KING COUNTY

Department of Natural Resources
KING COUNTY

INTEGRATED POND

ENHANCING THE DESIGN AND VALUE OF STORMWATER PONDS

THE INTEGRATED POND

Cover photo:
Ballinger Commons
Water Quality Pond

PRINTED ON RECYCLED PAPER

KING COUNTY

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September 1998
Funded by King County Water and Land Resources Division

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STORMWATER IS NOT

WASTEWATER,

IT IS A *RESOURCE* –

AS POTENTIAL GROUND

WATER, AS UNPOLLUTED

WATER, AS HABITAT,

AS AMENITY.

Part I
Introduction

After nearly two decades of requiring, designing, reviewing and living with stormwater storage ponds in the Pacific Northwest, the King County Water and Land Resources Division (formerly King County Surface Water Management) is confronting pond shortcomings – technical, esthetic and social – and pursuing their potential for improvement. Several generations of these facilities are providing information with which to improve design, function and place in our communities. There is no comprehensive solution to the various impacts these necessary facilities have on our communities. There are, however, new and coming regulatory flexibilities, clear and continuing demands for protecting and enhancing quality of life, a growing recognition that through public/private collaboration, improvements are possible, affordable and beneficial to all.

This water quality pond at Winterwood in Covington doubles as waterfront and parkland.

There is now ample evidence, both locally and nationally, that well designed ponds with attractive landscape buffers, and/or passive recreational features, can become major site amenities and contribute both added value and quality open space. Studies by the Urban Land Institute show that ***"quality landscape design and amenities can contribute substantially to both the real (...financial...) and perceived (...quality of life) value of a real estate development project."***[1] Their evidence shows that quality landscaping and amenities:

- "Can translate into increased financial returns for a project's developers.
- Give developers a competitive edge and increase the pace of a project's absorption.
- Are a key factor in establishing an image, identity, and sense of community for development projects.
- Include passive amenities that are often more valued than provisions for active recreation.
- Contribute substantially to the perception of security, privacy, and place."[2]

"WHEN ALL ELSE IS EQUAL, THE PRICE OF A HOME LOCATED WITHIN 300 FEET FROM A BODY OF WATER INCREASES BY UP TO 27.8 PERCENT"

1991 AMERICAN HOUSING SURVEY

This is typical of hundreds of similar detention ponds – functional but ugly.

So Why are Ponds Ugly?

Though ponds provide important safeguards against flooding, erosion and water resource degradation they can also be unattractive, expensive, mono-functional, and hard to maintain. County pond design standards tend to be prescriptive. Few guidelines exist for directing designers and builders to appropriate and integrative design solutions. Developers see the pond as a cost burden and avoid the expense of mitigating pond appearance because design variances can be expensive and time consuming.

Contractors bid and build projects for maximum return of their time and labor. Trees and slope variations in small scale environments, including ponds, are impediments that are typically removed to achieve the desired profit or break-even contract. Subsequent county maintenance is necessarily minimal. Too often, ponds resemble gravel pits, muddy holes in the ground, or vacant lots. Frequently, those who live nearby perceive these ponds as "the ugly thing the government made us build." Houses built next to these facilities can be less desirable to buy. Developers, in an effort to maximize buildable land, often include no separation or transition space around ponds and opt instead for smaller but steep, unattractive ponds requiring safety fencing.

Because ponds are rarely given a use outside their prime function they often lack any visual or actual connections to the neighborhoods they serve. But there can be significant advantages to upgrading the visual appearance and multi-functionality of ponds. Ponds with perimeter plantings resembling the surrounding neighborhood contribute attractive open space rather than detractive empty space. Large ponds with gentle slopes can be made into viable park and passive or active recreational space. Water quality ponds can be fit with fountains or be made to resemble a wetland.

A Change of Direction

The Water and Land Resources (WLR) Division would like to encourage all participants involved in the complex process of pond regulation, design, financing, construction, review and maintenance to explore the challenges and opportunities that ponds present. We are already in the process of updating regulatory standards to allow for greater flexibility. Other efforts have been made by the County to enhance ponds within existing communities. This booklet is

This water quality pond at Audubon Park exhibits the best in current water quality pond design – fountains, landscaping, places for people.

meant to open the door to further discussion and change. It details the very real problems inherent in pond function, engineering, maintenance, cost, and size. It also suggests opportunities for improvement in these areas and offers suggestions which focus on enhancement techniques. In the decade ahead, we are looking forward to future improvements in both pond design and usefulness facilitated by more flexible regulations and a shared approach to their care and management.

wise, part of the project recreation requirement may be applied to the pond site if either active or passive opportunities necessarily bare appearance.

Looking in New Directions

The Role of Ponds

The typical detention pond is usually dry, holding water after large storms and then allowing it to exit at a slow rate. These ponds are standard for residential developments where the amount of impervious surface is high, i.e. many roofs, streets and driveways. Water quality ponds generally hold stormwater all the time. The water is purified by settling and by biological processes. They are standard for larger developments. Some ponds combine the functions of detention and water quality ponds. To be functional, both types of pond must provide sufficient water storage capacity as well as access for maintenance. These and other basic functional and landscape requirements are outlined in the King County Surface Water Design Manual. However, the manual primarily addresses stormwater and can only minimally treat landscape issues.

An older but well integrated water quality pond at Springwood enhances the quality of life for residents.

Beyond the Single Function Pond

As long as the primary stormwater management function is retained, and a special use permit is approved, ponds can be put to uses that add to the value of surrounding properties. With suburban densities increasing, we can ill afford to overlook potentially valuable recreational or open space. Instead of being seen as ugly, left-over space, it can become a recreational or habitat amenity, relating the

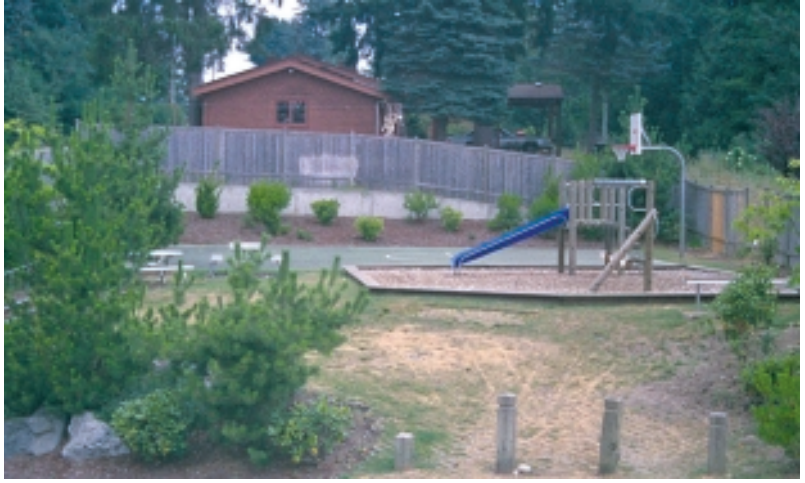
A basketball court was installed in this detention pond.

pond to its neighborhood in a multi-functional manner.

A few ponds have already been used for additional purposes and these can point the way toward a more integrative approach to pond design in the future. For example, some neighborhoods have sport courts installed on the bottom level of dry detention ponds. Other neighborhoods have strolling, running and interpretive trails around their water quality ponds – some of which are also natural wetlands or begin to resemble wetlands. A wider buffer area between pond and residences can serve as picnic and children's play areas. Some developers have used the pond as part of the subdivision entry, installing attractive signage and landscaping the edges. In these cases the homeowner's association must provide enhanced maintenance.

Some other possible uses for ponds might include:

- Living laboratory – where outdoor classrooms could meet for ecological study of wet landscape systems or where students could conduct school projects.



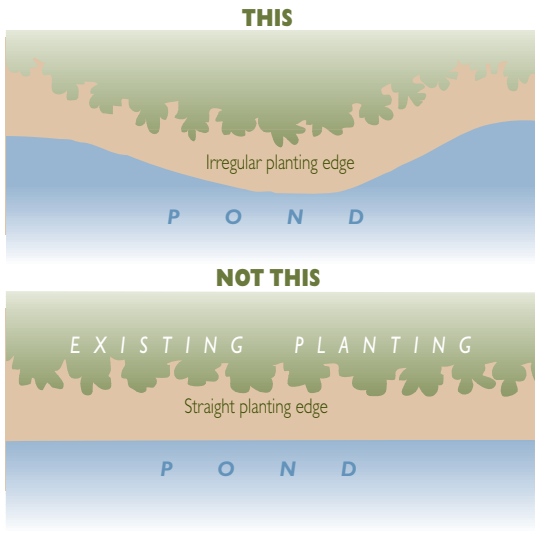
This community used a large underground tank to detain stormwater over which an entire neighborhood playground and picnic area was built.

- Terraced Court – straight sided walls built of rock gabions or retaining system blocks and terraced to hold plantings or patios. This feature would never need mowing and could be used for community gatherings, activities or events.
- Environmental art feature – i.e. earth works, sculptures, etc.
- Community garden feature or pea patch
- Decorative water feature
- Play courts

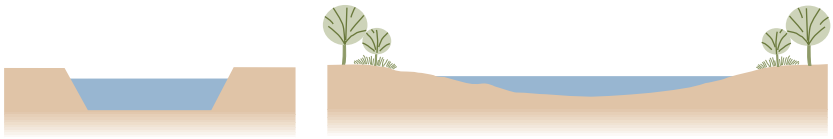
The Challenge From Engineering

For 15 years, engineers at the WLR Division have been improving regulations around the functional aspects of ponds – their construction, holding capacities, shapes, sizes and costs. Changes to the Design Manual will continue to be considered in future updates. New changes to the Design Manual involving landscaping include:

- The number of holding cells in ponds has been reduced – a single cell in detention ponds and only two cells in water quality ponds.
- A better design for "combined" ponds that have both a permanent stormwater pool as well as additional room for peak flow detention on top. These ponds have fewer berms, are deeper (permanent pool is an average of four feet or more), and have more water surface than the old designs. They are better at stormwater treatment, but they also improve esthetic and landscape possibilities (e.g. the use of fountains).



Irregular edges enhance naturalistic appearances.



Volume-for-volume, straight slopes fill fast and infiltrate slowly. Slope and pond serve no other purpose.

Flatter slopes fill slowly and infiltrate more rapidly, allowing slopes to be used for other purposes such as wetland habitat or recreation.

- If a water quality pond is built four times longer than it is wide, only a single cell is necessary. The resulting look of the pond is more linear and less box-like. A curving linearity can integrate better with natural topographies and greenbelts.
- Access ramps need only be provided to the first cell of a two cell pond. Moreover, ramps can use gravel or a "Grasscrete" like product instead of asphalt.
- Perimeter roads are no longer required. When re-landscaping an older pond (pre-1998), these portions of roads may sometimes be used as planting areas.
- Fences required for steep side slopes only need to be above the slope area, not necessarily around the whole pond. Alternatives to chainlink fence are also allowed if privately maintained. Wood fences, recycled plastic fencing, vertical bar fences and use of thorny shrubs like holly, rosa rugosa and barberry are also options.
- Erosion control options in addition to hydroseeding are now allowed. Four to six inches of "hog fuel" wood chips held in place with jute netting makes it easier to install non-grass plantings.
- Very basic landscaping guidance for "natural looking" ponds is provided, and such ponds are allowed in open space tracts, at least for some programs (like the Four-to-One zoning program in case study I).

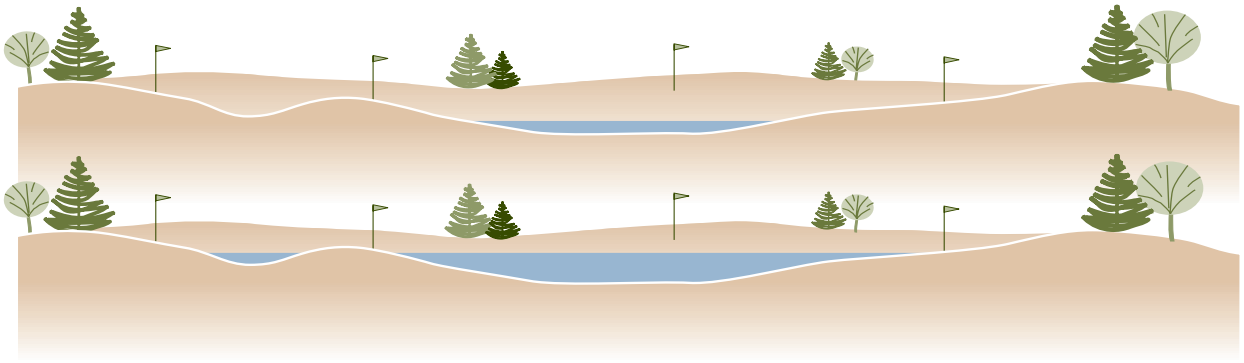
Hopefully, these improvements and others will add more flexibility to design options. Remember, that while the Design Manual does not address the multi-purpose use of ponds, it does not prohibit such use.

Ponds with Value Added Amenities

Many ponds lack any visual or biotic relationship to their surroundings. Many have been invaded by weeds and are littered with rocks. These ponds do not work well as open space and are hardly neighborhood amenities. In the past, developers and engineers have often dealt with the problems of pond size and cost by squeezing them into steep-sided rectangular pits surrounded by the requisite cyclone fence. These truly ugly ponds can impact the enjoyability, values and salability of the properties surrounding them, thus costing the developer and subsequent buyers even more.

There has been an interest on the part of some developers to incorporate well designed amenities into the pond design. Case studies included in Part II of this booklet document some of their successes. Besides Design Manual changes, one of the ways the County is beginning to help is by allowing 50 percent of the landscape requirement for a development to be applied to part of the

A park with tennis court was built around this water quality pond at Winterwood.



Upper levels of stormwater detention are devoted to infrequent flood flows. These flows could be widely spread into a grassy "green" for use as a golf course or park-like recreation area. Many detention ponds are wet only a few times a year during heavy storm events and may infiltrate quickly.

pond if the surrounding area is landscaped and functions as an amenity to the project. Likewise, part of the project recreation requirement may be applied to the pond site if either active or passive opportunities are provided within or adjacent to the pond site.

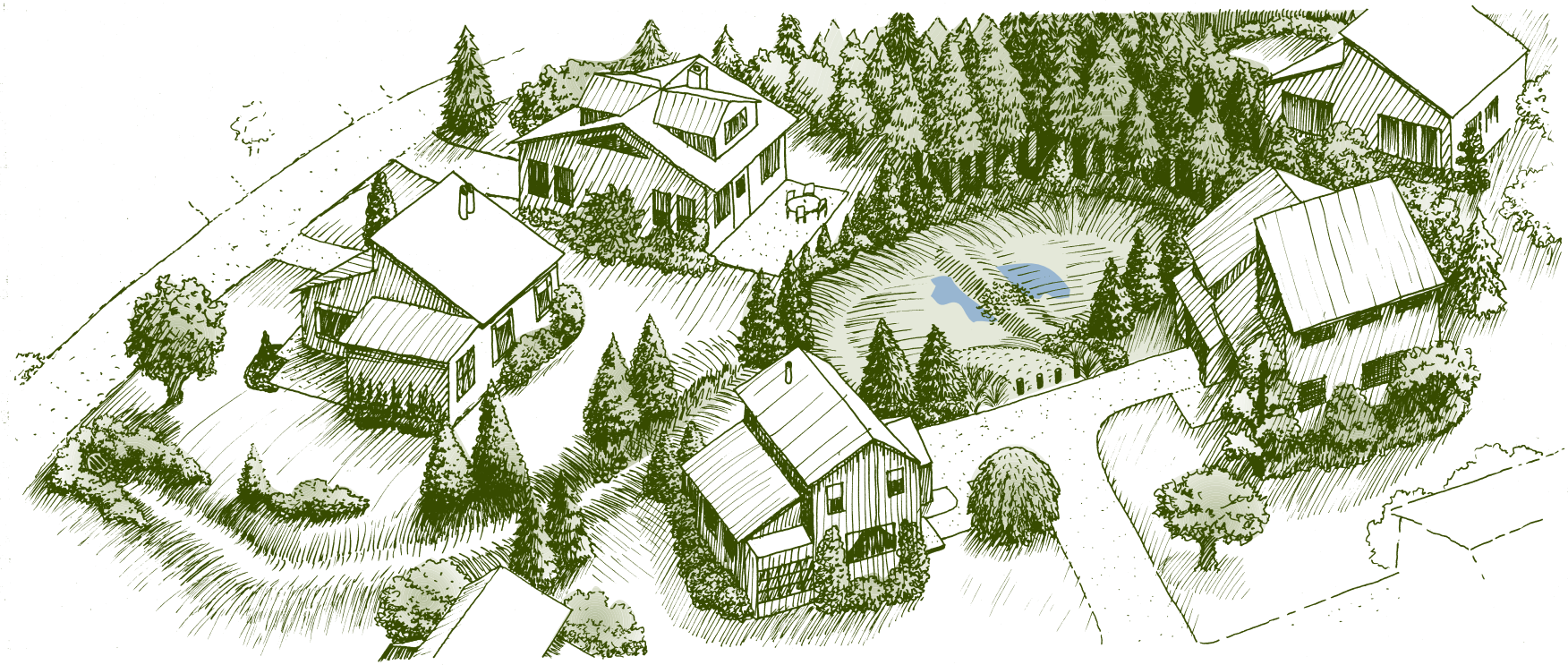
The ideal pond might be a valley-like open space surrounded by an attractive landscape (including paths, viewpoints, sitting or play areas) which may connect to a larger neighborhood trail system or green belt (see case studies). This arrangement could be at the entrance or edge, or wind centrally through the development with natural, undulating contours. If the pond is graded and blended with the topography of the site, and fences are not visual impediments, then the open space is perceived as part of the surrounding lots – which appear larger and more valuable. In dry detention ponds, sport courts may be formed in the bottoms. Wet ponds could incorporate a fountain or re-circulating waterfall feature. Native plantings could encourage wildlife to return to disturbed areas (backyard bird watching is the fastest growing sport in the U.S.). Maintenance of the area by the community could extend into the pond, creating a weed free, park-like environment. This multi-functional pond, adopted by neighbors invested in their quality of life, can be a working model for designers, developers, communities and county staff.

Economic Benefits of Water Quality Wet Ponds

Even though stormwater management costs money, properly designed runoff systems can provide economic benefits that counterbalance or even outweigh those costs. The practice of siting developments around man-made ponds,

Ponds can be designed to be linear or streamlike. The sinuosity works well in narrow spaces. Linked biofiltration swales, wet ponds and detention ponds can resemble a natural system when planted.

Views of water – even stormwater in this case – can add real value to the sale of a house.



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lakes, or wetlands created to control flooding and reduce the impacts of urban runoff is becoming more prevalent. Controls that are pleasing to the eye and safe for children can lead to increased property values and enhance the quality of life. Beautification of land areas adjacent to waterways and detention ponds should be considered an integral part of planning by developers. A 1991 American Housing Survey conducted by the Department of Housing and Urban Development and the Department of Commerce concurs that "when all else is equal, the price of a home located within 300 feet from a body of water increases by up to 27.8 percent" (*National Association of Home Builders*, 1993). If located close to the entrance and visible from the road, a pond could have considerable curb appeal and can repay installation costs through faster sales.