Technical Paper on
Incorporating Sustainable Development Methods into Critical Areas Ordinances

By the Snohomish County Sustainable Development Task Force

The purpose of our task force is to develop some suggested approaches and ideas for jurisdictions to follow in order to incorporate sustainable development strategies and principles into the update of their local Critical Areas Ordinances (CAOÌs). As we have discussed in our meetings, the challenge of offering technical suggestions to jurisdictions is that our advice must be easy to follow and flexible enough for incorporation. To this end, we have identified three main areas of focus: (1) programmatic strategies for preserving shallow groundwater recharge functions; (2) incentives for incorporating sustainable development strategies; and (3) incorporating the use of pervious concrete in new development, where applicable. These areas of focus provide a range of ideas, from an overall site and program assessment for determining the potential for incorporating sustainable development methods, to a rewards system approach, and finally, to a specific technique that has test-case examples that can be identified. These issues are addressed in detail in the following discussions.

1. Watershed Function and Recharge Preservation Issues

Many CAOÌs are written to protect a wetland and a stream, but then often allows destruction of the shallow subsurface hydraulic connection the wetland has with the stream it feeds. A surface connection of this kind is typically a type five stream, which is protected by some jurisdictions in their sensitive area ordinances. However, subsurface shallow groundwater flows are, on the other hand, usually only protected insofar as they stay within stream buffers.

It has become increasingly clear that Limited Impact Development (LID), (which seeks to distribute a variety of storm water controls uniformly throughout a development rather than collect, convey, and detain water in ponds), is probably the best hope to meet GMA requirements while still preserving enough watershed function to keep watersheds healthy. Not coincidently, LID results in the most quality of life for humans and wildlife by preserving the maximum amount of natural topography, soils and vegetation. This allows for trails, habitat, increased air and water quality and other benefits.

Large centralized stormwater ponds aren't the only way to protect water resources. Sensitive areas can also be protected by using more low-impact development practices. Low-impact development practices use the natural features of a site and engineered facilities to treat and infiltrate stormwater. Practices include narrower roads, engineered vegetated gardens and the protection of native vegetation. Using these practices can reduce the size of stormwater ponds while managing stormwater effectively. There is typically no loss in the number of developable lots, water resources are protected and, in some cases, costs are less. These practices hold such promise that communities around Puget Sound, including several in Thurston County, have embraced them in ordinance.

The Sustainable Development Task Force suggests that the following series of actions and practices be considered and/or incorporated into local Critical Areas Ordinance update efforts.

<u>Conservation of Natural Site Assets</u>

Site planning with low impact development practices begins with developing strategies to conserve the natural hydrologic assets and functions of a site. LID site conservation design techniques include directing development away from sensitive environmental areas (like streams and wetlands), preserving native vegetation and soils, maintaining existing drainage courses, and minimizing the extent of impervious areas.

Directing Runoff Through Natural Areas

Natural wooded areas are extremely effective groundwater recharge areas. Once conservation design and minimization techniques have been applied, an LID plan identifies or creates opportunities to retain as much runoff as possible on site and allow it to slowly infiltrate back into the ground. These practices include gently sloping impermeable surfaces to direct runoff onto vegetated areas with porous soils. Adding

crushed stone and organic material near and directly on these areas also increases infiltration, recharge, and storage.

Small-Scale and Distributed Controls

To mimic the way natural areas store, infiltrate, and release water, LID uses small-scale controls that are distributed throughout the site. This not only allows for a redundant system with less opportunity for failure, but can also provide a "treatment-train" approach where there are multiple opportunities to filter pollutants.

Customized Site Design

LID requires the designer to examine each site for its role in the hydrologic function of the watershed. Since land within a watershed is developed incrementally, rather than all at once, this helps protect the integrity of surface waters within a watershed as development occurs. This approach requires the designer to incorporate any available watershed or basin planning information into site design and design strategies to ensure that the effects of the site donÌt compromise the integrity of the watershed.

Maintenance, Pollution Prevention, and Education

In contrast to traditional stormwater facilities (such as ponds), many LID practices require only a minimum of maintenance. Bio-retention cells may only require occasional mulching or fertilizing, and permeable pavements may only need to be swept periodically. Pollution prevention techniques that reduce the amount of fertilizers, pesticides, dirt, and other chemicals that enter LID practices help reduce maintenance needs, increase efficiency and protect receiving waters. LID design approaches require that property owners and site managers be provided with brochures, videotapes, or other educational materials on how to properly handle and apply chemicals and reduce pollutants. This can enhance a communityÌs water quality education and involvement program.

2. Incentive Programs

It is sometimes necessary to provide incentives for people to implement conservation measures, especially when those measures might cost more money to implement. Sustainable development technologies sometimes cost more money to implement or require more time to research and construct the first time they are implemented. Therefore, we have researched codes and policies that provide incentive programs for sustainable development and have been implemented in various jurisdictions.

Incentives that have been developed to promote the use of LID measures to increase the amount of groundwater recharge include:

1. Discounted rates for stormwater discharge. For example, projects that infiltrate 100 percent of the stormwater can receive up to a 50 percent reduction in the stormwater utility fee.
2. Zoning code bonuses for implementing LID measures.
3. Green Roof bonus of adding one square foot of additional floor area for each square foot of green roof, if green roof covers at least 50% of roof area and at least 30% of the garden contains plants. The owner must sign a covenant with city to commit to maintaining the rooftop garden.
4. Applicants of small development projects may accept permit conditions that fulfill the best management practices for LID surface water rate control in lieu of submitting a a full permit package such as omitting the drainage narrative.
5. For major development activities and engineered grading projects, applicants who propose to use LID drainage controls may submit a drainage narrative instead of a preliminary drainage plan. The ordinance does not require a downstream analysis when the project design is approved for using LID standards.
6. In order to avoid high-density development that would have a significant adverse impact upon the habitat within designated sensitive drainage basins, administer development regulations that protect critical areas and designated sensitive drainage basins and adopt low impact development regulations within designated sensitive drainage basins that may include stormwater standards, critical area regulations, zoning designations and other development standards.
7. Establish street designs that minimize impacts to the natural environment especially within a designated sensitive drainage basin.
8. Establish residential densities of two to four units per acre; allow duplexes, townhouses, and multifamily uses and increase maximum building heights compared to other residential districts in attempt to reduce the amount of land covered by buildings. Allow several land uses, including duplexes and parking lots that are not typically permitted in single-family residential developments.
9. Ordinance provides developers with a financial incentive of using zero impact development practices in residential and commercial projects.
10. The Washington State Department of Transportation is currently revising its *1995 Highway Runoff Manual.* As part of this revision, the department will develop and reference three low impact development elements in the revised manual:

    - Permeable paving at park and rides, pedestrian paths, and lower speed roadways.
    - Bioretention along roadways.
    - Constructed wetlands for stormwater treatment.
    - The LID portion of the revised manual should be available for use by the end of September 2003 and will include plans, specifications, methodology for estimating costs, and a hydraulic design process.

3. Pervious Concrete

The use of curbs, gutters, collectors, conveyance pipes and detention ponds has been the traditional way to deal with stormwater from roads, parking lots, and other paved areas. Within the last few years, however, pervious concrete has been used in a variety of stormwater control applications**.** Used for decades in Europe and more recently in the eastern U.S., local concrete suppliers here in the Northwest have begun to make and market pervious concrete for roads, sidewalks, and parking lots. The pervious nature of this type of concrete lets water (i.e. rain) pass through to percolate into the ground.

Pervious concrete has been used in the City of Olympia for road and sidewalk projects, in Marysville for a sidewalk demonstration, and in Maltby for a residential cul-de-sac. Most recently, in Arlington, a developer (Chinook Homes) has laid a 1000 foot long residential street, just off Hwy 530 near I-5, using pervious concrete. This last is the largest example to date locally for road use. The Tulalip TribeÌs commercial development of the Quilceda shopping /casino complex uses pervious pavement in a parking lot area. Also there is a desire for pervious surfaces at the planned new Tribal Administration Center and future residential developments.

The benefits of pervious concrete for improving stormwater quality are being recognized in several other local cities for walkway and parking lot projects now in the planning stage. Our task force can provide updated information on the use of pervious concrete by local jurisdictions for stormwater control in project development.