

## **APPENDIX K: REGIONAL NONSTRUCTURAL MANAGEMENT PROGRAM**

Several basin plans are currently underway for basins within the north Thurston County area. In the future, additional basin plans are anticipated to be completed. Each plan contains basin-specific capital recommendations that focus on problems that occur and can be solved within the individual drainage basins. In addition, the plans contain recommendations that address non-capital issues existing in every drainage basin throughout the region. Jurisdictions within the north Thurston County area have worked together to create a package of cooperative non-capital recommendations to be included in each basin plan. Until this package is implemented, all current and future basin plans will include identical recommendations for a cooperative nonstructural program.

### **IMPLEMENTATION STRATEGIES FOR REGIONAL NONSTRUCTURAL RECOMMENDATIONS**

Two strategies have been developed to streamline implementation of cooperative recommendations. Both are described briefly below:

**Coordinate and Implement Regionally:** The scope of the recommendations under this strategy go beyond basin and jurisdictional boundaries and require cooperative participation to succeed. All jurisdictions will coordinate and contribute financially to one existing lead agency for each program recommendation, which will coordinate activities throughout the region.

Total recommendations under this strategy: 14

Examples: Multijurisdictional plan coordination, community grants.

**Coordinate Regionally, Implement Locally:** The scope of the recommendations under this strategy also go beyond basin and jurisdictional boundaries, but the recommendations would be implemented by individual jurisdictions. Each jurisdiction would have programs and staff in place to support these recommendations. Coordination would occur through existing processes.

Total recommendations under this strategy: 22

Examples: Public information and outreach, drainage manual revisions.

### **STORMWATER FACILITIES**

While most stormwater facilities serve a particular basin, the jurisdictions can work together to achieve enhanced operation of existing facilities and construction of new ones.

**Recommendation R-1: Maintain public and private stormwater management facilities on a scheduled basis.**

Discussion: Sediment accumulations, excessive plant growth, and incidental structural failures periodically impair the design capacity of stormwater systems. To a large extent, maintenance has historically been conducted only in response to a problem. With the implementation of this recommendation, pipe systems would be cleaned every two to three years, ditches dredged every two to three years, and ponds dredged every eight to ten years. High maintenance systems would be identified and given more frequent attention. Vegetation management would be conducted yearly. New and existing private facilities would be required to enter into legally binding maintenance agreements with the respective jurisdictions.

Benefit: Elimination of many existing flooding problems within the basins.

Estimated County Cost: \$525,000/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-2: Identify public and private stormwater facilities that can be upgraded, and improve them as an alternative to building new facilities.**

Discussion: Construction of new stormwater facilities is extremely costly. Often it is much more cost-effective to do minor improvements to ponds that already exist, but do not function at full capacity. These improvements vary depending on the pond, but can be as easy as replacing an existing orifice with a smaller one, dredging, deepening, or widening the facility. If enough retrofits of existing ponds are accomplished, the need for new storage facilities can be reduced. Although retrofitting can reduce the need for construction of small storage facilities, usually it does not substantially reduce the need for regional storage facilities.

Benefit: Increased efficiency of existing ponds and reduced need for new ones.

Estimated County Cost: Included in basin-specific recommendations.

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

## **HABITAT ENHANCEMENT/CRITICAL AREAS PROTECTION**

Habitat and wetlands can be protected efficiently using consistent management policies throughout the region. Critical habitat areas often cross jurisdictional boundaries and cannot be protected adequately using existing approaches.

**Recommendation R-3:**      **Protect critical areas including streams, wetlands, buffer areas, and lands adjacent to these areas through regulation. Purchase of wetlands and other critical areas for the purposes of outdoor recreation, stormwater management, and education should continue to be considered as an option.**

Discussion: Because outright purchase of critical areas such as stream corridors and wetlands is often prohibitively expensive, regulations can be used to ensure the continuation of their beneficial functions. Existing regulations addressing critical areas within the jurisdictions are currently being modified to meet the requirements of the state's Growth Management Act.

Critical areas can be adequately protected by prohibiting certain detrimental uses and activities. Use of existing or enhanced regulations can protect the areas relatively well without additional municipal costs. When possible, purchase of important wetlands will be used to preserve these resources for outdoor recreation, educational purposes, research, and to further protect their natural functions and values.

Benefit: Cost-effective protection of wetlands and other critical areas.

Estimated County Cost: Included in basin-specific recommendations.

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-4:**      **Provide technical and financial assistance to private parties pursuing open space preservation through programs such as conservation easements.**

Discussion: In order to place private property into permanent preservation, property owners must go through a lengthy and relatively expensive process. Preservation of open space is extremely important and should be made as easy as possible for anyone who is interested in pursuing these options. This includes the availability of technical advice and financial assistance to cover the potential costs of the process. This program would complement the work of the Capital Land Trust.

Benefit: Protection and preservation of critical areas currently in private ownership.

Estimated County Cost: \$1,600/year + \$1,000/one-time

Project lead: To be determined.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-5: Support and coordinate with parks and planning departments in the protection and acquisition of land offering unique open space attributes.**

Discussion: The potential to lose valuable open space is extremely high due to the rapid rate of development in north Thurston County. Preservation of open space is an important component of protecting water resources. By supporting and coordinating with parks and planning on the protection and acquisition of lands that offer especially valuable open space traits, these areas will not be lost.

Benefit: Protection of lands providing exceptional visual and wildlife amenities.  
Preservation of the natural beauty and character of the north Thurston County area.

Estimated County Cost: \$1,600/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-6: Minimize the number of street and utility crossings through critical areas. When crossing creeks, encourage necessary street crossings to use bridges or arch culverts that maintain the natural creek substrate. Encourage new utilities to use existing utility corridors.**

Discussion: Streams and wetlands are severely impacted by the construction and use of road and utility crossings. Minimization of the number of crossings would diminish resource impacts and hydrologic changes to the stream system. When no other reasonable alternative to creating a stream crossing exists, the use of arched culverts would maintain the natural stream substrate which is a critical component of stream habitat. Existing frameworks could be utilized to implement this recommendation, the most appropriate is probably through the development review process.

Benefit: Reduced degradation of water quality and habitat.

Estimated County Cost: No additional cost beyond current Critical Areas Ordinance development

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

## REGULATIONS/DEVELOPMENT CONTROLS

The jurisdictions can more effectively regulate development to protect natural resources if they work cooperatively.

**Recommendation R-7:**     ***Amend the Drainage Design and Erosion Control Manual for the Thurston Region, Washington (Regional Drainage Manual) to require half the current stormwater release rate for new development located on poorly drained soils, including all hydrologic Class C and D soils and many Class B soils as defined by the Regional Drainage Manual and the 1990 Soil Survey of Thurston County.***

Discussion: The Regional Drainage Manual established stormwater facility storage needs and release rates based on the best available information at the time. Section 1.3 of the manual supports the establishment of storage requirements and release rates by the basin planning process. Many jurisdictions in the Puget Sound area are evaluating the need to increase storage requirements. The recommendation is supported by recent Washington Department of Ecology (WDOE) proposals in the *Stormwater Management Manual for the Puget Sound Basin*.

The computer modeling efforts of the basin planning process have provided state-of-the-art analysis of the Indian/Moxlie, Percival, Woodard, and Woodland basins. These analyses provide far greater accuracy than past evaluations made possible.

These basins encompass approximately 49 square miles in the urban area. Much of the basins are within the Urban Growth Management Area (UGMA). The portions of the urban area not included in the basin planning areas include Ellis, Mission, Schneider, Green Cove, and Chambers basins. These basins and creek systems have been evaluated through a WDOE Centennial Clean Water Basin Reconnaissance grant (TAX90202). Through these various planning efforts, all basins and associated creek systems in the urban area have been investigated. The infiltration standards for these basins will be reevaluated and adjusted if necessary, when basin plans for them are developed.

The need to increase the drainage regulations is a function of the tendency of many local soil types to become saturated during storm events. Subsequently, rainfall creates runoff rather

han being infiltrated. Although portions of the urban area have not been evaluated by the basin planning process, the soils in these areas are typically as prone to saturation as the soils in the evaluated basins.

The proposed drainage requirements are critical to the success of the basin plans. Failure to adopt this proposal would result in the continuation of existing management problems or a reliance on the local jurisdictions to provide appreciable quantities of stormwater storage.

In addition to the costs associated with the jurisdictions providing regional storage, numerous conveyance systems upgrades would be necessary to accommodate future high flows. The implication of appreciably higher future flows is readily apparent in the Indian Creek basin. Prior to its confluence with Moxlie Creek, Indian Creek is conveyed in pipes at 19 locations. Many of these pipes are currently at capacity. Without increased storage requirements, potential development could result in the need to replace many of the high cost pipe systems.

The recommendation to increase the storage requirements includes several qualifiers:

- Areas with highly permeable soils would not be required to comply with the proposed storage requirement. These soils may be capable of infiltrating stormwater and meeting the proposed release rate requirement without increasing storage volume. Numerous areas in the southern portion of the urban area typically have highly permeable soils.
- The proposed requirements provide an impetus for developers to minimize impervious surfaces and effectively infiltrate runoff within a development. Developments designed to accomplish these goals could expect an appreciable reduction in stormwater management requirements. Innovative design techniques are numerous and may include narrower road widths, porous pavement, yard infiltration, depressional landscaping, and cluster development.
- With the necessary jurisdictional fee-in-lieu policies in place, stormwater management requirements for a proposed development could possibly be reduced. The reduction would be contingent upon a jurisdictional need to correct an existing stormwater problem. Fee-in-lieu contributions could be used only in the same drainage area as the proposed development.
- The goal of this recommendation is to maintain existing, pre-development stream flows through consistent design standards that do not place unnecessary complications on developers and engineers. For specific development sites, other methods may be considered to meet this goal.

The cost savings associated with more stringent standards are substantial when considered against potential necessary infrastructure upgrades.

Benefit: Stormwater runoff is often the primary detrimental influence on urban creek

systems. Often, artificially high flood flows have a greater impact on the integrity of urban creeks than does water quality contamination. The effects of stormwater flows are apparent in the creeks in the urban area. More stringent storage requirements than those currently provided by the Regional Drainage Manual are justifiable for the protection of natural resources and the minimization of future flooding problems in developed areas.

The recommendation would also provide substantial saving in public infrastructure needs. While the proposed storage requirement continues to allow increased flows to be released from a site following development, the recommendation does effectively reduce peak flows.

Estimated County Cost: No additional cost beyond scheduled Drainage Manual revisions

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-8:** Amend the Drainage Manual to require adequate treatment of stormwater prior to infiltration in highly permeable, Class A soils in industrial/high risk areas, as specified in the North Thurston County Ground Water Management Plan.

Discussion: Ground water recharge is important to the health of creeks, water supplies, and the minimization of stormwater management costs. Stormwater infiltration is supported by current drainage design regulations. However, infiltrating contaminated waters through highly porous soils may provide inadequate treatment thereby threatening ground water quality. A recent study conducted in the Puget Sound area supports the need for treatment prior to infiltration (Brown and Caldwell, 1990).

Benefit: Minimization of threats to ground water quality.

Estimated County Cost: No additional cost beyond scheduled Drainage Manual revisions

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-9:** Require new homes and remodels which increase impervious area to install stormwater management systems capable of managing the volume of runoff generated by the new development.

Discussion: While large development projects are required to install stormwater management facilities, single-family home construction is not required to do so. This type of

development, called in-fill, can have considerable cumulative effects on stormwater. There are several low cost, effective techniques that can be used for single-family in-fill development that effectively reduce the quantity of runoff generated from the site. This recommendation does not propose that systems with sufficient capacity to accommodate the additional runoff should be upgraded.

Benefit: Reduced quantity of stormwater runoff from in-fill development.

Estimated County Cost: No additional cost beyond scheduled Drainage Manual revisions

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-10: Evaluate current staffing levels and employ adequate staff to fully implement and enforce key elements of the Regional Drainage Manual.**

Discussion: Many requirements of the Regional Drainage Manual require considerable staff time to implement and enforce effectively. Key elements such as analysis of upstream and downstream impacts caused by new development are critical to the protection of water resources. However, the jurisdictions cannot adequately meet these requirements due to current staffing and budgetary restraints.

Benefit: Minimization of future flooding and natural resource problems.

Estimated County Cost: \$7,500/year + \$2,500/one-time

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-11: Restrict development in flood hazard area so that existing flood elevations are not increased under build-out conditions.**

Discussion: New development within the 100-year floodplains of all north Thurston County creeks would be limited. Existing structures would be reduced over time. Floodplain filling and construction that results in loss of local stream capacity and increased downstream flows would be eliminated.

The intent of this recommendation is to restrict development in the floodplain, not to prohibit compatible uses such as agriculture, or parks and trails. The basin plans require developers and new homeowners to meet higher standards to prevent increases in flooding. Common



sense dictates that the capacity of existing natural drainages should be maintained. Developments in the floodplain reduce natural drainage capacities and force flood waters further out into surrounding areas.

Benefit: The natural ability of streams to control floods would be protected.

Estimated County Cost: \$2,000/one-time

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-12:** Consider development standards to minimize future impervious surfaces by such measures as narrower streets, porous pavements, reduced parking requirements, and revised landscaping requirements. Encourage common standards throughout the jurisdictions.

Discussion: Streets generate approximately 25 percent of total urban stormwater. Parking lots and driveways contribute lesser but appreciable quantities of runoff. Landscaping requirements can be incompatible with efficiently managing stormwater. Elimination of conflicting regulatory objectives and minimization of impervious surfaces reduces stormwater management costs and promotes ground water recharge. Local planning departments are currently conducting preliminary investigations of these issues. The implementation of improved standards is important to effective long-term water resource management.

Benefit: Surface water management problems would be minimized by reducing the generation of runoff.

Estimated County Cost: None (Capital project will be used as in-kind grant match)

Project lead: Olympia

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-13:** Encourage innovative land use planning techniques (such as cluster housing) that preserve undisturbed open space and natural stormwater functions where appropriate throughout the region.

Discussion: Innovative development techniques such as cluster housing are effective means of reducing runoff, improving runoff quality, enhancing ground water recharge, and protecting critical areas. Because cluster housing maintains a substantial amount of

undisturbed vegetation, the natural functions and characteristics of an area may continue after development. The areas most appropriate for cluster development and other creative development techniques will be identified on a basin-specific level.

Benefit: Reduction of runoff quantity and improved runoff quality, ground water recharge, and critical area protection.

Estimated County Cost: No additional costs beyond Rural Zoning ordinance development.

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-14: Establish uniform standards for land clearing and grading within the Urban Growth Management area that minimize removal of native vegetation, improve water quality, and reduce stormwater runoff quantity.**

Discussion: The single largest impact on stormwater is the conversion of land from natural vegetation (including trees and shrubs) to grass or development. Olympia, Lacey, Tumwater, and Thurston County all regulate vegetation removal and grading through ordinances. A detailed clearing and grading plan is required for all new development. The plan must specifically identify vegetation to be removed, a schedule for vegetation removal and replanting, and the method of vegetation removal. Thurston County is developing a vegetation protection ordinance that will require a permit for all land clearing.

Uniform standards are an effective method to ensure that vegetation is properly managed during preparation of new development sites. Because the Urban Growth Management Area (UGMA) is intended to be developed at similar densities across the jurisdictions, uniform clearing and grading standards throughout the area are appropriate.

Benefit: Preservation of soil infiltration capacities, reduction of erosion, protection of creek channels, and protection of wildlife habitat.

Estimated County Cost: \$35,000/year + \$10,000/one-time

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

## **ENFORCEMENT/COMPLAINT RESPONSE**

Historically, jurisdictions in northern Thurston County have not supported a sufficient level

of regulation enforcement and complaint response. Regulations would be more effective if consistently enforced throughout the region.

**Recommendation R-15:** Evaluate current staffing levels and employ adequate staff to fully enforce development and environmental protection regulations which impact water resources. Improve coordination, management, and effectiveness of complaint response to water quality, habitat, and flooding issues regionally.

Discussion: The jurisdictions in north Thurston County have limited staff available for the enforcement of existing local regulations. Mechanisms aimed at protecting water resources (such as maintenance agreements between homeowners associations and the jurisdictions) are not well enforced. Improving enforcement would help protect the important functions of wetlands, creeks, and other critical areas within the basins.

Cooperation among the jurisdictions would improve public access to complaint systems, increase technical assistance staff, and increase public awareness of complaint system availability. More highly publicized complaint phone numbers and staff for response would increase the efficiency and effectiveness of existing complaint response efforts. Complaint response would be coordinated with Stream Team database and monitoring.

Benefit: Protection of creek channels, preservation of soil infiltration capacities, and reduction of illegal land grading and alterations which will decrease flooding, habitat degradation, erosion, and sedimentation. Better field inspection and analysis, public access and involvement, and remedial action.

Estimated County Cost: \$25,000/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

## **POLLUTION SOURCE CONTROL PROGRAMS**

Programs aimed at reducing pollution at its source are especially adaptable to regional implementation. The use of a diverse set of programs to stop the release of contaminants into the environment would improve the quality of water resources throughout the region.

**Recommendation R-16:** Support the adoption of a nonpoint pollution source control ordinance that defines practices and procedures to protect the public health and water quality of the Thurston region

**from polluted surface water runoff. Define penalties for infractions, responsibilities for clean-up, and train enforcement staff.**

Discussion: The state has limited resources to enforce nonpoint source regulations. A nonpoint pollution source control ordinance will enable local jurisdictions within northern Thurston County to regulate nonpoint sources when state agencies are unable to enforce their regulations. Such an ordinance does not replace state regulations, but rather complements them. Thurston County adopted such an ordinance in September, 1992.

Benefit: Protection of water quality and public health.

Estimated County Cost: No additional costs.

Project lead: Thurston County Health Department

Implementation strategy: Coordinate regionally, implement locally.

## **SYSTEM MONITORING**

System monitoring is a crucial element of water resource protection. While many monitoring efforts will be specific to each individual basin, it is also important to establish a regional monitoring program to oversee all water resources in the north Thurston region.

**Recommendation R-17: Establish a long-term regional water quality, stream gauging, and stream assessment program for key streams throughout the north Thurston region.**

Discussion: Monitoring environmental trends permits staff to evaluate the effectiveness of corrective measures, and provides an early warning system for problems. This program could utilize both volunteers and professional staff.

Benefit: Protection of aquatic resources within the north Thurston region, remedial measures will be evaluated and improved, and impacts related to specific projects will be identified.

Estimated County Cost: \$45,450/year

Lead jurisdiction: Thurston County.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-18: Monitor stormwater facilities to assess the performance of best management practices (BMPs) and promote improved management techniques.**

Discussion: The performance of stormwater treatment techniques is rarely evaluated. A degree of uncertainty exists regarding the long-term level of treatment provided by the best available, and current required, techniques.

Benefit: Accurate evaluations of performance would provide the basis for improvements in currently used techniques.

Estimated County Cost: Included in specific project cost estimates.

Project lead: To be determined.

Implementation strategy: Coordinate and implement regionally.

## **PUBLIC INVOLVEMENT AND EDUCATION**

Recommendations are organized by the general categories of PIE activities discussed in Chapter 7: community grants, education and training, public information and outreach, coordination and evaluation, and data management.

### **Community Grants**

**Recommendation R-19: Establish a regional community grants program to support volunteer action projects, school projects, and community education.**

Discussion: A permanent funding source will provide community groups and businesses with the means to participate in solving local storm and surface water problems. Some of the grants will target high priority projects and activities in each basin. There are no existing community grant programs devoted to water resources issues.

Benefit: Community initiated projects to address local storm and surface water problems, and additional funding for school projects focusing on water resources.

Estimated County Cost: \$3,000/year

Project lead: Thurston County.

Implementation strategy: Coordinate and implement regionally.

## **Education and Training**

**Recommendation R-20:** Present Stream Team activities for volunteers including: networking meetings, regional Stream Team workshops and action projects, and advanced training seminars. Involve school and community groups, and lake and streamside property owners in Stream Team activities and provide technical assistance for volunteers.

**Discussion:** Volunteer projects increase the sense of responsibility for water resources among local residents. The Stream Team program will result in hundreds of skilled volunteers who are actively protecting and restoring water resources, training other volunteers, and educating their friends and neighbors. This measure will extend and expand the existing Stream Team program which currently relies partly on grant funding.

**Benefit:** Increased awareness and protection of water resources throughout the north Thurston region.

**Estimated County Cost:** \$17,850/year

**Project lead:** Olympia and Thurston County.

**Implementation strategy:** Coordinate and implement regionally.

**Recommendation R-21:** Establish Public Involvement and Education (PIE) internships or work-study positions in local stormwater programs, and encourage local colleges to offer graduate and undergraduate projects and classes on water resources public involvement and education.

**Discussion:** College interns and projects will help to produce educational materials, interpret natural resources, coordinate volunteers, evaluate programs, and manage data. This will create a pool of trained, experienced resource people who can assist community water resources PIE programs in Thurston County.

**Benefit:** Inexpensive assistance for local stormwater programs, and development of qualified public education professionals.

**Estimated County Cost:** \$9,900/year

**Project lead:** All jurisdictions.

**Implementation strategy:** Coordinate regionally, implement locally.

**Recommendation R-22: Create a Stream Team naturalist program.**

Discussion: The Stream Team naturalist program will present interpretive programs on the natural resources of the watersheds to schools, community groups, and the general public. Stream Team volunteers will also be trained to present information. The Stream Team program will coordinate training and field activities. No such program currently exists.

Benefit: Support for public involvement and outreach activities, and improved environmental awareness in the community.

Estimated County Cost: \$4,400/year

Project lead: Olympia and Thurston County.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-23: Provide business and industry with education and training opportunities.**

Discussion: Business education activities will help forge a partnership between businesses and local government, with the common goal of protecting and improving water resources. Activities associated with this recommendation would include: workshops with Thurston Conservation District to implement conservation plans; workshops on implementing the new drainage manual and basin plan requirements; technical support on waste management and water resource issues (source control and BMPs through Operation: Water Works); and coordination with business organizations and public agencies.

The improved relationship between public and private sectors will eventually reduce the need for enforcement. Operation: Water Works is a temporary, grant-funded project to encourage best management practices for businesses; the other parts of this recommendation, such as drainage manual training and technical support would constitute a new program.

Benefit: Heightened awareness and understanding of water resources within the business community. Potential reduced need for enforcement of environmental codes.

Estimated County Cost: \$18,000/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-24: Present water resource training workshops for school teachers, and provide water resource education kits that include pre-designed curricula and teaching aids.**

Discussion: Water resource education for young people is a long-term investment in developing public values that support environmental protection and stewardship. Because environmental education is currently required in all Washington public schools, local governments have an opportunity to work cooperatively with school districts. Three educator workshops were presented in 1990 through a centennial grant that expired in June, 1991.

Benefit: Increased environmental education within public schools focusing on water resources.

Estimated County Cost: \$3,000/year

Project lead: Thurston County.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-25: Train jurisdictional staff to implement and enforce basin plan recommendations such as new drainage standards and land use regulations.**

Discussion: Adoption of the basin plan will result in a variety of new practices and regulations. Effective plan implementation will require retraining local government employees because they have the primary responsibility for enforcement and technical assistance. This recommendation would apply in Percival, Indian/Moxlie, Woodard/Woodland and McAllister/Eaton basins.

Benefit: Heightened awareness and enforcement of basin plan recommendations by jurisdictional staff.

Estimated County Cost: \$3,500/one-time

Project lead: Lead jurisdiction for basin plan.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-26: Provide opportunities to involve youth, families, teachers, and schools in special, water-related community activities.**

Discussion: A program of special community activities will include Family Fun Days,



children's Stream Team day camp, "hands-on" displays for schools, field trips to areas of special interest, cold water aquaria for classrooms, and classroom water quality presentations by staff. This program will involve residents who have not been reached by existing Stream Team programs, and will encourage active participation among entire family groups.

Benefit: Helps local schools meet Washington's environmental education requirements, and creates long-term improvements in water resources management.

Estimated County Cost: \$9,900/year

Project lead: Olympia and Thurston County.

Implementation strategy: Coordinate and implement regionally.

### **Public Information and Outreach**

**Recommendation R-27: Create a storm and surface water public information program to provide consistent, accurate information to the media and increase educational outreach to the public.**

Discussion: The public information program will supply the primary communication between local water resource management agencies, the media, and the public. The program will manage all media contacts by arranging interviews and filming sessions, producing accurate news releases and briefings, publishing frequent articles in newspapers and periodicals, and mounting high profile media campaigns. Outreach activities will include publishing educational brochures, posters, and publicity materials for local events that highlight the national significance of local issues. This program will improve the public perception of local water resource protection efforts, and prevent damaging misinformation from reaching the public through the media.

Currently, numerous local agencies provide bits and pieces of public information on water resource issues, with little consistency between information sources. This measure would consolidate these scattered sources of information and provide reliable funding. Most existing outreach relies on temporary project funds.

Benefit: More accurate and consistent public information, improved public perception of resource protection programs, and increased public participation in water resources programs.

Estimated County Cost: \$19,000/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-28: Investigate incentives that encourage schools to incorporate water resources curriculum and meet established criteria.**

Discussion: Utility rates will offer a financial incentive for schools to develop and maintain water resources education programs. The City of Olympia currently offers grants to schools for stormwater projects.

Benefit: Helps schools meet state environmental education requirements, and creates long-term improvements in water resources management.

Estimated County Cost: No cost beyond stormwater finance study.

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-29: Create a Citizen Stream Patrol program.**

Discussion: The Citizen Stream Patrol program will train local citizens to identify destructive practices such as illegal dumping, land clearing and grading, inadequate erosion controls, grazing in streams, and other violations. The Stream Team program will coordinate training and field activities. Stream-specific teams will work closely with existing enforcement and complaint-response programs. No such program currently exists.

Benefit: Increased personal responsibility for protection and stewardship of local stream basins, and improved regulations enforcement.

Estimated County Cost: \$4,400/year

Project lead: Olympia and Thurston County.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-30: Develop new water resource exhibits for fairs and local events.**

Discussion: Public exhibits will include portable, free-standing display boards as well as permanent interpretive signs for critical resource sites. Portable displays will be updated regularly to show progress on current projects. Exhibit topics will include stream systems,

volunteer projects, impacts of runoff, and suggestions for homeowners. Exhibits will be displayed at all major local events including Harbor Days, Wooden Boat Festival, Capitol Lakefair, Earth Day, Lacey Fun Fair, County Fair, Community Awareness Days, etc. Exhibits will also be displayed at schools, libraries, and community centers. Currently, exhibits often include out-of-date information.

Benefit: Improved outreach to audiences which have not received other types of public information, and increased public participation in volunteer projects

Estimated County Cost: \$500/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-31:     Manufacture and install watershed boundary signs for each major drainage in Thurston County using a region-wide design.**

Discussion: The most important challenge for public water resource education is making residents aware of the existing natural resources in their local areas. Stream crossing signs have already helped improve public awareness, and watershed boundary signs will increase awareness by identifying drainage boundaries. Existing signs on Interstate-5 in the Nisqually watershed provide a good example.

Benefit: Increased public awareness of water resources.

Estimated County Cost:\$500/one-time

Project lead: Thurston County.

Implementation strategy: Coordinate and implement regionally.

### **Coordination and Evaluation**

**Recommendation R-32:     Devote staff to a regional Education Technical Advisory Committee (ETAC).**

Discussion: Water resources education demands regional coordination because water resources transcend local boundaries. Each basin jurisdiction needs to devote ongoing staff to the regional PIE program, so as to avoid duplication with other programs and provide a consistent method for evaluating public involvement and education activities. The ETAC

would be responsible for coordination and evaluation of plan PIE elements, implementation of the public education guidelines in the Puget Sound Water Quality Management Plan, creation of a database to help monitor and evaluate plan implementation, and organization of a regional citizen advisory committee to monitor public education and involvement.

Benefit: Enhanced interjurisdictional coordination on public education issues.

Estimated County Cost: \$600/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

### **Data Management**

**Recommendation R-33:** Create a computerized data management system to organize and analyze data collected by Stream Teams, public workshops, and volunteer projects. Publish results biannually, including photos, monitoring data, and volunteer participation.

Discussion: The data management system will help managers to coordinate and evaluate the effectiveness of PIE activities, provide quick access and consistent information to all stormwater programs, and could be expanded to improve existing complaint response programs. Currently, data management is haphazard and inconsistent between jurisdictions.

Benefit: Improved PIE coordination and public assistance.

Estimated County Cost: \$1,850/year + \$1,250/one-time

Project lead: Olympia.

Implementation strategy: Coordinate and implement regionally.

## **REGIONAL NONSTRUCTURAL PROGRAM MANAGEMENT**

Several basins in north Thurston County are the subject of basin plans. Because drainage basins do not recognize jurisdictional boundaries, it is imperative that the governments work cooperatively to implement the plans.

**Recommendation R-34:** Support multijurisdictional basin plan coordination and

## **implementation.**

Discussion: Although basin plan implementation would necessitate increased levels of interjurisdictional coordination and decision making, existing administrative practices could be utilized depending upon the funding approach chosen to facilitate these needs.

Benefit: More comprehensive approach to coordinating the implementation of current and future basin plans.

Estimated County Cost: \$5,000/year

Project lead: All jurisdictions.

Implementation strategy: Coordinate regionally, implement locally.

**Recommendation R-35: Establish a technical support position to assist jurisdictions in identifying appropriate funding sources and preparing grant applications for implementation of basin plan recommendations.**

Discussion: Due to budgetary constraints, many of the recommendations within the basin plans will have to be implemented using outside financial assistance. Current staffing levels do not allow adequate time to be dedicated to searching for potential funding sources and preparing numerous grant applications.

Benefit: Heightened awareness of potential funding sources and competitiveness in the grant awarding process.

Estimated County Cost: \$5,000/year + 5,000/one-time

Project lead: Thurston County.

Implementation strategy: Coordinate and implement regionally.

**Recommendation R-36: Establish a five-year implementation strategy for increased cooperation in water resource management within the Urban Growth Management Area.**

Discussion: Stormwater issues are most effectively managed on a cooperative basis. As the UGMA becomes increasingly developed it will be necessary for expanded cooperative management of stormwater issues. Interjurisdictional management is the most cost-effective and least duplicative method of handling stormwater concerns.

Benefit: Increased effectiveness and comprehensiveness of stormwater management programs.

Estimated County Cost: \$5,000/year

Project lead: To be determined.

Implementation strategy: Coordinate and implement regionally.

## **APPENDIX L: COMMUNITY INVOLVEMENT**

The county conducted an extensive public involvement and education program under the basin planning grant, in order to increase basin residents' awareness of stormwater problems and involve them in developing solutions. A public involvement coordinator was hired during the course of the grant. The range of activities included:

- Public meetings and presentations
- School presentations and activities
- Volunteer projects
- Brochures and public information materials
- Septic maintenance workshops
- Community events
- Business education
- Citizen advisory task force meetings

### **PUBLIC MEETINGS AND PRESENTATIONS**

Grant activities were initiated with a series of public meetings in 1990, to present the findings of the spill risk analysis to basin residents. A follow-up survey of landowners was conducted in 1991, to identify key issues. In 1992, the emphasis switched to reaching existing groups with presentations on surface water problems in the basin, and possible solutions being considered in the plan. Presentations were made to:

- Lake St. Clair Organization
- Nisqually River Council Citizen Advisory Committee
- Nisqually River Council
- The Seasons Homeowners Association

In addition, a public meeting has been scheduled to present the draft plan to the basin residents in October, 1993.

### **SCHOOL PRESENTATIONS AND ACTIVITIES**

School children were a major focus of the public education program. In-class presentations were offered on a variety of topics related to the watershed. Presentations were made at:

- Meadows Elementary School
- NOVA School
- Evergreen Forest Elementary School
- Evergreen Forest Girl Scouts
- Jefferson Middle School

- ▮ North Thurston High School
- ▮ Seven-Oaks Elementary School

Teachers from all of those schools received additional assistance for developing watershed-based curricula and field activities. County staff worked with the Nisqually River Education Project and Budd/Deschutes Project GREEN (Global Rivers Environmental Education Network) to include water quality monitoring and other field activities on Eaton and McAllister creeks in a year-long watershed curriculum. A sixth grade class from Evergreen Forest Elementary School performed monthly monitoring of Eaton Creek and replanted native shrubs along the streamside to improve wildlife habitat. Students from Wah-He-Lute School and North Thurston High School monitored McAllister Creek. The Evergreen Forest students reported their findings at a regional student congress, held at the Evergreen State College in Olympia, in the spring of 1993. Students from NOVA School made three-dimensional contour maps of the basin, which were used in subsequent public presentations and briefings for elected officials.

Other activities included leading three tours of McAllister Springs for elementary students. The girl scout troop stencilled storm drains in their neighborhood. A packet of summer activities for kids was developed and distributed to homes in Meadows and Alpine Meadows. The packet contained twelve activities, such as science experiments and walking field trips, to teach kids and parents about the basin.

## **VOLUNTEER PROJECTS**

Members of the Lake St. Clair Organization, a group of lake homeowners, approached the county late in 1991 to request assistance for monitoring water quality in the lake. The county and the city of Olympia helped set up monitoring procedures and schedules, supply some equipment, pay for some lab tests, and conduct a brief data interpretation. The volunteers performed all of the sampling and data management, and drafted a handbook of procedures for the volunteer samplers. The group recently completed their second year of monitoring, and the Department of Ecology has agreed to help with data interpretation.

One member of the organization also agreed to collect water quality samples from three locations on Eaton Creek for fecal coliform analysis. The fecal sampling has been coordinated with the county's sampling program to provide a more complete picture of water quality conditions throughout the creek system.

Volunteer Stream Teams were organized in 1992 for Eaton and McAllister creeks, in coordination with the interjurisdictional Stream Team program. The Stream Teams received training on stream habitat assessment using the EPA's Streamwalk protocol, and on identifying aquatic insects. Other Stream Team presentations included Lakes Ecology, Common Sense Gardening, Wetlands, Fish Identification, Amphibians, Streams and Drinking Water, and Urban Wildlife. Most of these had very high attendance.



stream Team volunteer projects included stabilizing an eroding bank on Eaton Creek using willows and other native shrubs, and a canoe clean-up trip of McAllister Creek. The stream planting project site was weeded and maintained during the summer by a youth crew from the Community Youth Services TEAM program (Teaching Environmental Awareness through Mentoring). They also assisted a landowner with creating a gravel spawning area in Eaton Creek.

## **BROCHURES AND PUBLIC INFORMATION MATERIALS**

The Office of Water Quality prepared a brochure describing the characteristics, threats, and protective measures for McAllister Springs in 1990. The brochure was distributed at area grocery stores and McAllister Springs tours. The brochure was updated and reprinted in 1991 and 1992. The county developed and published a brochure on septic system maintenance in 1991, which included a handy maintenance record. In 1993, the county printed a brochure describing the McAllister/Eaton Creek basin, outlining the problems and proposed solutions, and explaining the basin planning process. The brochure included a map of the basin with a guide to various features. The brochure was distributed to all local basin landowners through a direct mailing.

Interpretive signs describing the history, characteristics, and threats to McAllister Springs were produced in 1991 and displayed at McAllister Springs tours. Later, they were permanently installed in the pumphouse at the Springs.

Two large displays on the basin were prepared in 1993, for use at community events and public meetings. One depicts the features of a watershed and highlights the human impacts. The second display describes the specific problems and possible solutions for problems in the basin. These displays were used at many of the events described in this chapter. A third display has been completed for use at the October public forum, which depicts the basin and uses photographs to show particular features of the basin.

A slide show on the features and problems of the basin was developed and used at many public and classroom presentations. "Table tents" with information on McAllister Springs (small cardboard displays for restaurant tables) were published in 1993 and distributed to many area dining establishments. They were revised, reproduced, and more widely distributed in 1993.

## **SEPTIC MAINTENANCE WORKSHOPS**

The 1991 homeowner survey identified septic system care and maintenance as a high priority topic of interest to basin residents. Following the survey, Office of Water Quality staff contacted homeowner associations in the basin and arranged a series of workshops for homeowners on maintaining their septic systems. The presentations also explained new

requirements implemented by the county for certifying that septic systems in the McAllister GSA are properly maintained. The septic system brochures were distributed at these workshops.

## **COMMUNITY EVENTS**

National Drinking Water Week National Drinking Water Week activities included weekend bus tours of the basin, ending with a guided tour of McAllister Springs. Table tents on the springs were distributed during the week. The 1992 National Drinking Water Week included a trivia contest on McAllister Springs which aired on a local radio station.

Washington Coast Weeks The county worked with the Nisqually River Council to sponsor events in the basin as part of the Nisqually Gathering of Waters in 1991, 1992, and 1993. Stream Team volunteers collected water samples from throughout the basin and brought them to the Nisqually Wildlife Refuge for analysis at a portable chemistry lab. The results of the testing were posted on a large display, for comparison with the previous years' data. A ritual was conducted where a representative from each Stream Team poured a small amount of water from each sampling site into a ceremonial urn. The urn was carried to the mouth of the Nisqually River, where the volunteers returned the remaining samples to the river. The urn was carried by boat to the tall ship Lady Washington, which sailed out through the Straits of Juan de Fuca and returned the river water to the Pacific Ocean. Speakers at the event included representative of the Nisqually River Council and the Nisqually Indian Tribe. Students from North Thurston High School produced and displayed several exhibits on the stream and water quality. In 1992, about 30 students received scholarships to board the Lady Washington at the end of the ceremony, and participate in an on-board naturalist program as the ship sailed to Point Defiance in Tacoma. In 1993, the event was moved up river to Frank's Landing and combined with the Nisqually Land Trust's annual Salmon Bake.

In addition to the events described above, county staff set up basin displays and offered activities such as making salmon prints and operating a ground water model at several events from 1991 through 1993, including:

- Harbor Days
- Olympia Wooden Boat Festival
- Lacey Fun Fair
- Project GREEN Student Congress

## **BUSINESS EDUCATION**

Landscaping, construction, automotive, and janitorial businesses in the basin were contacted through the regional Operation Water: Works program and offered the opportunity to attend free pollution prevention workshops and meet with staff for free technical consultations.

Those business categories were targeted because of their high potential to contaminate water. Businesses were located through the SIC codes provided by the Department of Labor and Industries. Most of the businesses in the basin were home-based businesses, because the basin contains very little commercial land.

The businesses were contacted by mail, and many businesses were surveyed by telephone to determine their interest. Personal consultations were arranged with businesses who requested them, and a series of six educational workshops were offered. The workshops explained local and state regulations, described appropriate BMPs, and walked the participants through a business self-assessment and pollution prevention planning process. The final product was a custom pollution prevention plan which identified specific actions, timelines, and responsible people. The project is described in detail in a final report available from the city of Olympia Water Resources Program.

### **CITIZEN ADVISORY TASK FORCE**

The county organized a citizen advisory task force representing basin residents at the end of 1992. Members were recruited by advertising in newspapers and radio spots, contacting local organizations, and direct mailing to streamside and lakeside property owners. The committee began meeting in February 1993, with the Public Involvement Coordinator and the Project Manager providing support. The committee met monthly or biweekly through October. The first few months focussed on educational presentations from various agency staff on the basic issues in the basin. The citizen task force began reviewing drafts of the basin plan in the spring, and provided extensive comments which led to development of a complete review draft in the summer of 1993. The task force continued to provide essential direction and made the final recommendations which are reflected in this plan. The task force members are listed on the front page of the plan.



## **APPENDIX M: 1991 DRAINAGE MANUAL MINIMUM STORAGE & MAXIMUM RELEASE REQUIREMENTS**

Excerpted from Chapter 4 of the Drainage Design and Erosion Control Manual for Thurston County and the Cities of Lacey, Olympia and Tumwater, Washington (1991)

### **4.1.1 Estimating Maximum Release Rates to Surface Water**

Release rates from a project may not exceed:

- o 50% of the "predeveloped condition" runoff resulting from the 2-year event, and
- o 100% of the "predeveloped condition" runoff resulting from the 100-year event.

Discharge rates for the "predeveloped condition" have been calculated using SCS methodology, and allowable discharge estimation for a project has been organized into chart form (the 50% factor for the 2 year event accounted for). The Project Engineer shall estimate maximum allowable release rates by the following method:

Maximum standard unit release rates before adjustment for site specific soils are:

Max Release, 2 yr event, = 0.08 cfs/disturbed acre

Max Release, 100 yr event = 0.70 cfs/disturbed acre

To estimate the unit release rate for a specific project, multiply the maximum standard unit release rates by the reduction factor from Figure 4.1. (Enter Figure 4.1 with the estimated project site infiltration rate; see Section 4.4.3). It is anticipated that there will be slight errors in reading charts. The Administrator will accept values 2% or 3% different from his/her estimate. To aid in reading Figures 4.2 and 4.3, major intercepts are interpolated in Table 4.1.

For example if estimated project site infiltration rate is 1 inch per hour, then, from Figure 4.1 the reduction factor is 0.43. Thus project specific maximum release rates are:

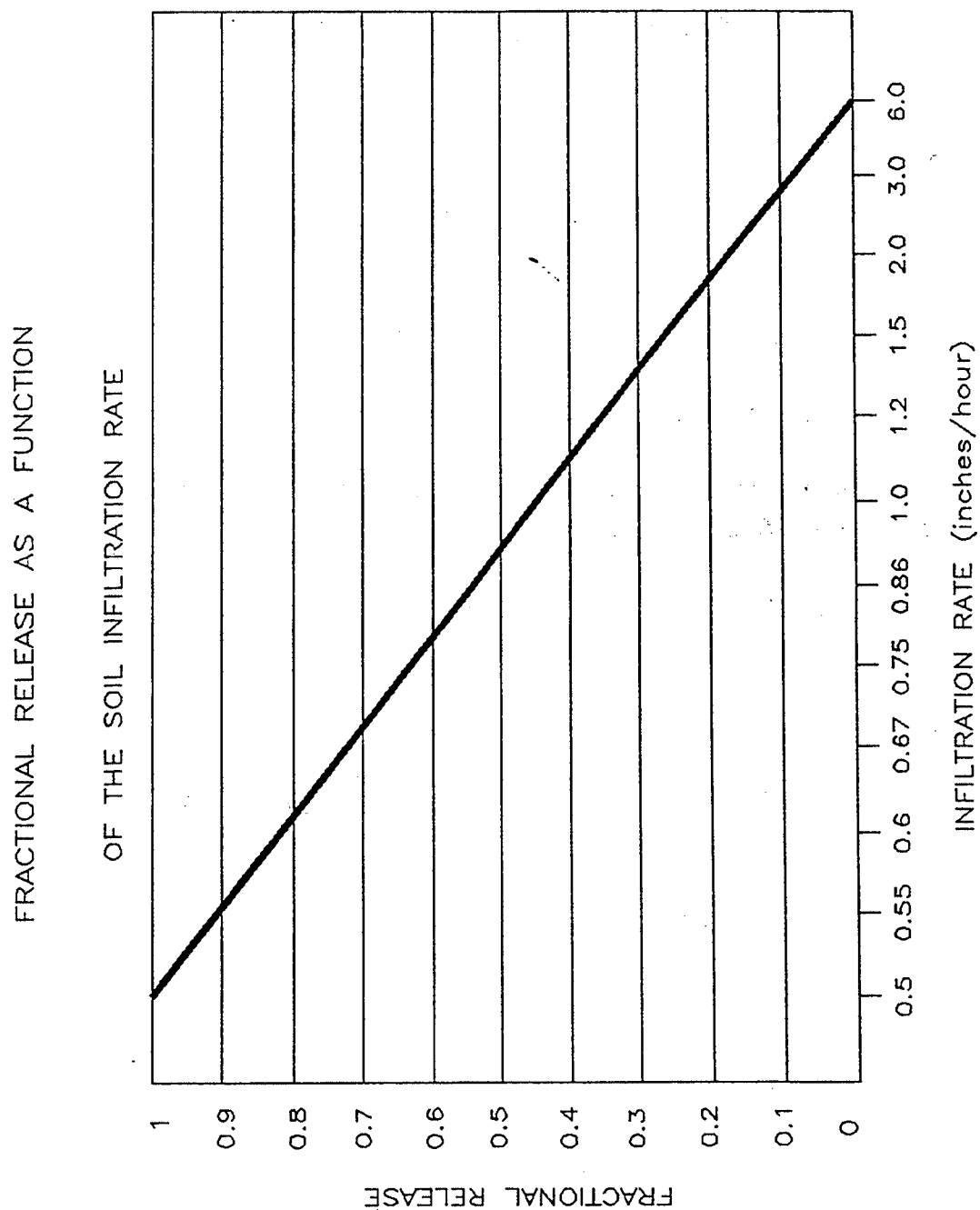
$$Q_2 = 0.08 * 0.43 = 0.0344 \text{ cfs/disturbed acre}$$

$$Q_{100} = 0.70 * 0.43 = 0.301 \text{ cfs/disturbed acre}$$

#### **4.1.2 Minimum Volume of Retention/Detention Facility**

Minimum live storage of 6,000 cubic feet per acre of impervious surface and 2000 cubic feet per pervious "disturbed area" in the area tributary to the facility shall be provided. This volume shall be provided at a minimum regardless of estimates obtained using standard charts below or hydrologic methods.

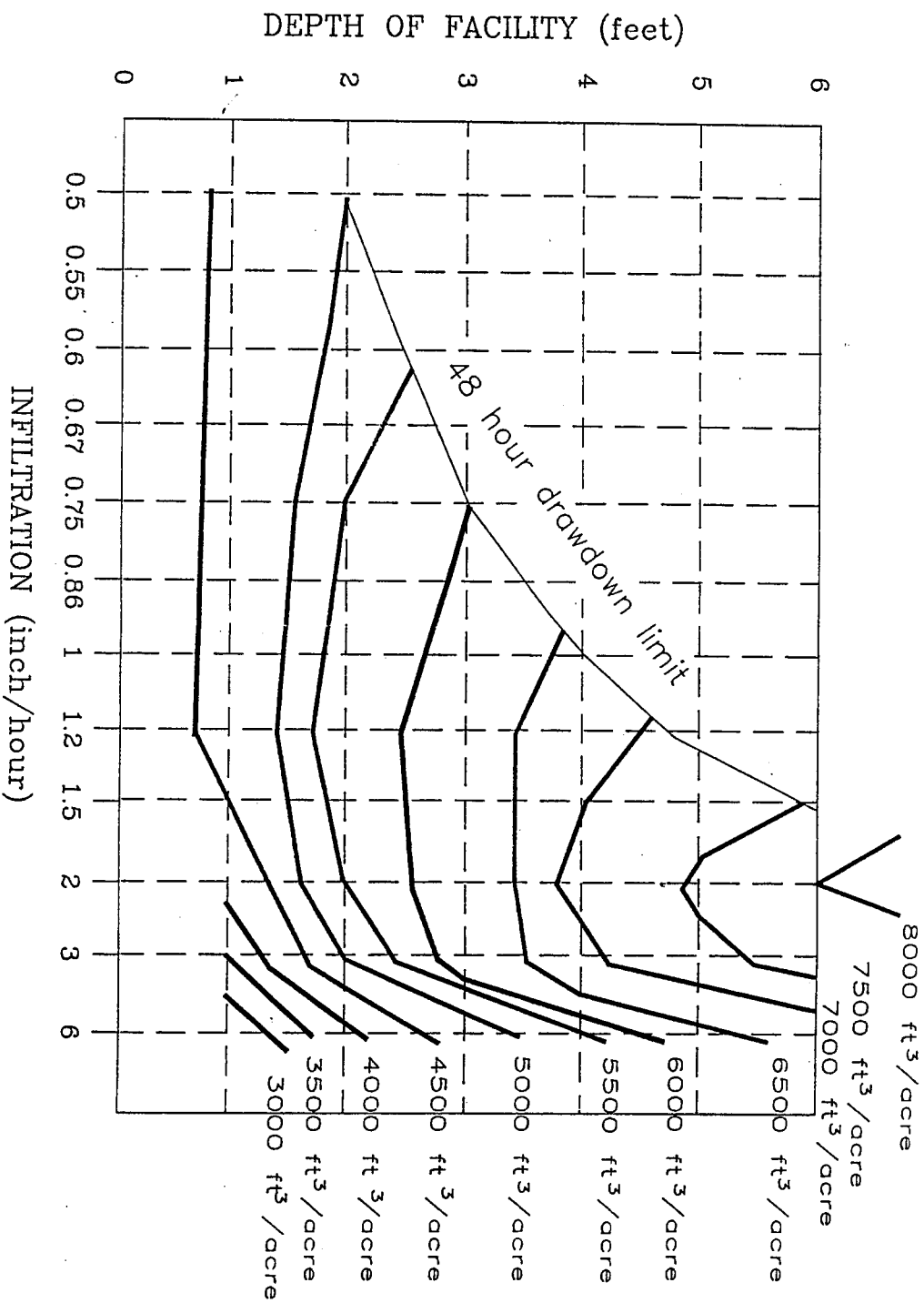
(Note partial exemption for storage requirements if lattice block paving is used; see Chapter 6, Section 6.8.1).



DATE:  
OCT 1990

RELEASE RATE REDUCTION ESTIMATION

UNIT STORAGE VOLUMES FOR INFILTRATION FACILITIES (cubic feet/acre impervious)



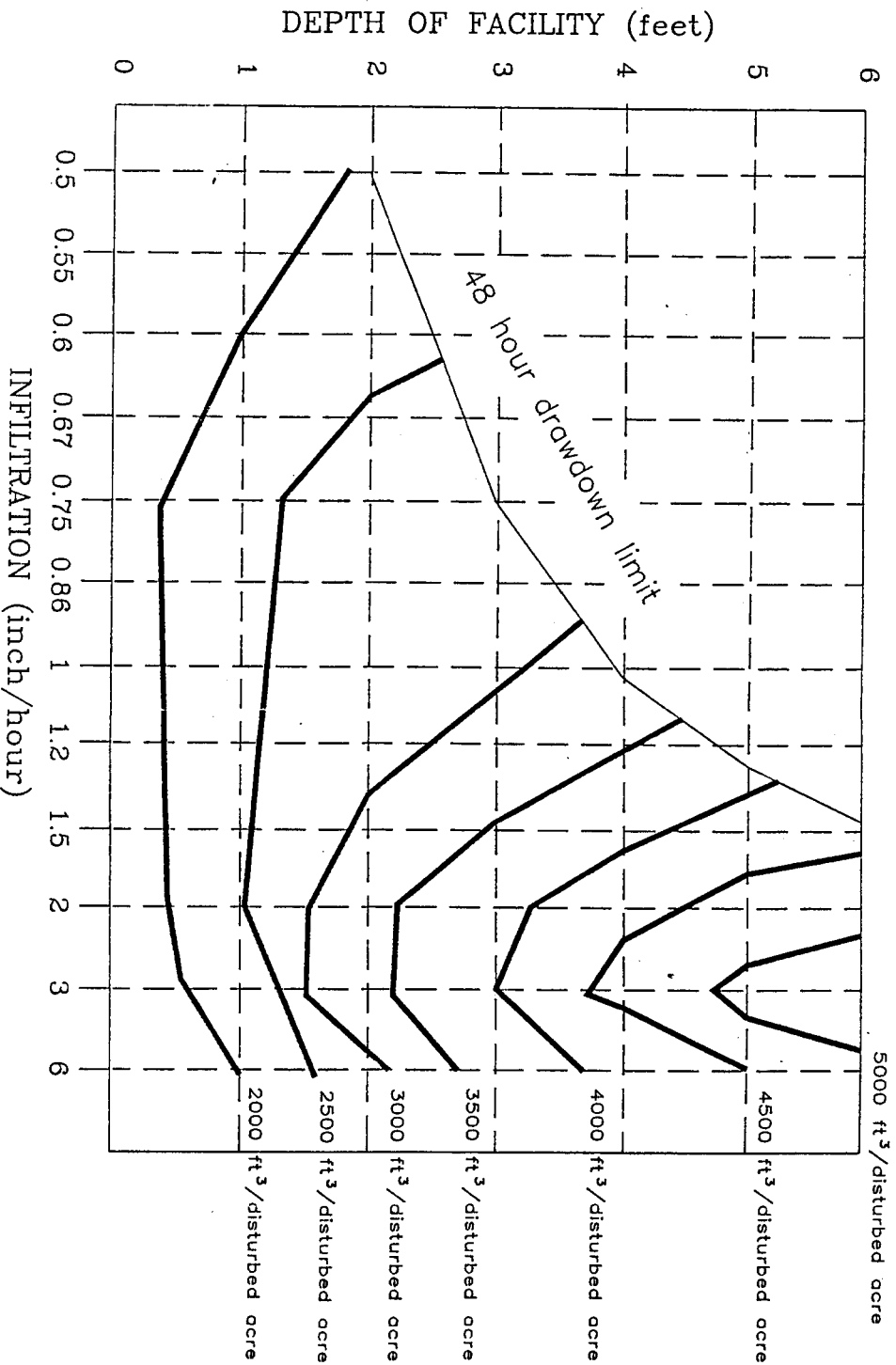
REFERENCE:

DATE:

UNIT INFILTRATION VOLUMES



# UNIT STORAGE VOLUMES FOR INFILTRATION FACILITIES (cubic feet/acre disturbed pervious)



REFERENCE:

DATE:

UNIT INFILTRATION VOLUMES

**TABLE 4.1: UNIT STORAGE VOLUMES FOR INFILTRATION FACILITIES**

For Impervious Acreage  
(all values in ft<sup>3</sup>/acre)

Depth (feet)	Infiltration (in/hr)					
	2.0	2.5	3.0	4.0	5.0	6.0
6.0	8000	7800	7650	7500	7000	6700
5.5	7750	7650	7550	7250	6900	6550
5.0	7550	7500	7350	7000	6700	6350
4.5	7300	7250	7100	6850	6500	6000
4.0	7050	7000	6850	6600	6150	5500
3.5	6600	6550	6500	6300	5500	5050
3.0	6300	6250	6200	6000	5050	4750
2.5	5950	5800	5600	5150	4650	4400
2.0	5500	5250	5050	4650	4200	3900
1.5	4750	4500	4250	4000	3550	3250
1.0	4200	3950	3500	3250	2900	2300

For Disturbed Pervious Acreage  
(all values in ft<sup>3</sup>/acre)

Depth (feet)	Infiltration (in/hr)					
	2.0	2.5	3.0	4.0	5.0	6.0
6.0	4800	5100	5500	5400	5050	4800
5.5	4700	5000	5300	5200	4950	4650
5.0	4600	4850	5100	5000	4700	4500
4.5	4500	4700	4900	4700	4500	4300
4.0	4300	4500	4600	4450	4250	4150
3.5	4150	4200	4350	4150	4000	3900
3.0	3850	3950	4000	3900	3750	3650
2.5	3650	3650	3700	3600	3500	3300
2.0	3350	3350	3350	3250	3050	2850
1.5	2950	3000	3000	2700	2500	2450
1.0	2450	2400	2300	2250	2150	2000