

Description Landforms, soils, and vegetation are protected from development impacts so that they continue to provide hydrologic functions for the site. Limiting the amount of disturbed area, minimizing soil compaction especially of high-permeability soils and preserving existing native vegetation protect the natural functions of a site.

General Information The urbanization process significantly modifies land surfaces and generally reduces a watershed's depression storage. The combination of site compaction, site imperviousness, and reduced depression storage can cause significant downstream problems. Limiting development impacts is the most effective way to preserve natural site functions.

Maintaining a site's existing topography helps protect the natural drainage channels and depressions which are much more effective in regulating water quality and quantity than any structural storm water facility. Protecting and using the hydrology of a site to generate the development form can save on development costs by minimizing earthwork and expensive drainage structures by working with natural landforms. The drainage system can also suggest pathway alignment, optimum locations for park and play areas, and potential building sites (Coffman, 2000).

Preserve the natural hydrologic functions of the site including streams and their buffers, floodplains, wetlands, steep slopes, and high-permeability soils; create landform alterations that perform a hydrologic function. Leave critical areas with desirable trees in their natural condition or only partially cleared.

Prior to construction, topsoil should be removed from all parts of the site that will be built on, as well as access paths and staging areas to be used later in restoring other portions of the site. Topsoil should not be relocated to critical areas such as preserved trees zones, vegetative stream buffers, or wetlands. To prevent erosion, small stockpiles can be covered with plastic; large stockpiles may require stabilization by seeding or mulching.

During construction, soil compaction should be minimized. This includes compaction by heavy equipment and small repeated forces such as persistent foot traffic. Limiting on-site stockpiling of materials and parking also reduces soil compaction. Staging areas should be chosen carefully, located preferably in an area that is already designed to be a hard surface such as a driveway, patio, or plaza, and well away from important trees or sensitive areas. In some cases, it is possible to use existing roads or parking areas adjacent to the site for materials storage.

Where possible, existing vegetation should be protected. Existing trees are among the most valuable features a site can have, from both ecological and real-estate perspectives. Trees stabilize the soil and prevent erosion, decrease

stormwater runoff, moderate temperature, provide buffers and screens, filter pollutants from the air, supply oxygen, provide habitat for wildlife, and increase property values. Although trees are the most prominent vegetation on most sites, the health of other vegetation may be equally important in some regions. Shrubs, meadows, hedgerows, windbreaks, and groves strongly affect both the character and the ecological functioning of the site (Thompson and Sorvig, 2000).

During site evaluation, note where valuable trees and other natural landscape features should be preserved. Locate roadways, buildings, storage areas, and parking pads away from valuable vegetation. Designate groups of trees, individual trees, and other vegetation to be saved on the erosion and sedimentation control plan.

Although direct contact by equipment is an obvious means of damaging trees and other vegetation, the most serious damage is caused by root zone stress from compacting, filling, or excavating too close to the tree. Fence protected areas, build with great care under trees, and avoid grade changes near trees to protect vegetation. Clearly mark boundaries to maintain sufficient undisturbed areas around the trees. Minimize trenching in areas with trees. Follow natural contours, where feasible, to minimize cutting and filling in the vicinity of trees. Do not excavate, traverse, or fill closer than the drip line, or perimeter of the canopy, of trees to be saved.

Areas to be protected should be marked prior to any clearing and grading. Fluorescent marker paint or flagging should be used around protected features to guide preliminary clearing, followed immediately by fencing. All fenced areas should be completely off-limits to vehicle and foot traffic, and to materials storage. Protection fencing should remain until all work and cleanup are complete. At the very least, fencing should remain in place until all heavy machines (including delivery vehicles) have left the site.

Additional Resources

Arendt, R.G., 1996. *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks*, Island Press.

Center for Sustainable Design, *Tree Preservation and Protection*, Mississippi State University. Available on website.

Dramstad, Wenche E., James D. Olson, and Richard T. Forman, 1997. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*, Harvard University Graduate School of Design, Island Press and the American Society of Landscape Architects.

Forman, R. T., 1995. *Land Mosaics: The Ecology of Landscapes and Regions*, Cambridge University Press.

Johnson, B. R. and K. Hill, eds., 2001. *Ecology and Design: Frameworks for Learning*, Island Press.

Figure 4-1. Protect natural site functions

