds requirements of ASTM F-879 and IFI-125. A drive rivet w/stainless steel pin is used to insure a secure fit to the post. A drive rivet is required on every clamp that secures a deck or overhead event to the post, and it is recommended but not mandatory on all other clamps.
 - iv. The following clamp types are not acceptable:
 - (a) Hinged clamps that do not seat completely around the post leaving gaps between the post and the clamp.
 - (b) Any mounting system utilizing only a bolt through system into the post.
 - (c) Steel clamps are not acceptable due to the high likelihood of rust forming on these parts.
 - v. Clamps must have a Powdercoat finish.
- .k Slides:
 - i. All slides will be one piece roto-molded from LDPE as specified and shall have full hoods with integrated handhold and sliding footers, slide entry barrier or other device that will cause the user to sit down before sliding. No sectional slides.
 - ii. Wall thickness of polyethylene may vary from .187" (3/16") to .312" (5/16") depending on the product.

- iii. Slides must not be allowed to pull away from the deck due to seasonal expansion and contraction. This event would be cause for removal and replacement by the manufacturer during the first 15 years of the slide's use.

.l Activity Panels:

- i. All activity panels shall be rotationally molded or $\frac{3}{4}$ " thick laminated high-density polyethylene with color throughout the thickness of the product.
- ii. All graphics on activity panels shall be routed in to expose the middle color of the sandwiched two-color polyethylene.
- iii. Decals are not acceptable for graphics on activity panels.

.m Warranty:

- i. All warranties shall be for an established term of years. Vague warranties that are open to interpretation such as "Lifetime Warranty" will not be accepted. The "Lifetime Warranty" must be stated in writing by the manufacturer as to exactly how many years the item is under warranty. As a further indication of quality the following minimum warranties shall be standard:
 - (a) 100-Year Limited Warranty for all posts, clamps, fasteners, beams, hardware, and caps, against structural failure due to corrosion/natural deterioration or manufacturing defects. This warranty does not include any cosmetic issues or wear and tear from normal use.
 - (b) 15 -Year Limited Warranty for all decks, non-moving aluminum, and steel components against structural failure due to corrosion/natural deterioration or manufacturing defects. This warranty does not include any cosmetic issues or wear and tear from normal use.
 - (c) 10-Year Limited Warranty for all polyethylene, roto-molded slides, PVC Coating, and any other plastic components. This warranty does not include any cosmetic issues or wear and tear from normal use.
 - (d) 3-Year Limited Warranty for all other parts, i.e.: Moving parts, Track ride trolleys and bumpers, etc. against failure due to corrosion/natural deterioration or manufacturing defects. This warranty does not include any cosmetic issues or wear and tear from normal use.