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ENH 1149

Sustainable Landscape Construction:

Materials and Products — Plastics and Rubber[1]

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PLASTICS ARE DURABLE, decay resistant, waterproof, and low maintenance. Because of these qualities, they are considered to be most "fit for purpose" despite the fact that they produce harmful emissions in production. Construction plastics are generally used for pipes, irrigation systems, and fence and rail panels. However, qualities that make these materials sustainable also make them difficult to recycle and dispose: they make up approximately 12% of all solid waste produced today in the developed world. Polyvinyl chloride (PVC or vinyl, from which we make pipes, decking, and fencing) is the most commonly used plastic in the construction industry because it is durable, impervious to moisture, and resistant to insects and fungi. However, the harmful by-products of PVC production and disposal are dioxins, which are persistent, bioaccumulative toxins (PBTs) that accumulate in fatty tissues and can lead to birth defects and endocrine disruption. Dioxins are released in the emissions from PVC production and in the burning of PVC materials. The use of PVC is also discouraged because of its limited recycle potential.

Substitutes for PVC include other plastics such as high-density polyethylene (HDPE). HDPE produces fewer pollutants in manufacturing and is the most recyclable plastic. Low-density polyethylene (LDPE) is another recyclable plastic mostly used for flexible products such as geotextiles and erosion control netting. Rubber is an elastic polymer that occurs naturally (latex) or can be synthetically produced. Rubbers are used for liners, hoses, patio blocks, mulches, playground surfaces, and sealants. The primary environmental concerns are the emissions of VOCs during manufacturing.

DESIGN STRATEGIES:

- **Use plastic products that number each component.** PVC is number 3 and should be avoided. HDPE is number 2 and LDPE is number 4.
- **Avoid the use of composite materials** such as fencing, decking, and artificial turf that contain PVC or vinyl. Look for alternatives to PVC, for example, HDPE is an alternative in irrigation pipes and drip lines, conduits, downspout extensions, root barriers, tree guards, lawn edging, fencing, gates, trellises, decking, railings, and outdoor furniture. LDPE is a good substitute in umbrella fabric, pool and grill covers, and geotextiles.
- **Use recycled products.** Look for materials containing a minimum of 25% post-consumer recycled content or 40% total recycled content.

CONSTRUCTION TECHNIQUES:

- **Use standard tools.** Most plastics can be cut and shaped with standard wood working tools.
- **Look for simple assembly.** Many prefabricated fences, railings, arbors, gazebos, and gates come preassembled or in panels that can be easily snapped together, eliminating the need for multiple tools. However, some brands require a fastener system that is proprietary.
- **Use screws and bolts.** Screws and bolts are recommended for connections with plastics, which have a high rate of expansion and contraction. Connections must accommodate the increased movement of plastic materials.

Adapted from:
Calkins, M. (2009). *Materials for sustainable sites: A complete guide to the evaluation, selection, and use of sustainable construction materials.* Hoboken, NJ: John Wiley & Sons, Inc.

Smith, C., Clayden, A. & Dunnett, N. (2008). *Residential landscape sustainability: A checklist tool.* Oxford, UK: Blackwell Publishing Ltd.

Thompson, J.W. & Sorvig, K. (2008). *Sustainable landscape construction: a guide to green building outdoors.* Washington, DC: Island Press

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