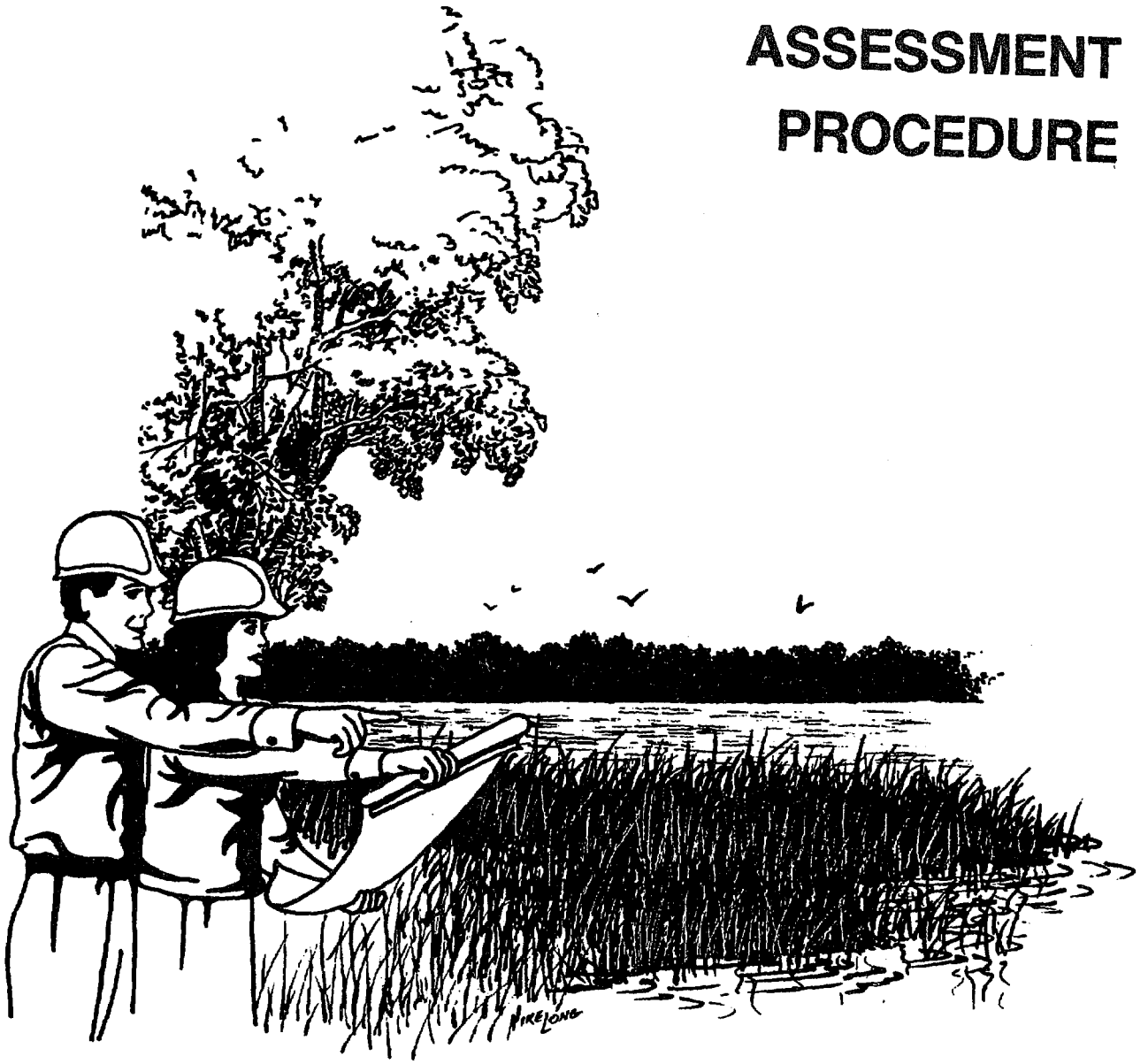
Task 62 FY 90
Final Work Product

# MODEL ENVIRONMENTAL ASSESSMENT PROCEDURE



PREPARED BY

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

DECEMBER 1991

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Prepared by the Staff of the
Hampton Roads Planning District Commission

December 1991

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## PREFACE

In May 1989, the Southeastern Virginia Planning District Commission completed development of the Regional Stormwater Management Strategy for Southeastern Virginia. That report recommended that local governments undertake a variety of activities on a cooperative basis. Since completion of that study, several state and federal initiatives in the areas of Nonpoint Source and Stormwater Management have progressed closer to implementation. All of these programs focus on local governmental implementation and place heavy emphasis on implementation of Best Management Practices. Both the affected local governments and the region's development community have indicated that the preferred approach for satisfying these requirements would be a regional one, where administrative procedures as well as facility and system design are similar throughout Hampton Roads.

Previous studies have identified nonpoint source pollution and stormwater management as a key water quality problem in many of the estuaries, lakes and rivers of Hampton Roads. While recognizing that overall guidance is being developed at the state level, it is believed that a region-specific environmental assessment procedure and associated guidance would enhance efforts by the region's localities in this regard.

The objective of this Model Environmental Assessment Procedure has been to develop a region-specific common approach to assessing the environmental impacts of development proposals to be used in plan of development review. This procedure focuses primarily on water quality issues and, specifically, the Chesapeake Bay Preservation Act requirements. Other environmental issues have also been considered for locally-designated environmentally- sensitive areas, based on evolving local programs and state and federal regulatory programs.

# MODEL ENVIRONMENTAL ASSESSMENT PROCEDURE

## ENVIRONMENTAL REVIEW QUESTIONNAIRE

## OVERVIEW OF THE INITIAL ENVIRONMENTAL REVIEW

## QUESTIONNAIRE AND RECOMMENDATIONS FOR USE

### INTRODUCTION

The following model Initial Environmental Review Questionnaire is designed to alert both the developer and the City/County staff to any environmental problems associated with a project that may require mitigation. This Questionnaire is also designed to assist developers in understanding and complying with the many local, state and federal environmental regulations affecting land development. Accompanying the Questionnaire is a detailed Guidance Text which summarizes local, state and federal environmental programs which are applicable to land development activities.

The Questionnaire is intended to be an initial screening only. More detailed assessments of potential environmental impacts may be required during the City/County development review process, or as part of the application processes required to obtain various environmental permits.

Only impacts on the natural environment are addressed. The Questionnaire does not address impacts on the human environment, except for noise, and, therefore, does not include such issues as historic resources, traffic, aesthetics, energy consumption, and so forth.

Prior to the Questionnaire is a discussion of issues that should be considered by local City/County staff when administering the Questionnaire; a user's guide. These issues include appropriate local review responsibility, determining when to require completion of the Questionnaire, evaluating impacts, and integrating the Questionnaire with a geographic Information System.

This model is intended to serve as a prototype only. It is expected that local government staffs will want to revise both the Questionnaire and Guidance Text to reflect local programs and policies.

### USE OF THE QUESTIONNAIRE

The initial Environmental review Questionnaire should be used as a **preliminary** assessment of the types of environmental impacts that may be associated with a proposed development of redevelopment project. This assessment permits proposals, which raise significant environmental impact questions, to be identified for a further and more detailed study; such study typically occurs during the local development review process or as part of the application processes required to obtain various environmental permits. The

questionnaire is intended to "flag" and significant environmental impacts that may occur. It is also intended to initiate a dialogue between the developer and local government staff on potential environmental issues before a project is begun or, at least, prior to land disturbance. Its objective is to incorporate environmental concerns - -both constraints and opportunities - - into the development planning process, by evaluating the assets and liabilities of the project environs and how those factors operate to influence a development's design.

The Questionnaire can also be used as a tool to educated developers about the environmental issues that are of concern to local governments, and state and federal regulators. To accomplish this, the Guidance Text accompanying the Questionnaire summarizes local, state, and federal programs and regulations associated with each of the environmental issues addressed by the Questionnaire. This document should provide a fast and efficient means for screening a variety of development proposals and does not require the user to have detailed technical expertise in environmental impact assessment.

**Administering the Questionnaire**

It is recommended that the Initial Environmental Review Questionnaire be administered by the local planning department and completed by the developer of a proposed project. Designated professional certification should also be completed on behalf of the developer or his representative. Once completed, planning staff would review and verify the information in the Questionnaire. With the information provided by the Questionnaire, the planning staff can begin to work with the developer to ensure that all applicable environmental regulations are complied with, and that efforts are made to mitigate significant environmental impacts.

In general, projects subject to an initial environmental review should be limited to those having the potential for causing significant environmental impact. However, specifying what types of projects met this broad criterion may be difficult however. The need to treat all proposed projects equitably generally precludes the option of making subjective determinations on a case-by-case basis. Therefore, requiring the completion of an Initial Environmental Review Questionnaire should be considered for one or a combination of the following categories of development projects:

- All project requiring site plan reviews.
- All project requiring rezoning, subdivision or a conditional use permit.
- All proposed land uses falling under a pre-determined "potential risk to water quality" category.

- All projects exceeding 2,500 sq. ft. area of land disturbance; this threshold generally triggers compliance with E&S control requirements. Higher thresholds may be chosen.

- All projects exceeding certain size or quantity thresholds. For example, all multi-family residential projects exceeding 20 units, all commercial projects exceeding 12,000 square feet, all projects requiring greater than 40 parking spaced, all proposals using in excess of specified quantities of hazardous materials, and so forth. Other examples are commercial/industrial development proposing greater than 250,000 sq. ft. of gross building floor area, and other development projects which contain greater than 100 acres and propose more than 200 dwelling units.

- All projects occurring in or near designated environmentally sensitive areas (e.g. Chesapeake Bay Preservation Areas, Natural Area Preserves, water supply drainage basins, etc.), or area containing certain environmental features (e.g. wetlands, unstable slopes or hyric soils, etc.).

- All projects clearly requiring one or more environmental permits (e.g. E&S, wetlands, wastewater discharge, groundwater withdrawals, and so forth).

- At the discretion of the planning director, any proposal which has the potential to elicit a public controversy due to the potential for environmental impacts.

Regardless of what project are subject to the Initial Environmental Review Questionnaire, it is important that each applicant be given the Questionnaire early in the development review process. This could be done at a pre-submittal meeting or whenever the City/County staff distributes applications for rezoning, subdivision, or conditional or special use permits.

**Evaluating Impacts**

The Questionnaire asks respondents to identify "significant" environmental impacts. For the purposes of this environmental review process, a significant environmental impact can generally be defined as a potentially substantial adverse change to the land, water, air, flora and fauna in the area of a proposed activity. In most cases, what constitutes a significant environmental impact is determined by local, state and/or federal regulatory standards. For example, some development proposals may be considered significant because, due to the nature of the proposed activity, they are subject to air or water effluent limitations under air or water regulatory programs. Other activities may be significant by virtue of

their location in or near environmentally sensitive areas delineated by regulatory criteria (e.g. wetlands, Chesapeake Bay Preservation Areas, and so forth).

The Questionnaire does not provide a mechanism for assessing "cumulative impact." Although the individual environmental impacts of a project may be individually limited, the effects of the project may be considerable when viewed in combination with the effects of other past, present and possible future projects.

While there is concern in the available literature about the cumulative environmental impacts of development, relatively little research has been conducted on how to measure such impacts. Many state environmental programs issue permits in isolation and allow exemptions for smaller projects. This can allow impacts to accumulate without regulatory agencies having a sense of the overall effects. Fragmented authority for oversight of different aspects of an activity adds to this lack of control.

To date, there are no methodologies applied in Virginia that are acceptable to both environmental regulators and the regulated communities. However, the Virginia Council on the Environment recently funded a study through the Coastal Resource Management Program to identify methodologies for explicitly considering cumulative and secondary impacts. A report was issued in November 1991 which defines a cumulative impact, identifies five specific types of impacts, determines obstacles and impediments to cumulative impact management in Virginia, and examines programs in other states. Even though an acceptable cumulative impact assessment methodology has not been developed, it is still imperative that, throughout the development review process, consideration be given to the potential for such impacts.

Therefore taking the appropriate above-mentioned environmental impacts into consideration along with all of the information submitted by the project application on the Questionnaire, the following three determinations could be made.

1. **Negative Declaration:** a finding that the proposed project could not have significant adverse impacts on the environment as categorized in the Questionnaire.

2. **Mitigated Negative Declaration:** a finding that although the project could have significant adverse impacts on the environment as categorized in the Questionnaire, the proposed mitigation measures detailed and/or agreed upon by the project applicant will remedy those impacts.

3. **Positive Declaration:** a finding that the project, as proposed, will have significant adverse impacts on the environment which cannot be remedied through the proposed mitigation measures.

If a "Positive Declaration" is determined, then a finding of environmental inconsistency for the proposed project is made. A locality may wish to provide administrative relief from such a determination through an administrative appeals process. For example, in the event that the property owner or other aggrieved party with pre-determined standing alleges an error in any order, requirement, decision or determination made by local planning staff in the interpretation of any portion of the Questionnaire and/or the information submitted on the Questionnaire, an appeal may be filed pursuant to the local administrative appeals process. Inclusion of a severability clause may also be warranted at local discretion.

**Integration with Geographic Information System (GIS)**

The usefulness of the Initial Environmental Review Questionnaire can be greatly enhanced if used in conjunction with a computerized Geographic Information System (GIS) containing applicable environmental data coverages. A GIS can be used to quickly analyze a proposed project's location with respect to a variety of sensitive environmental features. Data coverages which may indicate the environmental constraints associated with a project site include soils, slopes,wetlands, Chesapeake Bay Preservation Areas, Natural Heritage Preserves, endangered species habitat, water supply watersheds, and so forth. Most are or will be digitized on EcoMAPs. The primary goal of the Virginia EcoMAP System is to be comprehensive natural resource inventory within a GIS.

**Conclusion**

In summary, the overarching goal when using this Questionnaire, and subsequently evaluating potential environmental impacts, should be to minimize the negative impacts that could be associated with proposed development or redevelopment in environmentally-fragile areas. This can be achieved by managing land uses and their location and intensity through the encouragement, where most applicable, of innovative design, construction, operation, and maintenance techniques which are sensitive to the natural environment.

# MODEL INITIAL ENVIRONMENTAL REVIEW QUESTIONNAIRE

Project No. _____

**PURPOSE OF QUESTIONNAIRE:**

The purpose of this Questionnaire is to provide information that will help both you and City/County staff identify any significant adverse environmental impacts resulting from your proposal. With this information, you and the City/County can begin working together to ensure that any such impacts can be avoided or reduced.

This Questionnaire is also intended to inform you of the environmental issues that are of concern to both the City/County and State and federal regulators. Contained in the Guidance Text accompanying the Questionnaire are summaries of local, State and federal programs and regulations that may affect your project. The Guidance Text is structured so as to correspond with the environmental issues addressed by the Questionnaire.

**Instructions for Applicant:**

1. Completion of this Questionnaire is required for the following development proposals:

   (Local staff should insert locally derived criteria for requiring completion of an Initial Environmental Review Questionnaire. See accompanying discussion entitled Use of the Initial Environmental Review Questionnaire.)

2. In completing this Questionnaire, it is assumed that you will only need currently available information concerning your proposal and its potential environmental impacts. Points of contact are provided for your convenience so that you may inquire about and obtain the most current and accurate data available. Additional studies, research or other investigations are not required, unless requested by City/County staff.

3. This Questionnaire applies to all parts of your proposal, even if you plan to construct them over a period of time, or on different parcels of land.

4. If you answer "yes" or "maybe" to a question, please read the appropriate section of the Guidance Text accompanying the Questionnaire. For each question, the Guidance Text addresses (1) how to determine if the project is subject to any relevant regulations, and (2) what a developer must do if it appears that a project is subject to the regulation(s). If you are absolutely certain that the proposed project will not have the environmental impacts in

question or be subject to any applicable environmental regulations, you may answer "no" and skip to the next question.

5. It is important that this questionnaire be fully and accurately completed to the best of your knowledge. In addition, a certified professional must testify to the accuracy and completeness of your answers by providing his/her signature and title in the signature space at the end of the questionnaire.

   (Local staff should insert who/which professional(s) must provide this certification.)

6. City/County staff may ask you to explain your answers or to provide additional information, if available.

## BACKGROUND INFORMATION

(Please attach additional sheets if space provided is inadequate to answer the question.)

1. Name of Proposed Project:

2. Name of Applicant:

3. Address and phone number of applicant or contact person:

4. Date Questionnaire completed:

5. Location of proposed project. Give the precise location of the proposed project, including the street address, parcel number and lot number, if applicable. If the project is to occur over a large area, identify the boundaries of the site.

6. Give a brief description of your proposed project including proposed use(s) and size.

7. List any environmental information that you know about that has been prepared, or will be prepared, directly related to your proposed project.

8. State previous uses of the property on which project is being proposed, if known. Consult aerial photos, property deeds, restrictive convenants, etc. available in local planning office, Circuit Court Clerk's office, or real estate/Commissioner of Revenue's office to obtain this information.

## ENVIRONMENTAL IMPACTS

### 1. WETLANDS

A. Will the project result in the dredging or filling of nontidal wetlands?

Yes _____ Maybe _____ No _____

See **pages 13-18** of the Guidance Text to answer this question.

B. Will the project result in the dredging or filling of tidal wetlands?

Yes _____ Maybe _____ No _____

See **pages 15-18** of the Guidance Text to answer this question.

C. Will the project impact State-owned subaqueous land?

Yes _____ Maybe _____ No _____

See **pages 19-20** of the Guidance Text to answer this question.

D. Will the project result in the alteration of wetlands drainage patterns by ditching, damming, road construction, or other means?

Yes _____ Maybe _____ No _____

E. Describe measures proposed to reduce or avoid impacts on wetlands or subaqueous land, if any. (Include any anticipated government approvals or permits that will be needed.)

### II. CHESAPEAKE BAY PRESERVATION AREAS

A. Is the project located within a Chesapeake Bay Preservation Area?

Yes _____ Maybe _____ No _____

See **pages 21-23** of the Guidance Text to answer this question.

B. If located within a Chesapeake Preservation Area, will the project encroach into the Resource Protection Area?

Yes _____ Maybe _____ No _____

See **pages 23-24** of the Guidance Text to answer this question.

C. Will the project require compliance with a WQIA/CWQIA procedure?

Yes _____ Maybe _____ No _____

See **page 22** of the Guidance Text to answer this question.

D. Describe measures proposed to comply with the Chesapeake Bay Preservation Act, if necessary. (Include any anticipated government approvals that will be needed.)

## III. PRIMARY SAND DUNES

A. Will the project in any way alter coastal primary sand dunes?

Yes _____ Maybe _____ No _____

See **pages 25-27** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce or avoid impacts to primary sand dunes, if any. (Include any anticipated government approvals or permits that will be needed.)

## IV. SURFACE WATER QUALITY

A. Will the project result in a point source discharge to surface waters?

Yes _____ Maybe _____ No _____

See **pages 28-32** of the Guidance Text to answer this question.

B. Will the project result in a discharge of nonpoint source pollutants to storm sewer systems or directly to surface waters?

Yes _____ Maybe _____ No _____

See **pages 33-38** of the Guidance Text to answer this question.

C. Will the project contribute to erosion and sedimentation impacts to adjacent properties, or waterways, or sensitive environmental resources?

Yes _____ Maybe _____ No _____

See **pages 38-39** of the Guidance Text to answer this question.

D. Will the project contribute to the need for off-site stormwater management facilities?

Yes _____ Maybe _____ No _____

See **pages 39-40** of the guidance text to answer this question.

E. Describe measures proposed to reduce or avoid impacts to surface water quality, if any. (Include any anticipated government approvals or permits that will be needed.)

## V. SURFACE WATER QUANTITY AND FLOW

A. Will the project be an instream use, or an offstream use, or a non-consumptive use?

Yes _____ Maybe _____ No _____

See **page 41** of the Guidance Text to answer this question.

B. If the project will be one of the above uses, please describe.

C. Will the project affect the flow regime of a local river or stream?

Yes _____ Maybe _____ No _____

See **pages 41-42** of the Guidance Text to answer this question.

D. If the project will affect surface water flow regime, please describe that effect. (Include any anticipated increase or decrease from pre-development flows).

E. Will the project be located within a state-designated Surface Water Management Area?

Yes _____ Maybe _____ No _____

See **pages 42-43** of the Guidance Text to answer this question.

F. If located within a Surface Water Management Area, will the project involve surface water withdrawals of greater than or equal to 300,000 gallons/month?

Yes _____ Maybe _____ No _____

See **pages 42-43** of the Guidance Text to answer this question.

G. Describe measures proposed to reduce or avoid impacts to surface water quantity, if any. (Include any anticipated government approvals or permits that will be needed.)

## VI. GROUNDWATER QUALITY

A. Will the project have the potential to significantly impact groundwater quality?

Yes _____ Maybe _____ No _____

See **pages 44-54** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce or avoid impacts to groundwater quality, if any. (Include any anticipated government approvals or permits that will be needed.)

## VII. GROUNDWATER QUANTITY

A. Will the project have the potential to significantly impact groundwater quantity?

Yes _____ Maybe _____ No _____

See **page 55** of the Guidance Text to answer this question.

B. Will project be located within a state-designated Groundwater Management Area?

Yes _____ Maybe _____ No _____

See **pages 55-56** of the Guidance Text to answer this question.

C. Describe measures proposed to reduce or avoid impacts to groundwater quantity, if any. (Include any anticipated government approvals or permits that will be needed.)

## VIII. AIR QUALITY

A. Will the project result in an increase in odor, dust, fumes, gases or other air contaminants?

Yes _____ Maybe _____ No _____

See **pages 57-62** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce or avoid impacts to air quality, if any. (Include any anticipated government approvals or permits that will be needed.)

## IX. SOLID AND HAZARDOUS WASTE MANAGEMENT

A. Will the project result in an increase in municipal solid waste, hazardous waste, or construction debris requiring management?

Yes _____ Maybe _____ No _____

See **pages 63-69** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce impacts to regional waste management, if any. (Include any anticipated government approvals or permits that will be needed.)

## X. TREE PRESERVATION

A. Will the project result in a change in the number or diversity of trees?

Yes _____ Maybe _____ No _____

See **pages 70-71** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce or avoid impacts to trees, if any. (Include any anticipated government approvals or permits that will be needed.)

## XI. ENDANGERED AND THREATENED SPECIES

A. Will the project affect any federal or state-listed endangered or threatened plant or animal species through a taking or loss of habitat?

Yes _____ Maybe _____ No _____

See **pages 72-73** of the Guidance Text to answer this question.

B. If project will affect any federal- or state-listed endangered or threatened plant or animal species, please identify which one(s).

See **pages 74-79** of the Guidance Text to answer this question.

C. Describe measures proposed to reduce or avoid impacts to federal or state-listed endangered or threatened species, and/or loss of habitat, if any. (Include any anticipated government approvals or permits that will be needed.)

## XII. NATURAL AREA PRESERVATION

A. Will the project result in a loss of habitat for nongame species?
Yes _____ Maybe _____ No _____

See **page 80** of the Guidance Text to answer this question.

B. Will the project impact any Natural Area Preserves designated through the Virginia Natural Heritage Program?

Yes _____ Maybe _____ No _____

See **pages 81-82** of the Guidance Text to answer this question.

B. Describe measures proposed to reduce or avoid impacts to State Natural Area Preserves, if any. (Include any anticipated government approvals or permits that will be needed.)

## XIII. NOISE

A. Will the project result in a significant increase in noise levels to the surrounding land area, either during construction or operation?

Yes _____ Maybe _____ No _____

B. If located within the vicinity of an airport, either commercial or military, will the project site fall within an AICUZ Noise Zone or Accident Potential Zone?

Yes _____ Maybe _____ No _____

See **pages 82-85** of the Guidance Text to answer this question.

## SIGNATURE

I. I, the undersigned, swear that the above responses are made truthfully and to the best of my knowledge.

Applicant:

_____
Name (Print or Type)

_____
Title

_____ _____
Signature Date

Person Completing Form:

_____
Name (Print or Type)

_____
Title

_____ _____
Signature Date

II. I, the undersigned, am knowledgeable about the proposed project and do hereby certify that the above questionnaire is accurate and complete according to all available information.

Certified Complete:

_____
Name (Print or Type)

_____
Title

_____ _____
Signature Date

# GUIDANCE TEXT

## I. WETLANDS AND SUBAQUEOUS LAND

Regulation of wetlands (tidal and nontidal) and subaqueous land is accomplished through the federal permitting process established under the federal Clean Water Act and the River and Harbors Act of 1899. Generally, all development within bodies of water and wetlands which can be defined as "waters of the United States", requires a permit from the Army Corps of Engineers (COE). "U.S. waters" is defined to include all waterways and their adjacent wetlands channelward of the ordinary high water shoreline. Section 10 of the Rivers and Harbors Act (RHA) regulates activities affecting navigation in the U.S. Waters. Section 404 of the Clean Water Act (CWA) addresses dredge and fill operations in wetlands and expands the definition of U.S. waters to include all wetlands adjacent to tidal and non-tidal waterways as well as isolated wetlands.

All applications for permits from the COE require coordination with the U.S. Fish and Wildlife Service (FWS), the U.S. Environmental Protection Agency (EPA) and the National Marine Fisheries Service (NMFS). Under Section 404, the EPA has the power to veto, under certain circumstances, a decision by the COE to approve a permit. Under Section 401 of the Clean Water Act, all projects requiring a COE permit must receive a certification from the State Water Control Board (SWCB) that the project will not have a significant adverse water quality impact, and that the State's water quality concerns will be complied with. However, Virginia has proposed that the 401 Certification Program in Virginia be phased out and replaced with the Virginia Water Pollution Protection Permit Program. This permit will be issued to constitute the certification required by Section 401 of the CWA. Also, the federal Coastal Zone Management Act of 1972 requires that any applicant for a required federal license, permit, or federally funded activity affecting land or water uses in the coastal zone area of Virginia to provide, in the application to the licensing or permitting agency, a certification that the proposed activity complies with the Virginia Coastal Resources Management Program.

Many projects involving wetlands or subaqueous land fall under COE General Permits. The COE is authorized to issue General Permits on a state, regional or nationwide basis for certain categories of development activities which are similar in nature and cause only minimal adverse environmental impacts. Most wetland or subaqueous land disturbances authorized under a General Permit may proceed without applying for an individual permit. In some circumstances, conditions associated with a General Permit require that the Corps be notified before an activity takes place. The COE District Office should be contacted to determine whether a project qualifies for a General Permit and, if so, whether any General Permit conditions apply to the project.

## A. Nontidal Wetlands

At present there is no State regulatory program governing development in nontidal wetlands. The following describes procedures in the federal Section 404 permitting process that are specific to nontidal wetlands.

To determine whether a site contains nontidal wetlands, the Norfolk District of the COE recommends the following procedure.

1. Consult the U.S. Soil Conservation Service's local soil survey for your jurisdiction to check for the possible presence of hydric soils on your site.

2. If it is found that any portion of your site contains hydric soils, a formal wetlands delineation should be performed in accordance with the procedure outlined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands. More information on the wetlands delineation process and guidance on the Manual edition to be used is available from the COE District Office.

3. Once a wetlands delineation has been performed, the results must be verified by the Corps. A preapplication procedure has been recommended by the Corps. It will be used to review wetlands delineations and make a final determination of federal jurisdiction. More information on the preapplication procedure is available from the COE District Office.

The 404 permit process for development in nontidal wetlands involves the steps outlined below. (This process applies to individual permits only.)

1. Complete and submit a COE permit application.

2. If the application is complete, the COE prepares and distributes a public notice within 15 days.

3. 30 day public comment period.

4. COE conducts site inspection.

5. Application is reviewed EPA, FWS, NMFS, SWCB, VMRC, VIMS, and VCOE at monthly coordination meeting.

6. COE ensures compliance with other regulations:

   a. Section 401 water quality certificate from the State Water Control Board.

   b. Certification that the project complies with the Virginia Coastal Resources Management Program.

   c. Adherence to National Environmental Policy Act procedures.

7. Depending on the conclusions reached by the federal reviewing agencies and the volume and nature of public comments, the Corps may decide that a public hearing is warranted.

8. A decision is made by the COE to approve, approve with modification or deny a permit application.

For more information on development in nontidal wetlands contact:

| | |
|---|---|
| U.S. Army Corps of Engineers, Norfolk District | (804) 441-7656 |
| State Water Control Board | (804) 527-5000 |
| Tidewater Regional Office | (804) 552-1840 |

**B. Tidal Wetlands**

In addition to the federal regulatory process, State and local governments have enacted programs to regulate development in tidal wetlands. The Virginia Wetlands Act of 1972, as amended, applies to all tidal wetlands, both vegetated and non-vegetated. The Act also applies to the wetlands of the Back Bay and North Landing River which are subject to wind tides only. The Act defines tidal wetlands as that land lying between mean low water and an elevation above mean low water equal to 1.5 times the mean tide range at the site of a proposed project. Title 62.1, Chapter 2.1 of the Code of Virginia gives the Virginia Marine Resources Commission (VMRC) primary responsibility for regulating tidal wetlands. Local governments may establish and administer their own regulatory programs, with VMRC oversight, through local Wetlands Boards and ordinances which conform to model State legislation.

A joint permitting process has been established which combines the local, State and federal tidal wetlands permitting requirements. Joint permit applications can be obtained from the VMRC, local wetlands boards or the COE District Office. VMRC and the Virginia Institute for Marine Science (VIMS) have developed Wetland Guidelines which describe tidal wetlands types, their values, and methods

of coastal construction that minimize impacts. These Guidelines can be used to assist applicants when filling out the joint permit application.

A general overview of the joint permit application process is provided below and a flow chart depicting the process can be found on page 17. The entire joint permitting process generally takes two to three months. Complex projects may take longer.

1. One permit application is completed and submitted to the VMRC. Copies of the application are then forwarded to the COE and to the local Wetlands Board.

2. A joint public notice is prepared by COE. If a project does not require a permit from COE or qualifies for a COE General Permit, individual public notices are prepared by each of the other regulatory agencies.

3. A site inspection is conducted jointly, where possible, by the VMRC, VIMS, COE, and the local Wetlands Board.

4. The application is reviewed by EPA, FWS, NMFS, SWCB, VMRC, VIMS, and COE at monthly coordination meeting.

5. Depending on the conclusions reached by the reviewing agencies and the volume and nature of public comments, a public hearing may be held.

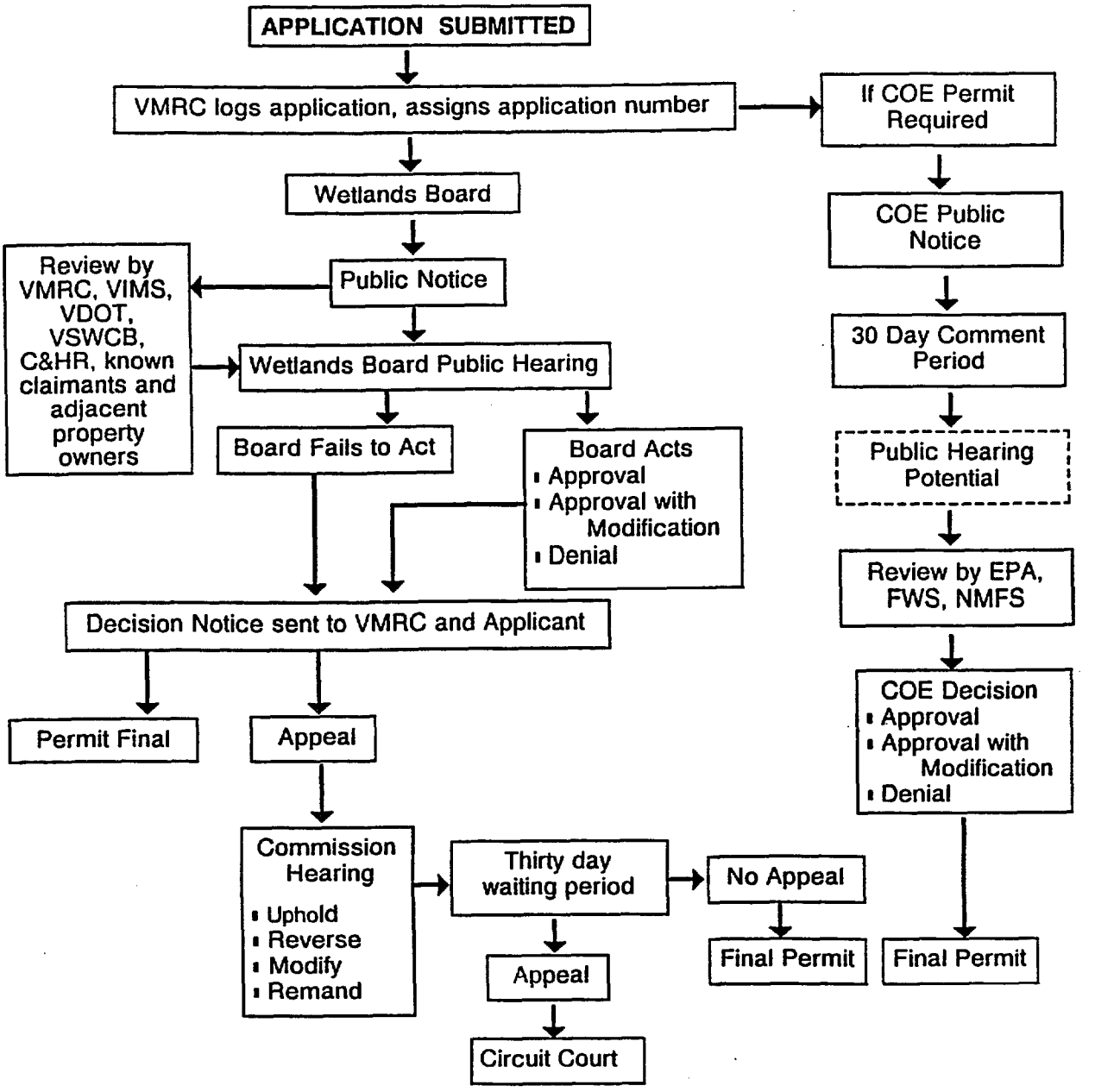
6. Separate decisions are made by the local Wetlands Board and the COE to approve, approve with modification, or deny their respective permit applications.

7. The local Wetlands Board decision is reviewed by the VMRC to ensure consistency with the State Wetlands Act.

8. Decisions may be appealed to the VMRC within ten days. The VMRC Board will review any appeals within forty-five days and make a determination to uphold, reverse, modify, or remand the original decision.

9. After a thirty-day waiting period, the VMRC decision can be appealed to the Circuit Court. If no appeal is made, a final permit is issued.

# FIGURE 1
# WETLANDS PERMIT REVIEW PROCESS




**Acronyms**

VMRC - Virginia Marine Resources Commission
VDOT - Virginia Department of Transportation
C&HR - Virginia Department of Conservation and Historic Resources
VIMS - Virginia Institute of Marine Science
VSWCB - Virginia State Water Control Board
COE - Corps of Engineers
EPA - Environmental Protection Agency
FWS - Fish and Wildlife Service
NMFS - National Marine Fisheries Services

Adapted from: Chesapeake Bay Foundation Conserving Our Wetland Resources: Avenues for Citizen Participation, 1987.

Source: SVPDC, The Value of Wetlands: A Guide For Citizens, 1988

For more information on development in tidal wetlands contact:

| | |
|---|---|
| U.S. Army Corps of Engineers,<br>Norfolk District | (804)441-7656 |
| Virginia Marine Resources Commission | (804)247-2200 |
| State Water Control Board<br>Tidewater Regional Office | (804)527-5000<br>(804)552-1840 |

Local Wetlands Board

(Insert name and number of local wetlands board contact.)

## C. Subaqueous Land

All development activities affecting subaqueous, or submerged, lands associated with federally defined "waters of the United States" are subject to the federal COE permitting process described at the beginning of this section. Types of projects which may affect subaqueous lands and require COE permits typically include structures such as piers, breakwaters, bulkheads, revetments, power transmission lines and aids to navigation, and such activities as channelization, excavation, dredging, filling and ocean dumping.

As defined in the Code of Virginia, "Tidewater Virginia" encompasses approximately 5,000 miles of shoreline. There are about 2,300 square miles, or roughly 1,472,000 acres, of tidally influenced subaqueous lands. This vast area requires an ever- increasing custodial responsibility for the State. In Virginia, all tidally influenced submerged lands channelward of mean low water are owned by the Commonwealth. Additionally, State ownership extends as well to non-tidal subaqueous lands throughout the Commonwealth, which had not been granted to private owners before 1792. Title 62.1, Chapter 1 of the Code of Virginia states that it is unlawful to encroach upon or use any materials from State- owned submerged lands without a permit from the Virginia Marine Resources Commission (VMRC). Exemptions to this statute include the following:

- Dams authorized by proper authority
- Fishing and shellfishing already regulated under State Code
- Federal navigation and flood control projects
- Private, noncommercial piers adjacent to private land which do not interfere with navigation

All non-exempt activities affecting subaqueous lands are subject to the joint permit application process described in the preceding section on tidal wetlands. Applications can be obtained from the VMRC or from local wetlands boards. In addition to a permit fee, rents or one time royalty payments are required for most activities affecting State-owned subaqueous lands. The VMRC has prepared Subaqueous Guidelines which informs applicants of the general conditions and terms under which subaqueous activities will be allowed in State waters.

For more information on development activities affecting State- owned subaqueous lands contact:

Virginia Marine Resources Commission (804)247-2200

Local Wetlands Board

(Insert name and number of local wetlands board staff contact.)

**Sources of additional information:**


Chesapeake Bay Foundation. Conserving our Wetland Resources: Avenues for Citizen Participation, 1987.

Commonwealth of Virginia. Title 62.1, Chapter 1, Code of Virginia, 1950, as amended.

_____. Title 62.1, Chapter 2.1, Code of Virginia, 1950, as amended.

Federal Interagency Committee for Wetland Delineation. 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication. 76 pp. plus appendices.

Southeastern Virginia Planning District Commission. The Value of Wetlands: A Guide for Citizens. Chesapeake, Virginia: SVPDC, 1988.

U.S. Army Corps of Engineers. Corps of Engineers Wetlands Delineation Manual. Final Report (Technical Report Y-87-1) Washington, D.C.: Department of the Army, January, 1987.

U.S. Congress. River and Harbors Act of 1899. 33 U.S.C. 403.

U.S. Environmental Protection Agency. "Proposed Revisions to the Federal Manual for Delineating Wetlands." Office of Wetlands, Oceans, and Watersheds. Washington, D.C.: EPA, August, 1991.

U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Department of Agriculture Soil and Conservation Service, and U.S. Department of Interior Fish and Wildlife Service. "1989 'Federal Manual for Identifying and Delineating Jurisdictional Wetlands'; Proposed Revisions." 56 Federal Register 40446, August 14, 1991.

Virginia Institute of Marine Science and Virginia Marine Resources Commission. Wetlands Guidelines. Newport News, Virginia: VMRC, undated.

Virginia Marine Resources Commission. Subaqueous Guidelines: Guidelines for the Permitting of Activities which Encroach In, On or Over the Submerged Lands of the Commonwealth of Virginia. Newport News, VA: VMRC, 1986.

## II. CHESAPEAKE BAY PRESERVATION AREAS

### A. General Requirements

Under the Chesapeake Bay Preservation Act (Title 10.1, Chapter 21, Code of Virginia), the forty-six cities and counties and forty- three towns in Tidewater Virginia are required to develop programs to delineate and protect environmentally sensitive areas known as Chesapeake Bay Preservation Areas (CBPAs). CBPAs are defined as those lands, which if improperly developed, may result in substantial damage to the water quality of the Bay and its tributaries.

Local Tidewater governments must delineate two categories of CBPAs: **Resource Protection Areas** (RPAs) and **Resource Management Areas** (RMAs). The RPA includes lands at or near the shoreline which have important value to water quality. Under the Act, the RPA must include tidal wetlands, certain nontidal wetlands, tidal shoreline and any other lands with important water quality values. The RPA must also include a 100-foot buffer area measured from the landward side of these natural features. The RMA is land which protects the values of the RPA. The delineation of the RMA is left to the discretion of local governments, but is subject to State consistency review. State regulations require that localities consider including floodplains, highly erodible and permeable soils, steep slopes, nontidal wetlands not included in the RPA, and any other lands necessary to protect water quality.

Under the Act, local governments are allowed to designate portions of RPAs and RMAs as Intensely Developed Areas (IDAs). IDAs are areas where concentrated development already exists. This designation allows for redevelopment and infill development where little of the natural environment remains. Not all localities have designated IDAs.

The initial step in determining whether a site is located within a CBPA is to contact the local planning staff. Most localities have prepared maps which show the general location of CBPAs. The CBPA delineations on these maps are extremely generalized, however. Detailed, site-specific surveys showing the exact location of CBPA resource features on a lot may be required. These surveys are generally the responsibility of the applicant.

In all CBPAs, development must meet general criteria that require the reduction of pollutants found in runoff and/or protect sensitive lands from land disturbance. These general criteria are briefly described below. For guidance on meeting these criteria, the local planning staff should be contacted.

- o Minimize disturbance of land.

- o Preserve natural vegetation.

- o Minimize impervious cover such as paving.

- o Ensure regular maintenance of required stormwater best management practices.

- o All development exceeding 2,500 square feet must undergo a formal development review process, and comply with the requirements of the local erosion and sediment control ordinance.

- o All on-site sewage treatment systems must have a reserve drainfield which equals the waste treatment capacity of the primary drainfield, and be pumped out once every five years. The reserve drainfield requirement does not apply to any lot or parcel recorded prior to October 1, 1989.

- o Control the quality of stormwater runoff from new development so that post-development pollutant loads do not exceed pre-development pollutant loads. For redevelopment areas and any development in IDAs, pollutant loads must be reduced by 10%. If a redevelopment site is already served by stormwater best management practices, post-development pollutant loads shall not exceed existing loads.

  A specific calculation procedure for use in demonstrating compliance with this criteria has been developed. It is discussed in greater detail in Part II of this document, the "Comprehensive Model Water Quality Impact Assessment Procedure."

In RPAs, only water dependent uses, such as piers, and redevelopment are allowed. New homes and related structures, such as swimming pools, are prohibited. Any development within an RPA must meet the general criteria noted above and be subject to a Water Quality Impact Assessment (WQIA) to be performed by the applicant in accordance with local guidelines, or a comprehensive WQIA (CWQIA) Procedure if one is adopted by the locality. See Part II of this document which discusses the Model CWIQA Procedure. Subsequent discussions with the Chesapeake Bay Local Assistance Department have suggested that any land disturbing activity which constitutes redevelopment as defined in Sec. 1.4 of the Chesapeake Bay Preservation Area Designation and Management Final Regulations (VR 173-02-01) definitions section within an RPA will also be subject to a WQIA. Part II provides guidance for use in performing the WQIA.

In RMAs, any use allowed under the local zoning ordinance is still permitted. However, all new development must meet the general performance criteria outlined above.

If a locality designates IDAs, development in those areas must meet the above criteria pertaining to stormwater management and erosion and sediment control.
For more information about the Chesapeake Bay Preservation Act or development activities within CBPA boundaries, contact:

Virginia Chesapeake Bay Local
Assistance Department (800)243-7229

(Insert name and number of local Chesapeake Bay staff contact.)

**B. Encroachment into the RPA Buffer Area**

Activities allowed in the buffer area are as follows:

- o Paths cleared through the buffer to water access points such as piers or boat ramps.
- o Shoreline erosion control activities. Vegetative control techniques are preferred over structural techniques. Structural techniques will still require any applicable local, state or federal waterfront development permits.
- o Pruning or thinning of vegetation to create a vista.
- o Mowing or other maintenance of lawns that existed when the local CBPA program became effective.
- o Construction of wells.

Septic systems, swimming pools, sheds, decks or similar structures cannot be constructed by right in the buffer. However, the local exception process may allow some of these uses in the landward fifty feet of the buffer. In such cases, it will be necessary to prepare a WQIA in accordance with local guidelines, and to provide best management practices landward of the buffer area which achieve water quality benefits that are equivalent to the full 100-foot buffer.

When a buffer area results in the loss of buildable area on a lot or parcel recorded before October 1, 1989, a buffer may be reduced by no more than fifty feet in width as long as the reduction is the minimum necessary to achieve a reasonable building area, and, where possible, an area equal to the buffer

encroachment is provided elsewhere on the site to provide water quality protection benefits.

For more information regarding development activities within CBPA boundaries, contact:

Virginia Chesapeake Bay Local
Assistance Department (800)243-7229

(Insert name and number of local Chesapeake Bay staff contact.)

**Sources of additional information:**


Commonwealth of Virginia. Title 10.1, Chapter 21, Code of Virginia, 1950, as amended.

Hampton Roads Planning District Commission. "CBPA Administrative Procedures - Hampton Roads Localities." February, 1991.

_____. "Summary of Local Chesapeake Bay Preservation Act Programs" in Environmental Reviews. January, February, March, 1991, No. 2.

Southeastern Virginia Planning District Commission. "Virginia's Chesapeake Bay Preservation Act: A Guide" in Environmental Reviews. Special Edition. March, 1990.

Virginia Chesapeake Bay Local Assistance Department. "Factual Answers to Bay Act Misconceptions". Undated.

_____. Local Assistance Manual. Richmond, Virginia: CBLAD. 1990.

_____. VR 173-02-01.1. "Emergency Chesapeake Bay Preservation Designation and Management Regulations." Virginia Register, Volume 7, Issue 7, December 31, 1990, p. 1138.

## III. PRIMARY SAND DUNES

In 1980, the Virginia General Assembly passed the Coastal Primary Sand Dune Protection Act (Title 62.1, Chapter 2.2, Code of Virginia). In passing this legislation, the Commonwealth recognized that coastal primary sand dunes provide a number of valuable functions including protection of life and property from flooding and erosion caused by coastal storms; replenishment of beach sand; provision of habitat for coastal fauna; and, preservation of the overall scenic and recreational attractiveness of Virginia's coastal environment. Also inherent in this legislation is an understanding that development activities that impact coastal dunes must not only take these values into account, but must also recognize the dynamic nature of dune systems. Inappropriate development activity may contribute to increased erosion, coastal flooding damage to fixed structures, and increased public expenditures for disaster assistance and beach replenishment.

Under the Coastal Primary Sand Dune Protection Act, localities having coastal primary dunes are authorized to adopt a State prescribed ordinance which establishes a local permitting program to control development in these dunes. This ordinances must be implemented by the local Wetlands Board. As with the Virginia Wetlands Act, the Primary Sand Dune Protection Act requires the Virginia Marine Resources Commission (VMRC) to review, on appeal, local permit decisions. In addition, where a locality has opted not to adopt the specified ordinance, the Act requires the VMRC to administer the permit program itself. The three Hampton Roads localities subject to the Act (Hampton, Norfolk and Virginia Beach) administer their own dune permitting programs.

As defined in the Coastal Primary Sand Dune Protection Act, the coastal primary dune system commences at the intertidal zone and extends landward to a point on the backside of the first row of dunes where the slope drops below ten percent. The Act establishes the following standards for construction on primary dunes:

> "No permanent alteration or construction upon any coastal primary sand dune shall take place which would:
>
> (a) impair the natural functions of the dune as described by the Act;
>
> (b) physically alter the contour of the dune; or
>
> (c) destroy vegetation growing on the dune.

Activities contrary to these standards will be permitted only if the wetlands board or Commission finds that there will be no significant adverse ecological impact from the proposal, or that granting a permit for the proposal is clearly necessary and consistent with the public interest."

It is apparent from these standards that the Act encourages a permitting process which carefully balances the public and private benefits and detriments of each proposed activity. Guidelines prepared by the VMRC and the Virginia Institute of Marine Science to implement the Act indicate that, in general, alteration of primary dunes may be justified in order to provide beach access, as long as the natural functions of dunes are not significantly disturbed. These guidelines also indicate that dune alteration will ordinarily not be justified for the following:

1. Activities that can be accommodated without encroachment into the dune area;

2. Where construction is proposed on the dune crest or seaward of the crest;

3. Where the dune location must be modified in order to accommodate the proposed activity; and,

4. Where alteration of the dune would likely result in damage to neighboring property owners.

In 1987, the Coastal Primary Sand Dune Protection Act was amended to allow property owners along rapidly eroding Sandbridge Beach in Virginia Beach to build bulkheads and other shoreline stabilization structures as long as permission was obtained from adjacent property owners. In 1988, in response to continuing beach erosion problems, the Act was amended again to remove the provision requiring permission from adjacent property owners.

Permit applications for primary dune alterations can be obtained from and filed with the local Wetlands Board. Within 60 days of receipt of the completed application, the Wetlands Board must hold a public hearing on the application. The Wetlands Board must notify all adjacent landowners and interested public agencies of the public hearing no less than 20 days before the scheduled hearing date. In addition, notice of the public hearing must be published in a local newspaper once a week for the two weeks prior to the hearing. The Wetlands Board must make its determination within 30 days of the hearing and the applicant must be informed of the Board's decision within 48 hours of the determination. Violation of the provisions of the Coastal Primary Sand Dune Protection Act may result in a penalty of up to $25,000 per day.

For more information contact:

Virginia Marine Resources Commission (804)247-2200

Local Wetlands Board

(Insert name and number of local wetlands board staff contact.)

**Sources of additional information:**

Commonwealth of Virginia. Title 62.1, Chapter 2.2, Code of Virginia, 1950, as amended.

Virginia Marine Resources Commission. Coastal Primary Sand Dunes/Reaches Guidelines: Guidelines for the Permitting of Activities which Encroach into Coastal Primary Sand Dunes/Reaches. Newport News, Virginia: VMRC, revised 1986.

# IV. SURFACE WATER QUALITY

A project can contribute to surface water quality degradation through several different processes. These include the discharge of pollutants from a discrete point source, the discharge of nonpoint source pollutants carried in stormwater runoff, or erosion and sedimentation during construction. The following summarizes existing water pollution regulations associated with each process.

## A. Point Source Discharges

Point source discharges enter a waterbody at a discrete location, usually a discharge pipe. Such discharges, which are generally composed of municipal sewage treatment or industrial process wastewater, are regulated under Section 402 of the federal Clean Water Act. Section 402 establishes the National Pollutant Discharge Elimination System (NPDES) which requires that a discharging facility obtain a permit limiting the amount of pollution that can be discharged into a given stream.

Under Section 402, point source discharges must meet the more stringent of two separate requirements:

1. The requirements needed to maintain a receiving water's quality standards, ideally a quality suited for "the protection and propagation of fish, shellfish and wildlife" and for recreation in and on the water."

2. Minimum treatment requirements imposed uniformly nationwide based on the type, age and size of the discharging facility.

### Virginia Pollutant Discharge and Elimination System (VPDES)

While some states have elected to have the EPA manage their NPDES permit programs, Virginia requested and in 1975 was granted the authority to administer its own permitting program. The Virginia Pollutant Discharge Elimination System (VPDES) is administered by the State Water Control Board (SWCB) in conformance with the federal NPDES regulations.

VPDES permits specify maximum levels of pollutants permitted in a discharge, procedures for discharge sampling and testing, and Best Management Practices needed to control and abate pollutants. The permits also require the reporting of sampling and testing results to the SWCB at least once per year, and the immediate notification (within 24 hours) of any spills or unpermitted discharges. Routine reporting frequency is dependent on the size and characteristics of the discharge. Once granted, permits are valid for five years.

The water quality standards established by the SWCB require maintaining certain levels of dissolved oxygen and pH for designated stream segments (VR 680-21-01.5). Other standards have been established for mercury, chlorine and radiological substances. In shellfish areas, fecal coliform standards are also established. The State's Policy for Nutrient Enriched Waters (VR 680-14-02) and Toxics Management Program (VR 680-14-03) may be found in the State Water Control Board Regulations, as amended. In Hampton Roads, the nutrient standard applies to the Chesapeake Bay and its tributaries, and the Chowan River.

In meeting these standards, proposals to construct new or modify existing industrial facilities must demonstrate that "best available control technology" will be used before a permit can be granted.

Applications for VPDES permits are obtained from and, when completed, submitted to the SWCB. The SWCB point of contact for Hampton Roads is the SWCB Tidewater Regional Office in Virginia Beach. Applications must be submitted to the SWCB 180 days prior to the commencement of construction, expansion or employment of the discharging facility.

Upon receiving a permit application, the SWCB will either tentatively issue the permit or deny the application. If a decision is made to tentatively issue a permit, then a draft permit is prepared for public review. A period of at least thirty days following the date of initial public notice is allowed for interested parties to provide comments on a draft permit and request a public hearing. If a public hearing is requested, a public notice must be published at least thirty days in advance of the hearing date. No VPDES permit application will be considered complete until the SWCB receives notification from the locality in which the discharge is to take place that the discharging facility is consistent with all applicable local ordinances.

If a permit application is found to be unacceptable, the SWCB advises the applicant of the requirements necessary to obtain approval. Prior to a formal Board action, an applicant is given the opportunity to either withdraw an application or satisfy the conditions necessary for approval.

Permits are generally not granted if a proposed discharge will cause or contribute to the violation of water quality standards. An applicant proposing to discharge to streams which do not meet applicable water quality standards may be granted a permit under certain circumstances. It must be determined by the SWCB through a waste load allocation study that there is sufficient waste assimilative capacity in the receiving stream or waterway to allow discharge of the waste(s) in question. It must also be shown that existing dischargers are being governed by compliance schedules, which are designed to ensure that the stream or waterway meets applicable water quality standards.

The SWCB may also issue VPDES general permits for categories of dischargers that involve the same or similar types of operations, discharge the same or similar types of wastes, require the same effluent limitations or operating conditions, and require the same or similar types of monitoring. General permits preclude the need for individual permits; however, as with an individual permit, the effluent limits in the general permit will be set to protect the quality of receiving waters. Also, no discharge would be covered by the general permit unless the local governing body has certified that the facility complies with all applicable local zoning and planning ordinances.

For example, one increasingly popular alternative to traditional septic tank systems are on-site package sewage treatment plants (STP) which discharge to surface waters. These plants generally provide sewage treatment to one or more residences or businesses by providing biological processes and/or sand filtration. Because they discharge to surface waters, they are regulated by the VPDES program. The 1990 Virginia General Assembly passed legislation allowing the SWCB to require that individual STP plants with flows of less than or equal to 1,000 gallons per day be covered by both a VPDES general permit and a VDH permit. In July 1991, the SWCB adopted emergency regulations establishing a general permit covering such domestic sewage discharges. Adoption of these as permanent regulations (VR 680-14-09) is currently undergoing public review.

Before issuing its permit, the VDH must agree that all other on-site disposal options have been explored and found unsatisfactory, certain criteria regarding outfall location and development density have been met, and that monitoring and maintenance contracts are in place. In addition, local governments must provide certification that the package treatment plants comply with local ordinances. Other proposed VPDES general permits applicable to Hampton Roads are discharges from molluscan shellfish and crustacea processing establishments (VR 680-14-10), and corrective action plans (CAP) for remediation of leaking underground storage tanks (VR 680-14-11).

Certain discharges are exempt from the VPDES regulations. In most cases, these exemptions exist because the discharges are addressed by other state and federal regulations. Some of the more common exemptions under the VPDES regulations include:

- Any discharge associated with the normal operation of a vessel. This exemption does not include the overboard disposal of trash or garbage. Nor does it include discharges when a vessel is operating in a capacity other than as means of transportation (i.e. mining, storage or seafood processing).

- Discharges of fill or dredge materials already covered by a permit issued under Section 404 of the federal Clean Water Act.

- o Discharges to publicly owned treatment works. (See discussion of VWCB Pretreatment Program below.)

- o Discharges of nonpoint sources from agricultural activities. This exemption does not include discharges from concentrated animal feeding operations.

- o Return flows from irrigated agricultural land.

- o Land disposal activities when already covered by State Department of Health and State Department of Waste Management permits.

In Hampton Roads, provision of wastewater treatment facilities is critically tied to the accommodation of development in a manner which protects public health and the environment. Rational and efficient provision of these facilities has been examined in many studies prepared by state, regional, and local agencies. Most of the recent studies on this issue have also examined the water quality implications of such facilities.

In response to increasing urban development in the region and especially in the rural portions of Southeastern Virginia, the Southeastern Virginia Planning District Commission in 1987 endorsed an advisory policy regarding the provision of wastewater collection and treatment facilities to serve development in Southeastern Virginia. It is the stated policy that publicly-owned facilities are preferred and privately-owned and operated facilities are discouraged, except where there are no other service options available. Where feasible, regional public facilities are encouraged.

**Pretreatment Program**

The VPDES program also regulates industries which discharge directly to public sewer systems. Publicly Owned Treatment Works (POTWs) are not designed to treat toxic industrial wastes. Such wastes may interfere with the plant's biological treatments processes, pass through them untreated into receiving waters, or contaminate sewage sludge precluding proper disposal. POTW operators have the primary responsibility for ensuring, that before being discharged to the sewer system, industrial effluents meet applicable pretreatment standards. Oversight and regulation of the POTW pretreatment programs was delegated to the SWCB by the EPA in 1989. The VWCB's primary means of regulating local POTW pretreatment programs is by incorporating program requirements into POTW VPDES permits. The SWCB also audits pretreatment programs and conducts inspections of significant industrial dischargers.

As authorized by Chapter 66, Acts of the Virginia General Assembly, 1960 and by the federal Clean Water Act, as amended, the Hampton Roads Sanitation District (HRSD) adopted its own industrial wastewater discharge regulations in November 1978, which were later revised in 1983. These regulations provide requirements for control of the discharge of such wastewater into any part of the sewerage system of the HRSD, directly or through its local collection systems, and cover the quantity and rate of discharge, quality of industrial wastewaters discharged in the system, and the issuance of Industrial Wastewater Discharge Permits. All industries which discharge industrial wastewater into the sewerage system or whose discharge otherwise may have a significant impact on the system, as determined by HRSD, shall obtain a permit prior to the commencement of such discharge. For a complete listing of prohibited waste discharges, refer to the HRSD IWD regulations.

**Virginia Pollutant Abatement (VPA) Permits**

VPA permits may be required for wastewater handling facilities which do not involve discharging to a sewage treatment facility or to State waters. Such facilities may include pits, ponds or lagoons which rely on evaporation or store waste for eventual land application. VPA permits may also be required for on-site septic tank drainfields or land application of sludge from wastewater treatment facilities. VPA permit conditions generally include requirements for liners and other facility design and performance criteria.

The basis for issuance of VPA permits is to ensure that wastewater will not discharge directly to State surface waters, and to protect groundwater. Applicants for VPA permits are required to provide conceptual plans for proposed facilities. These plans are reviewed by VWCB staff and a site inspection is made. If it is determined that there is a potential threat to groundwater quality, the applicant must provide site evaluation data and possibly conduct groundwater monitoring before a permit is approved.

The VPA permit program is administered by the VWCB. The permit application and public review procedures for VPA permits are essentially the same as those for VPDES permits. VPA permits are valid for ten years.

For further information on VPDES, VPA, or HRSD IWD permits contact:

| | |
|---|---|
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |
| Hampton Roads Sanitation District | (804)460-2261 |

## B. Nonpoint Source Discharges

Nonpoint Source (NPS) pollution is generally defined as the transfer of pollutants from land to water during rainstorms. NPS pollutants can enter waterways directly via overland flow, or indirectly through a stormwater collection system. Although water quality control efforts have historically focused on point sources, EPA studies have shown that over half of the nation's water pollution problems can be attributed to nonpoint sources. Increasing concern for the water quality impacts associated with urban runoff has led to the development of a variety of state and federal programs which require the incorporation of NPS pollution control into local stormwater management activities. One of these programs, the Chesapeake Bay Preservation Act, is discussed in Section II of this Guide. Other NPS control programs that may affect development activities in Hampton Roads are discussed below.

### EPA NPDES Stormwater Permitting Regulations

As discussed in Section IV.A. of this Guide, Section 402 of the federal Clean Water Act establishes the National Pollutant Discharge Elimination System permitting program for point source discharges. A 1987 amendment to Section 402 required the EPA to develop regulations which extend the NPDES permitting program to NPS pollutants contained in stormwater discharges. Regulations for this program were published on November 16, 1990 (55 FR 47990 et seq.) and amended on March 21, 1991 (56 FR 12098 et seq.).

The EPA NPDES permitting regulations address stormwater discharges associated with both industrial activities and municipal storm sewer systems serving populations greater than 100,000. By October 1992, the EPA is required to issue additional regulations for all other stormwater discharges.

The EPA regulations for municipal storm sewer systems require localities to establish stormwater management programs, that will eventually result in local regulations affecting the way land is developed and managed. Localities subject to the regulations are currently preparing permit applications which describe existing stormwater management activities and problems, and outline community-specific stormwater management programs which will be needed to implement permit conditions over a five year term. Six Hampton Roads localities have populations greater than 100,000 and therefore must comply with the regulations. They are: Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach. Localities having populations greater than 250,000 (only Norfolk and Virginia Beach in Hampton Roads), have until November 16, 1992 to complete the permit application process. Localities with populations between 100,000 and 250,000 must complete their permit applications by May 17, 1993.

Of more immediate concern to the development community are the EPA regulations for industrial stormwater discharges. New and existing industrial facilities are subject to a permitting process that is separate from and has different application requirements than the municipal permitting process. Under the industrial regulations, facilities must obtain stormwater permits for discharges to receiving waters and discharges to municipal storm sewer systems.

The EPA regulations describe the types of industrial facilities required to submit applications and specify the information necessary to complete the application. A number of industrial activities required to obtain NPDES stormwater permits are specifically cited in the regulations by industrial category or Standard Industrial Classification (SIC) code. More generally, the regulations apply to any discharge from any conveyance used for collecting and transporting stormwater originating from manufacturing, processing, or raw material storage areas at industrial plants. Areas that are located on plant lands, but are separate from industrial activities, such as office buildings or parking lots, are generally excluded from this definition. Other facilities and activities subject to the industrial regulations that do not fall neatly into the above definition include the following:

- Mining activities
- Hazardous waste treatment, storage and disposal facilities
- Landfills, land application sites and open dumps that receive industrial wastes
- Recycling facilities
- Power generating facilities
- Vehicle maintenance and equipment cleaning facilities
- Sewage treatment plants or other wastewater treatment systems which have design flows of greater than 1.0 mgd or are approved under a pretreatment program
- All construction sites greater than five acres which are not part of a larger plan of development or sale

Industrial facilities that discharge stormwater directly to a municipal storm sewer system must obtain a NPDES permit even if the municipal system has a permit. Moreover, a new industrial facility must formally notify the operator of the municipal storm sewer system to which it discharges no more than 180 days prior to commencing discharge.

The regulations do not indicate specific NPS controls to be included in the permit conditions. They state only that controls must be developed from Best Available Technology, Best Control Technology or, in some cases, be water quality-based controls. Specific controls will be determined by the permitting authority. In Virginia, the permitting authority is currently the EPA regional office. However, the VWCB is currently studying the feasibility of assuming this responsibility.

The EPA regulations authorize three categories of industrial permits: individual, group and general. Individual permits are facility-specific. The current deadline for the submission of individual industrial permit applications is November 18, 1991. However, the EPA has proposed extending that deadline to May 18, 1992. In the future, individual permit applications for new industrial stormwater discharges must be submitted 180 days before commencing the activity that will result in the discharge. Although the VWCB has yet to assume permitting authority, applications for individual permits should be submitted to the VWCB where they will be forwarded to the regional EPA office.

Group permits are standard permits, issued in lieu of individual permits, which apply broadly to entire subcategories of similar facilities. Issuance of group permits and the conditions that accompany the permits are dependent on detailed information provided during the application process by several representative members of a group. The assumption in the group permitting approach is that, since similar industrial facilities will have similar stormwater discharges, it is reasonable to require the same permit conditions. Groups are generally organized by industrial trade associations. They must contain at least four members and are subject to EPA approval.

Prior to September 30, 1991, a group of facilities wishing to apply for a group permit was required to jointly submit an initial Part 1 application to the EPA by that same date. This application was used to determine whether the group qualified as a properly constituted "group". The EPA had 60 days to make this determination. The Part 1 application was used to identify the members of the group who would be required to submit the detailed information required in the Part 2 application. If found to be ineligible for a group permit, individual facilities have one year from the date of the permit denial to apply for individual permits. If approved as a group, a Part 2 application must be submitted twelve months after the approval of the Part 1 application or by May 18, 1992, whichever comes first.

The EPA only offered this one opportunity to apply for group permits. After September 30, 1991, no more group permit applications will be accepted and all new industrial facilities will have to either apply for individual permits or qualify for general permit coverage. Individual facilities not identified in an already submitted group permit application have until February 18, 1992 to "add on" to an already

approved group permit. Approval for adding on to a group permit application must be obtained from the EPA as well as the existing membership of the group.

General permits can be issued by states or the EPA and provide blanket coverage for groups of facilities which are not included in existing or proposed group permits, but which are deemed similar enough to justify coverage under a single, comprehensive permit. The EPA has proposed regulations for the issuance of general stormwater permits in states which do not have general permitting authority. The EPA granted Virginia general permitting authority in May 1991. However, the State has yet to assume authority for the NPDES stormwater permitting program and therefore has not promulgated regulations for the issuance of general NPDES stormwater permits. Until State regulations are promulgated, stormwater dischargers will be subject to the EPA general permitting regulations.

The evolving EPA general permitting regulations, as well as any future State regulations, will undoubtedly be less cumbersome than those imposed on an individual or group applicant. EPA's primary intent for promulgating general permitting regulations is to ensure coverage of most of the regulated discharges in states without NPDES authority. Industrial facilities wishing to be covered under a general permit will not need to prepare permit applications. They will need only to submit a notice of intent to the permitting authority which will determine whether the facility is eligible for general permit coverage. The upcoming EPA general permitting regulations will specify the information that will be required in this notice of intent.

For more information on the NPDES stormwater permitting program contact:

| | |
|---|---|
| U.S Environmental Protection Agency,<br>Office of Enforcement and Permits | (202)475-9518 |
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

(Insert name and number of City/County agency responsible for local NPDES stormwater permitting program.)

**State Stormwater Management Regulations**

The 1989 Virginia General Assembly passed the Stormwater Management Act (Title 10.1, Chapter 6, Code of Virginia) enabling local governments to establish, by ordinance, stormwater management programs. Under this legislation, such programs would require a developer to submit to a locality for approval a stormwater management plan prior to any non-exempt activity. Land development projects that disturb less than one acre of land area are exempt. State regulations establishing minimum acceptable technical criteria and administrative procedures

for these programs became effective on December 5, 1990. Pursuant to the Act, the implementation of local stormwater management programs is voluntary. The regulations only apply to localities which have existing programs, or which opt to develop new programs. According to the regulations, existing stormwater management ordinances must comply with the regulations by December 5, 1991.

The State stormwater management regulations require that local stormwater management programs do the following:

- Require regulated development activities to maintain post-development peak runoff rates at or below pre-development runoff rates
- Establish minimum technical criteria to control NPS pollution and control flooding
- Require the provision of long-term responsibility for and maintenance of stormwater management facilities
- Require local programs to include certain minimum administrative procedures

In Hampton Roads, only Virginia Beach currently has a stormwater management program that is similar in structure to the program outlined by the Stormwater Management Act regulations. However, Virginia Beach must revise its ordinance to comply with the regulations. Other localities are considering or have begun development of stormwater management ordinances.

For more information on State Stormwater Management Regulations contact:

Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation (804)786-2064

(Insert name and number of City/County agency responsible for developing and/or implementing stormwater management ordinance)

**Local Reservoir Protection Programs**

A number of Hampton Roads localities have adopted ordinances specifically aimed at controlling NPS pollution in watersheds surrounding public water supply reservoirs. These ordinances typically require developers to implement stormwater Best Management Practices, shoreline buffers and stormwater diversion projects to prevent NPS pollutants from reaching water supplies. Localities with reservoir

protection programs include Newport News, Norfolk, Portsmouth, James City County and York County.

For more information on local reservoir protection programs contact:

(Insert name and number of City/County agency responsible for developing and/or implementing reservoir protection ordinance)

## C. Erosion and Sediment Control

The Virginia Erosion and Sediment Control Law (Title 10.1, Chapter 5, Code of Virginia) requires that local erosion and sediment (E&S) control programs be developed and implemented by either the locality or, where a locality chooses not to assume responsibility for an E&S program, the local soil and water conservation district. All Hampton Roads localities have adopted their own E&S programs.

Under the Erosion and Sediment Control Law (ESCL), any party engaging in any "land disturbing activity" must submit an E&S control plan to the local "plan-approving authority" and receive approval for this plan before work can proceed. In most cases, the plan-approving authority is the local public works department. The ESCL defines a land disturbing activity as "any land change which may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the Commonwealth....". Although this definition may appear to be quite broad, there are a number of exemptions which significantly narrow the scope of the Law. The most far-reaching exemption is for disturbed land areas of less than 10,000 square feet. However, the ESCL gives localities the authority to reduce this exemption to a smaller area or to qualify the conditions under which it applies. Furthermore, the threshold for this exemption is reduced to 2,500 square feet in Chesapeake Bay Preservation Areas. Some of the other, common land disturbing activities that are exempted are as follows:

- Home gardens and individual home landscaping, repairs and maintenance work
- Individual service connections
- Installation, maintenance and repair of underground utility lines located under existing hard surfaced roads or sidewalks
- Septic system lines or drainage fields
- Tilling, planting and harvesting crops, livestock feedlot operations, and agricultural engineering operations

- o Preparation of single family residences separately built, unless in conjunction with multiple construction in a subdivision development

- o Installation of posts or poles

- o Shore erosion control projects on tidal waters

Under regulations recently promulgated to implement the ESCL, any property owner who is engaged in a land disturbing activity of more than 10,000 square feet and claims to be exempt from the ESCL has one year from the commencement of the activity to prove that activity is exempt.

For more information on local E&S programs contact:

Virginia Department of Conservation
and Recreation, Division of Soil and
Water Conservation (804)786-2064

(Insert name and local number of City/County agency responsible for implementing local E&S program.)

**D. Land Development Fees for Construction of Off-Site Stormwater Management Facilities**

Title 15.1, Chapter 11, Section 466(j) of the Code of Virginia enables local governments to assess fees to developers based on the pro-rata share of runoff contributed by new development. These fees can only be assessed if a locality has a comprehensive drainage master plan in place which identifies watershed-specific drainage facility needs. In addition, the fees can only be used for off-site facilities serving a project on which a fee is assessed. Fees are generally assessed on a per acre basis and are often based on imperviousness, land use or contribution to peak flow. Several Hampton Roads localities have implemented stormwater management pro-rata share payment programs.

For more information on local stormwater management pro-rata share payment programs contact:

(Insert name and local number of City/County agency responsible for implementing pro-rata share payment program.)

**Sources of additional information:**

**Point Source Control**

Hampton Roads Sanitation District. "Industrial Wastewater Discharge Regulations." Virginia Beach, Virginia: HRSD, November 1978, rev. June, 1983.

Southeastern Virginia Planning District Commission. "Policy Statement on Provision of Sewage Collection and Treatment Facilities." Chesapeake, Virginia: SVPDC, 1987.

Virginia State Water Control Board. VR 680-14-01. "Virginia Pollutant Discharge Elimination System." Virginia Register, September 27, 1989.

**Nonpoint Source Control**

Commonwealth of Virginia. Title 10.1, Chapter 6, Code of Virginia, 1950, as amended.

Commonwealth of Virginia. Title 15.1, Chapter 4, Code of Virginia, 1950, as amended.

U.S. Environmental Protection Agency. "National Pollutant Discharge Elimination System Permit Application Regulation for Stormwater Discharges; Final Rule." Federal Register, 47990, November 16, 1990.

_____. "Revision of the Virginia National Pollutant Discharge Elimination System (NPDES) Program to Issue General Permits." Federal Register, 30573, July 3, 1991.

Virginia Department of Conservation and Recreation. VR 215-02- 00. "Stormwater Management Regulations." Virginia Register, November 5, 1990.

**Erosion and Sediment Control**

Commonwealth of Virginia. Title 10.1, Chapter 5, Article 4, Code of Virginia, 1950, as amended.

Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation. VR 625.02.00. "Erosion and Sediment Control Regulations." Virginia Register, August 13, 1990.

## V. SURFACE WATER QUANTITY AND FLOW

Activities affecting streamflow or "instream flow" in Hampton Roads rivers and streams may have negative impacts on both man's beneficial uses and the natural aquatic habitat. Generally, these activities are limited to large scale development projects that result in the following impacts:

- o Decreased water levels resulting from withdrawals for industrial activities, irrigation or municipal water supply
- o Increased water levels resulting from water treatment, power generation or industrial facility discharges, or from land use changes that increase imperviousness or require channelization of tributary streams
- o Changes in circulation and salinity levels due to channel modifications (i.e. dredging, filling, erosion control, damming, etc.)

According to Title 62.1, Chapter 24, Code of Virginia, a beneficial use means both instream and offstream uses. Instream beneficial uses include but are not limited to "protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values." Offstream beneficial uses include but are not limited to "domestic (including public water supply), agricultural, electric power generation, commercial, and industrial uses." Non-consumptive uses refer to "use of water withdrawn from a stream in such a manner that it is returned to the stream without substantial diminution in quantity at or near the point from which it was taken, and would not result in or exacerbate low flow conditions."

At the federal level, in administering the permitting process established under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899, the U.S. Army Corps of Engineers (COE) gives consideration to a number of potential environmental impacts including instream flow. Section 404 regulates the discharge of dredge and fill materials into waters of the United States. By definition, "waters of the United States" includes all waterways and their adjacent welands channelward of the ordinary high water shoreline. Section 10 regulates construction in or alteration of navigable U.S. waters. A more detailed discussion of these regulations can be found in Section I.

Under Section 401 of the (CWA), all projects requiring a permit from the COE must also receive State certification that the project will not have significant adverse water quality impacts. In Virginia, this process is administered by the State Water Control Board (SWCB). The SWCB may require the incorporation of Minimum Instream Flow (MIF) requirements for such certification.

In Virginia, there has been increasing support for instream flow protection. This support is reflected in the passage of five bills by the 1989 Virginia General Assembly which provide for greater involvement by the State in instream flow management. The two bills having the greatest potential for affecting development projects were the establishment of the Virginia Water Protection Permit program and the authority granted to the SWCB to establish "Surface Water Management Areas" (see Title 62.1, Chapter 24, Code of Virginia). Because regulations to implement these two programs are currently being developed by the SWCB, the implications for development projects are uncertain. However, the following provides a brief discussion of the intent of these programs.

The Virginia Water Protection Permit (VWPP) program provides independent, statutory authorization of the State's Section 401 certification process. Issuance of a VWPP constitutes not only the certification required under Section 401, but also a finding by the VWCB that a proposed activity will "protect instream uses." Domestic uses and existing beneficial uses would be given the highest priority in permitting decisions. Virginia has proposed that the 401 Certification Program in Virginia be phased-out and replaced with the VWPP Program. The SWCB published proposed VWPP regulations in October 1990; however, due to a large number of concerns regarding the regulations, the SWCB withdrew its proposal and is in the process of drafting revised regulations.

The Surface Water Management Areas (SWMA) program is modelled after the existing Groundwater Management Areas program. Under the SWMA program, the SWCB or any other State agency, or any locality may initiate a study to determine the merit of establishing a Surface Water Management Area. Designation as a Surface Water Management Area requires that the stream in question must show evidence of instream values, the potential for low flow conditions that could threaten important instream uses, and the potential for the aggravation of low flow conditions by offstream uses.

Once a SWMA is established, all non-exempt surface water withdrawals would require a permit from the SWCB. Exemptions include non-consumptive uses (i.e., most of the water is returned at or near the point of withdrawal); withdrawals of less than 300,000 gallons per month; and withdrawals by a wastewater treatment system. All existing "beneficial consumer" withdrawals, including withdrawals for public water supply systems, in effect by July 1, 1989 may continue without a permit provided that they have instituted approved water conservation programs.

SWMA permit conditions are to include instream flow requirements that protect beneficial instream uses without "imposing unreasonable burdens" on offstream uses. Specifically, the conditions can include but are not limited to maximum withdrawal amounts, timing of withdrawals, and requirements for

voluntary or mandatory conservation measures. Permit conditions would only be applicable during low flow periods as determined by the SWCB.

The SWCB has not yet drafted SWMA permitting regulations and does not intend to do so until the VWPP regulations are finalized.
Also, no SWMA's have been designated.

For more information on regulations affecting surface water quantity and flow, contact:

| | |
|---|---|
| U.S. Army Corps of Engineers,<br>Norfolk District | (804)441-7656 |
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

**Additional source of information:**

Commonweatlh of Virginia. Title 62.1, Chapter 24, Code of Virginia, as amended.

# VI. GROUNDWATER QUALITY

In response to a growing awareness of the vulnerability of groundwater to contamination by human land use activities, a number of federal laws were enacted in the mid to late 1970s that direct the EPA or other federal agencies to address specific land use threats that may contaminate groundwater. The primary responsibility for implementing most of these laws lies with the states; however, local approaches to groundwater protection can also be coordinated through zoning and land use controls. Groundwater contamination that may occur as a result of new development and the federal and/or State regulatory programs that respond to groundwater quality are discussed below.

Groundwater is primarily stored in aquifers. Aquifers are geologic formations which contain sufficient saturated permeable material, such as rock, sand or gravel, to yield significant quantities of water. Aquifers are recharged by precipitation seeping into the ground or by surface waters with which they are interconnected. Grounwater becomes available for human use when it emerges into a stream, through a spring or when it is drawn up in wells.

That groundwater is naturally cleansed of pollution as it moves through the soil is a common misconception. Although soil has the capacity to filter and absorb some wastes, many contaminants pass through the soil layer to the saturated zones or aquifers. Major sources of groundwater contamination commonly found throughout the U.S. include: hazardous and non-hazardous waste sites; surface impoundments for storing liquid wastes; storage tanks for fuel and other regulated substances; septic tanks; pesticide and fertilizer application; animal waste lagoons; improperly sealed abandoned wells; highway de-icing compounds; accidental spills of fuel and chemicals during transport; active or abandoned metal or coal mines; and, underground injection of liquid wastes, which is illegal in Virginia. In Virginia and in Hampton Roads, in particular, groundwater contamination can also occur along the Atlantic Coast, Chesapeake Bay, and inland areas when groundwater is pumped out faster than it can be replenished and salt water advances into freshwater aquifers.

Protection of the aquifer system is essential to ensure a continued supply of safe and plentiful groundwater. In Hampton Roads, the primary source of municipal drinking water supplies comes from surface water. However, in the event of an emergency such as a drought or surface water contamination from a toxic spill, during which both the quantity and quality of the water source can be threatened, groundwater resources become an important alternative source of water supply. In the more rural areas where municipal water service does not exist, individual wells are relied upon for domestic water supply.

Virginia's varied geology affects both the quality and quantity of our groundwater. Most of the State's precipitation- - an average of 43 inches per year-- becomes surface runoff, but some of it seeps into the water table, recharging the aquifers which hold groundwater. How much runoff reaches the aquifers depends on things such as how much vegetation there is on the surface, how wet the soil is, and what kind of rock the water travels through. These things also affect how much water aquifers in the area will produce and how high the water's mineral content will be.

## A. General Hydrogeology of Hampton Roads

Hampton Roads lies within the Coastal Plain physiological province of Virginia, which extends from the Atlantic Ocean west to the Fall Line. The underlying geology of the Coastal Plain is unconsolidated sands, silts, clays, gravels, limestone, marl and shell strata, and aquifers may be confined, unconfined, or surficial. Groundwater is abundant in this province and, as the majority of the State's population lies within it, groundwater usage is high. This combination of geology and population density increases the risk of groundwater contamination in the region.

According to a joint groundwater management study conducted by the Virginia and North Carolina Groundwater Subcommittees in 1975, the Coastal Plain region of southeastern Virginia is underlain by a "wedge" of sedimentary rocks that range in geologic age and can be several thousand feet in thickness along the coast. There are three aquifer systems underlying southeastern Virginia. The Cretaceous aquifer system is sometimes referred to as the principle aquifer. It contains relatively thick, but discontinuous, sands and some gravels of high porosity, transmissivity and storativity. It is the most productive aquifer with yields of up to 2,000 gallons per minute (gpm).

The Tertiary aquifer system overlies the Cretaceous system and consists of interbedded sands and clays with some beds of limestone and shell. The clays serve as aquitards and confine the water under pressure. Although it is considered a "secondary" aquifer, it is moderately productive yielding up to 200 gpm. As with the Cretaceous aquifer system, the aquitards greatly reduce natural vertical recharge to the aquifer system in much of the area.

The water table aquifer consists of the sands and gravels that lie above the first significant clay layer. Thickness of the aquifer is generally less than 100 feet, with a maximum of about 120 feet. It is an important part of the hydrologic system as it serves as a recharge reservoir to the underlying confined systems. The aquifer is widely used as a source of individual domestic water supplies and will become increasingly important with increased water demands and improved groundwater development methods. The water table aquifer is also more

susceptible to pollution from land surface sources than the confined or artesian aquifers below.

### Groundwater Recharge

An important first step in planning for the protection of groundwater resources is the delineation of land areas that contribute water to the aquifer through runoff and/or recharge. Contributions are derived from both natural and artificial sources. Natural sources include indirect recharge from overlying lands, infiltration from streams and lakes, and runoff from upgradient watershed areas. Artificial sources most often include man's activities upon the land surface.

Recharge to the aquifer systems of the Coastal Plain is derived chiefly from precipitation in the region. The water table aquifer is the reservoir for recharge to the underlying artesian aquifers. Except in a very narrow zone near the Fall Line along the province's western boundary, the artesian aquifers are recharged principally by vertical leakage from the water table aquifer through the confining clays. The rate of recharge to any particular aquifer unit depends of the vertical permeability and thickness of the overlying beds. Recharge is also affected by the pumping of wells which increase the gradient between the water table and the pumped aquifers. Because of the thickness and low permeability of the many clay layers in the Tertiary and Cretaceous aquifer systems, the rate of recharge over most of the area is relatively low and potential yield is limited. Restrictions on the amounts of groundwater which may be withdrawn in the Southeastern Virginia Groundwater Management Area are discussed in Section VII.

### Groundwater Quality

The chemical and physical quality of the water in the aquifer systems of the area varies greatly and is critical with respect to utilization. The Tertiary and Cretaceous aquifer systems contain brackish to saline water in the extreme eastern parts of Virginia. West of the fresh-saline water interface, pockets of saline water are sometimes found in the Tertiary and Cretaceous aquifer systems. Saline waters may move upward into fresh water aquifers as a result of sustained pumping; however, in some cases the mineral content of water from wells has gradually decreased after long term withdrawals.

## B. Federal and State Laws and Policies

The federal Environmental Protection Agency (EPA) adopted a Groundwater Protection Strategy in 1984 that provides a system for internal EPA coordination of groundwater protection programs and offers technical assistance for the development of state programs. This strategy provided $7 million in 1985 for a grant program to develop state groundwater protection strategies, tools for groundwater management, and information collection systems. The Virginia

Groundwater Protection Steering Committee was formed with an EPA grant in late 1985. The Steering Committee is chaired by the State Water Control Board (SWCB) and consists of representatives from eight other state agencies, all of which have either direct or indirect responsibility for groundwater protection in Virginia.

In May 1987, the Steering Committee published the Groundwater Protection Strategy for Virginia, which was later supplemented in 1990. This document outlined recommendations for how the state agencies responsible for groundwater protection could work individually and collectively to better carry out Virginia's groundwater protection policies.

Virginia has a strong constitutional mandate to protect its natural resources and environment from pollution in Art. XI, Sect. 1 of the Virginia Constitution. The Commonwealth has declared a state-wide anti-degradation policy to protect all waters. The Virginia Water Control Law's anti-degradation policy mandates the protection of existing high quality and provides for restoring all other State waters to a condition of quality the will permit all reasonable public uses (State Water Control Law, Section 62.1- 44.2, Code of Virginia). The SWCB publishes water quality standards to carry out the statute's intent.

The State's central mechanism for preventing groundwater contamination is a group of permit programs governing specific activities. Such activities include operating a hazardous waste facility, a solid waste landfill, a septic tank, or an industrial waste lagoon. Virginia is also exploring ways to minimize potential effects of the more diffuse threats that are not specifically being addressed by existing permit programs.

The Steering Committee recommended that top priority be assigned to the following five potential sources of groundwater contamination: underground storage tanks, landfills, surface waste impoundments, septic tanks, and pesticides and fertilizers.

**Underground Storage Tanks**

Leaking underground storage tanks (USTs) are the most commonly reported source of groundwater contamination in Hampton Roads. According to the VWCB, between 1986 and 1989, 89 of the 126 reported groundwater contamination incidents in southside Hampton Roads involved leaking USTs. The number of reported leaking USTs is thought to greatly understate the actual problem for two reasons. First, most of the reported incidents were identified because they impacted and often permanently degraded nearby well water supplies. In areas using surface water and public distribution systems, however, tank failures are presumed to go unnoticed and therefore unreported. Second, the EPA estimates that 35% of all USTs will eventually leak as a result of tank construction and

subsequent corrosion. This estimate combined with a VWCB estimate that there are 12,000 to 15,000 USTs in southside Hampton Roads alone, indicates a high probability that there are large numbers of leaking USTs across the entire region.

In 1984, Congress passed the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). These amendments require states to regulate certain USTs. The RCRA defines an UST as any combination of tank and underground pipes where the volume of the system is ten percent or more beneath the surface.

Virginia's federally approved UST Program is administered by the SWCB. Under this program, newly installed USTs are required to meet design, construction and monitoring standards that prevent leaks and overflows, as well as have corrective action plans detailing a mitigation strategy in the event of a spill. These requirements are implemented by permitting programs administered by local building inspectors. The SWCB conducts random inspections to uncover violations of the State program.

In addition to the design, construction and operating requirements, an owner or operator of a UST must demonstrate to the SWCB that they have ability to assume financial responsibility for any bodily injury or property damage resulting from an accidental release from an UST.

The facilities listed below are exempt from the RCRA UST provisions. Many of the exempted facilities are subject to other federal and State regulations.

- Farm or residential tanks with a capacity of 1,100 gallons or less storing motor fuel for noncommercial use
- Any UST storing heating oil for consumptive use on the property where stored
- Pipeline facilities
- Surface impoundments, pits, ponds, or lagoons
- Stormwater or wastewater collection systems
- Flow-through process tanks
- Liquid traps or gathering lines related to oil or gas producing and gathering operations, not including oil and gas traps at gas stations
- Septic tanks

- Any tank located in an underground area as long as the tank is sitting on or above the floor surface

Additional regulatory exemptions are listed below.

- USTs which contain a hazardous waste regulated elsewhere by RCRA
- Wastewater treatment tanks regulated under the Clean Water Act
- "Self monitoring" machinery and equipment where operation depends on the presence of a regulated substance
- Any UST system with a volume of 110 gallons or less
- Any UST system containing a de minimis concentration of regulated substance determined by the State on a case- by-case basis
- Any UST system used to contain spills or overflows in emergencies which is emptied as soon as possible after use.

Whenever a release from an UST is identified, certain activities are required of the owners and operators of the system. These activities are governed the "Underground Storage Tanks: Technical Standards and Corrective Action Requirements" (VR 680- 13-02). Among the required activities are immediate pollution abatement steps, a site assessment, and risk and remediation assessments. Based on this information, the SWCB may require the owner and operator to submit a corrective action plan (CAP) for responding to the situation. Owners and operators are then required to obtain a CAP permit in order to implement the remediation activities detailed in the CAP.

For more information on UST regulations contact:

| | |
|---|---|
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

**Landfills**

Most Virginia households and businesses dispose of trash in solid waste landfills. Landfills have also been used to dispose of household chemicals and fertilizers, hazardous waste from small businesses, and other construction materials.

Unlined landfills and waste lagoons, illegal dumps, and hazardous waste sites all can contribute to groundwater contamination. Liquid wastes can infiltrate soil and rock layers, and precipitation percolating through solid wastes can leach out metals and other contaminants and carry them to groundwater. The disposal of wastes through underground injection also can endanger groundwater; in Virginia, the use of hazardous waste injection wells is currently banned.

In the last decade, a series of changes in federal and state laws has had a significant impact on solid waste management. In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) requiring "cradle-to-grave" management and tracking of hazardous wastes, as defined in the statute. Virginia's 1986 Waste Management Act requires all solid waste facilities to have permits taking environmental protection into account. This Act also requires regional waste management plans and allows for appropriations from state general funds to help localities manage solid waste. In December 1988, the Virginia Department of Waste Management issued its "Solid Waste Management Regulations" (VR 672- 20-10) that address the siting, design, management, closure, and post-closure monitoring of solid waste landfills. These are discussed in greater detail in Secion IX.

For more information on solid waste management, contact:

| | |
|---|---|
| Virginia Department of Waste Management | (804)225-2667 |

**Surface Waste Impoundments**

Surface waste impoundments are pits, ponds or lagoons used by industries, agricultural operations and municipalities for the retention, treatment and/or disposal of hazardous and non- hazardous liquid wastes. Leaking surface waste impoundments can easily contaminate groundwater.

The SWCB regulates the construction and operation of surface impoundments under either the VPDES or VPA permit programs. These programs are discussed in detail in Section IV of this Guidance Text. In accordance with the 1984 RCRA amendments, the SWCB requires liners for all new surface impoundments containing wastes regulated under the RCRA. The SWCB may also require, as a VPDES or VPA permit condition, liners for impoundments containing RCRA- exempt wastes where groundwater is threatened.

For more information on surface waste impoundment regulations, contact:

| | |
|---|---|
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

## On-Site Sewage Disposal Systems

Failing or inadequate on-site sewage disposal systems are generally considered to be a common source of groundwater contamination. Domestic and commercial on-site systems, which generally include septic systems and mass drain fields, are regulated by the Virginia Department of Health (VDH) under the 1982 State Sewage Handling and Disposal Regulations. Before on-site systems can be constructed, permits must be obtained from locally- based VDH sanitarians. Before permits are issued, the sanitarian will review site characteristics and the proposed system design to ensure that the system will function adequately. Site characteristics included in this review include topography; percolation rates; standoff distance to water table; depth to restrictive layers; slope; and, setback distances to potentially sensitive site features such as streams, lakes, reservoirs, public and private wells, shellfish waters, and so forth.

At present, the required separation distance between the bottom of the septic system trench and the seasonal high water table ranges from two to eighteen inches, depending on soil type. The Code of Virginia allows localities to adopt more stringent regulations than the State's and many have done so. In response to growing concerns for the protection of groundwater quality, the VDH convened a task force to study the feasibility of requiring an increased separation distance. In July 1991, the task force issued its report recommending a twenty-four inch separation distance for soil Group I (affecting Poquoson, and portions of Hampton and Virginia Beach) and an eighteen inch separation distance for soil Group II (affecting Chesapeake, Norfolk, Suffolk, Isle of Wight, and portions of Virginia Beach, James City and York Counties.) Other recommendations were included to ensure the proper oversight of any on-site waste disposal system.

Systems are inspected at time of installation to ensure compliance with VDH regulations. Subsequent inspections occur only in response to complaints of failing systems.

On-site package sewage treatment plants discharging to surface waters are regulated through the VPDES and VDH permitting programs. These programs are discussed in Section IV.

Septic tank systems for the disposal of industrial wastewater are regulated by the SWCB under the VPA permit program. Before a VPA permit can be issued, it must be demonstrated that a proposed industrial septic system will protect the beneficial uses of groundwater. Groundwater monitoring is often a permit condition. The VPA permitting process is addressed in Section IV.

Owners of small businesses, homes, or rental properties than rely on septic systems for sanitary waste diposal should ensure that they are not used for the diposal of non-domestic wastes. Allowing movement of fluids containing

contaminants into underground sources of drinking water is prohibited by federal law (40 CFR Sec. 144.12).

In addition to the VDH and VWCB regulations, development projects occurring within Chesapeake Bay Preservation Areas are subject to septic system standards contained in local Chesapeake Bay Preservation Act regulations. These standards state that all septic systems must be pumped out every five years and all new systems must be constructed with a 100 percent reserve drainfield.
For more information about on-site sewage disposal regulations, contact:

| | |
|---|---|
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

(Insert name and number of local VDH sanitarian responsible for onsite sewage disposal permitting program.)

**Pesticides and Fertilizers**

Virginians use pesticides and fertilizers in farming, forestry, and urban park management and private lawns and gardens. In 1982 pesticides were applied to more than 900,000 acres in Virginia, and herbicides were used on over one million acres. Fertilizer sales for Virginia totaled 715,000 tons in 1984. These chemicals benefit farmers and others, but there use is difficult to monitor and regulate.

Groundwater contamination from fertilizers and pesticides depends upon the rate at which they are applied, their decomposition rate and water solubility, and the nature of the soil and depth to groundwater. Contamination usually extends over a wide area at low concentrations but can build up over time.

Several federal programs address potential groundwater contamination by fertilizers and pesticides. These programs include the Safe Drinking Water Act, under which EPA proposed maximum contaminant levels in 1987. The EPA is also examining the potential other laws such as the Toxic Substances Control Act have for groundwater protection.

Several state agencies have responsibilities that relate directly or indirectly to pesticide and fertilizer use and groundwater protection, and a number of state and local agencies are involved in technical assistance programs for farmers at the local level.

For more information regarding pesticide and fertilizer application, contact:

| | |
|---|---|
| Virginia Department of Agriculture and Consumer Services | (800)552-9963 |

Virginia Cooperative Extension Service

(Insert locations and numbers of local CES contacts.)

**Hazardous Wastes**

The improper management of hazardous waste may result in severe groundwater contamination problems. Hazardous substances that are dumped, buried or accidentally spilled on the ground way quickly find their way into the water table. The RCRA provides for the strict regulation of hazardous wastes from "cradle to grave". This program is discussed in detail in Section IX.

For more information on hazardous waste management, contact:

Virginia Department of Waste Management (804)225-2997

**Underground Injection**

Underground injection is the placement of fluids into the ground through a well. Examples of underground injection wells are cesspools, cooling water return flow wells, heat pump exchange wells, agricultural drainage wells, sand backfill wells, septic systems, "improved sinkholes," and solution mining wells.

Allowing the movement of fluids containing contaminants into underground sources of drinking water is prohibited by federal law (40 CFR Sec. 144.12). The Underground Injection Control (UIC) program, part of the federal Safe Drinking Water Act, was created to ensure that disposal of fluids by injection does not threaten present and future drinking water sources.

Under the EPA's UIC program for Virginia, owners or operators of injection wells must report wells to the EPA for its inventory of Virgina's underground injection wells. Immediate action will be taken by the EPA or the State on such wells that pose a risk to human health. In Virginia, the use of hazardous waste injection wells is illegal.

If you plan to own or operate an underground injection well tha4 has not been reported to the EPA, contact:

Underground Injection Control Section,
U.S. Environmental Protection Agency,
Region III - Philadelphia, PA. (215)597-9928

**Sources of additional information:**


Commonwealth of Virginia. Title 62.1, Chapter 3.1, Code of Virginia, 1950, as amended.

North Carolina-Virginia Groundwater Subcommittee. "Groundwater Management in Southeastern Virginia and Northeastern North Carolina." August 1, 1975.

Southeastern Virginia Planning District Commission. Groundwater Protection Handbook for Southeastern Virginia. Chesapeake, Virginia: SVPDC, 1990.

Task Force on Septic Regulations. "Report of the Task Force on Septic Regulations." Final Draft. Charlottesville, VA: Institute for Environmental Negotiation, July 1991.

U.S. Environmental Protection Agency. "Underground Storage Tanks; Technical Requirements and State Program Approval; Final Rules." 53, Federal Register 37082, September 23, 1988.

_____. "Protecting Our Groundwater." Office of Public Affairs (A-107). Washington, D.C.: EPA, September 1985.

_____. "Virginia's Groundwater: You Can Help Protect It." Adapt. from "Threats to Virginia's Groundwater," a Virginia Water Resources Reasearch Center publication by Diana L. Weigmann and Carolyn J. Kroehler. Undated.

Virginia Groundwater Protection Steering Committee. Groundwater Protection Strategy for Virginia. Charlottesville, VA: Institute for Environmental Negotiation. 1987, 1990 Supplement.

_____. Virginia Groundwater Management Handbook: State Agency Programs for Groundwater Protection. Richmond, VA: VGPSC, 1988.

## VII. GROUNDWATER QUANTITY

In response to increasing groundwater withdrawals from the aquifers of eastern Virginia, the Virginia Groundwater Act (Title 62.1, Chapter 3.4, Code of Virginia) was passed in 1973. As originally enacted, the Act required the permitting of industrial and commercial users withdrawing more than 50,000 gallons per day within designated groundwater management areas. Agricultural withdrawals and withdrawals for human consumptive use, including municipal withdrawals, were specifically exempted from the provisions of the Groundwater Act.

The Groundwater Act also grants the State Water Control Board (SWCB) the authority to declare a groundwater management area (GWMA) where there is reason to believe that-- in the area of question-- groundwater levels are declining, there is substantial well interference, the aquifer may be depleted or that the groundwater may be polluted.

Once a groundwater management area is declared, all existing users within the area are eligible to file a registration statement documenting their right to continue to withdraw groundwater to the extent of their maximum daily withdrawal in two years preceding the declaration. In addition, any person constructing a well on the date of declaration is eligible to file a registration statement documenting their right to withdraw groundwater to the extent of the design capacity of the groundwater withdrawal system under construction.

After withdrawal claims are verified, the SWCB is required to issue to these users a Certificate of Groundwater Right documenting their right to continue to withdraw groundwater. Under the Groundwater Act, the General Assembly retained the authority to limit such rights should the continued unrestricted uses of groundwater contribute to shortage or pollution of groundwater.

Any person wishing to withdraw additional groundwater in a GWMA after the declaration must apply for a groundwater withdrawal permit from the SWCB. The SWCB may not issue a permit that will deprive those having prior lawful rights to the amount of groundwater to which they are entitled.

On February 26, 1975 the SWCB declared the Southeastern Virginia GWMA. This area was composed of the Counties of Prince George, Sussex, Southampton, Surry, and Isle of Wight and the Cities of Norfolk, Portsmouth, Chesapeake, Virginia Beach, Suffolk, Hopewell, and Franklin. On November 1, 1975 the SWCB declared the Eastern Shore GWMA.

During the late 1970's and early 1980's the experience of the SWCB in applying the Groundwater Act indicated that withdrawals for irrigation and human consumptive uses were of significant magnitude. The extent of these withdrawals

was such that they prevented adequate management of the groundwater resource within the State's two declared GWMA's. Due to these concerns, the Groundwater Act was amended in 1986 to include municipal water withdrawals and to reduce the threshold for permitting from 50,000 gallons per day to 300,000 gallons per month. Withdrawals for agricultural purposes remained exempt.

On December 6, 1989 the Southeastern Virginia GWMA was expanded and renamed the Eastern Virginia GWMA. The expanded area included the Counties of Charles City, James City, King William, New Kent, and York; the areas of Chesterfield, Hanover and Henrico Counties east of Interstate 95; and the Cities of Hampton, Newport News, Poquoson, and Williamsburg.

For more information on obtaining Groundwater Withdrawal Permits, contact:

| | |
|---|---|
| State Water Control Board | (804)527-5000 |
| Tidewater Regional Office | (804)552-1840 |

**Sources of additional information:**


Commonwealth of Virginia. Title 62.1, Chapter 3.4, Code of Virginia, 1950, as amended.

Geraghty & Miller, Inc. "Availability of Groundwater in the Southeastern Virginia Groundwater Management Area." Prep. for the Virginia State Water Study Commission. Annapolis, MD: G&M, Inc., March 1979. Reprinted July, 1979 by VaSWCB.

State Water Control Board. Groundwater Resources of the Four Cities Area, Virginia. (Norfolk, Virginia Beach, Portsmouth, Chesapeake), Planning Bulletin 331. Richmond, VA: SWCB, November 1981.

U.S. Geological Survey. "Evaluation of Municipal Withdrawals from the Confined Aquifers of Southeastern Virginia." Open-File Report 88-723. In cooperation with the Southeastern Virginia Planning District Commission. Richmond, VA.: USGS, 1988.

## VIII. AIR QUALITY

Virginia's air quality program has been developed under the Virginia Clean Air Law and the federal Clean Air Act (CAA) of 1970, as amended. Air quality policy formulation and approval of associated regulations is the responsibility of the State Air Pollution Control Board (SAPCB). The Virginia Department of Air Pollution Control (VDAPC) is the administrative agency charged with carrying out the SAPCB's policies. The VDAPC is authorized to perform all functions necessary to implement Virginia's air quality program including development of regulations, air quality monitoring, site inspections and investigations, issuance of permits, enforcement, and technical assistance. The VDAPC's regional offices are responsible for implementing the State's air quality program in the field. The Hampton Roads regional office (Region VI) has its headquarters in Chesapeake. The Region VI office receives guidance from the Hampton Roads Air Pollution Control Committee which consists of representatives from local governments, area military facilities and special interest groups.

The State air pollution control regulations require that the construction, reconstruction or modification of all "stationary sources" of air pollutants be subject to a preconstruction review and permitting process. Stationary sources are defined as any building, structure, facility or installation which emits or may emit air pollutants. Although the term "air pollutant" is not specifically defined, it is applied to mean all State or federally controlled substances that are subject to SAPCB regulation. In general, air quality permits dictate how facilities will be designed, constructed, equipped and operated to comply with air quality standards.

The permitting regulations adopted by the SAPCB and implemented by the VDAPC fall into two basic categories: those necessary to carry out the State Implementation Plan which is developed by the State to achieve compliance with the federal CAA, and those designed to meet State standards that are not part of the federal program. The following briefly summarizes the regulations that fall into each category and pertain to the permitting of new stationary sources of air pollutants.

### A. Federal Clean Air Act Program

Under the CAA (Sec. 108 and 109), EPA was directed to publish a list of pollutant emissions which cause or contribute to air pollution and which may reasonably be anticipated to endanger public health or welfare. EPA must issue air quality criteria for an air pollutant within twelve months after such pollutant has been listed. Another name for listed pollutants is "criteria pollutants."

Subsequently, national primary and secondary ambient air quality standards (NAAQS) are proposed by EPA for each criteria pollutant. Primary NAAQS shall be standards the attainment and maintenance of which in EPA's judgement, based on such criteria and allowing for an adequate margin of safety, are requisite to protect the public health. Any secondary NAAQS shall specify a level of air quality the attainment and maintenance of which in EPA's judgement, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air. The NAAQS refer to the total amount of any criteria pollutant permitted in the air in a particular place from all sources. Consequently, they are simply goals for dealing with nationwide air pollutant problems and are not emissions limitations. Limitations are set, however, to achieve those goals.

To date, there are six criteria pollutants for which NAAQS have been established: particulate matter, sulfur oxides, nitrogen oxides, ozone, carbon monoxide, and lead.

The CAA also directed the EPA to identify "hazardous air pollutants," for which it has published national emission standards (NESHAPs). At this time, EPA has identified seven hazardous air pollutants: beryllium, mercury, arsenic, vinyl chloride, radionuclides, benzene, and asbestos.

Under Sec. 108 of the CAA, each State has the primary responsibility for assuring air quality within its entire geographic area, and must submit a State Implementation Plan (SIP) specifying the manner in which the primary and secondary NAAQS will be achieved and maintained within each air quality control region (AQCR). AQCRs were established within each State by EPA in the q970's for the purposes of efficient and effective air quality management. As mentioned above, Hampton Roads is in Virginia's AQCR VI.

In addition to providing for the attainment of primary and secondary NAAQS, SIPs also include emission limitations, schedules and timetables for compliance with such limitations, and other such measures as may be necessary to ensure attainment and maintenance of the NAAQS. These can include transportation controls, air quality maintenance plans, and preconstruction review of direct sources of air pollution.

The basic federal regulations for permitting construction and operation of new or modified stationary sources of air pollutants are separated into two categories: "minor" sources and "major" sources. Minor sources are those that do not emit more 100 tons per year of any one criteria pollutant. Major sources emit more than 100 tons or a single criteria pollutant. Both types of sources require that Best Available Control Technology (BACT), as defined by the EPA, be incorporated into a project. In brief, BACT is defined as the maximum degree of emission reduction which the SAPCB, on a case-by-case basis, determines is

achievable through the application of either production processes or other available methods such as fuel cleaning or treatment, or fuel combustion techniques. In making this determination, the SAPCB takes energy, economic and environmental impacts into consideration.

New or modified "major" stationary sources proposed in an area that has not attained one or more of the NAAQS established by the EPA (Nonattainment Area) must meet stricter permitting regulations. These regulations require that an applicant demonstrate that emissions will be controlled to the lowest achievable emission rate (LAER). Hampton Roads was classified as a Marginal Nonattainment Area for ozone in 1991 and will, therefore, be subject to stricter ozone emissions limitations for both stationary and mobile sources in the future. Localities included in this designation are the Counties of James City and York, and the Cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg.

Certain sources specified in the State regulations are subject to additional permitting requirements to ensure compliance with the EPA New Source Performance Standards and NESHAPs. Because of these additional requirements, the processing time for permits for these sources is usually longer.

### B. State Standards

In addition to the regulations required by the Clean Air Act, the SAPCB has developed regulations under its own regulatory authority. Virginia's "Regulations for the Control and Abatement of Air Pollution" were published by the SAPCB in 1985 and have been since revised to reflect new changes in State policy. They include standards for open burning, odor and air toxics.

The air toxics program is intended to address pollutants not currently controlled by the federal Clean Air Act. Through this program, the SAPCB regulates ambient concentrations of several hundred pollutants through imposition of guidelines derived from occupational safety standards. All stationary sources are required to comply with these guidelines.

### Permit Application Process

Permit applications for projects located in Hampton Roads must be submitted to the VDAPC regional office in Chesapeake. A permit application checklist has been provided on page 60. It is recommended that the regional office be contacted well in advance so it can provide assistance in the preparation and submittal of applications. All necessary local land use approvals must be obtained from a locality prior to the submittal of an application.

## FIGURE 2

## DEPARTMENT OF AIR POLLUTION CONTORL

## PERMIT APPLICATION CHECK LIST

1. Have you checked with DAPC Regional Office?
2. Identify type of facility - boiler, incinerator, chemical plant, paper mill, acid plant, furniture plant, bathroom fixtures, etc.
3. Size - design capacity
4. Hours of operation
5. Quantity of air emissions in pounds per hour and tons per year.
   a. Particulate
   b. Sulfur oxides ($SO_2$)
   c. Nitrogen oxides ($NO_x$)
   d. Carbon monoxide (CO)
   e. Volatile organic compounds (VOC)
   f. Lead
   g. Toxics
6. Air pollution control devices - type, size, rated efficiency
   a. Bag House
   b. Cyclone
   c. Scrubber
   d. Precipitator
7. Stack parameters
   a. Height
   b. Diameter
   c. Exit gas velocity
   d. Exit gas temperature
   e. Exit gas volume

Upon receipt of the application, the VDAPC has 30 days to determine whether the application is complete. Once an application has been deemed complete and a draft permit has been prepared by the VDAPC, the permit may be advertised for public comment and the SAPCB may decide to hold a public hearing on the permit. A public review and hearing process is mandatory for several categories of facilities including any source of hazardous air pollutants, any major stationary source, and any source that has generated opposition or adverse comment from the public or another government entity.

Public hearings are usually held before a VDAPC staff member in the locality where a facility is to be constructed. Following the comment period and public hearing, the VDAPC staff makes its recommendation to the Executive Director. The Executive Director usually makes the decision to approve or deny the permit, although controversial permits may go to the SAPCB for a decision.

In general, permits for most small facilities can be issued in less than 30 days, while larger more complex facilities will take as long as 60 days. Permits which require SAPCB action, are subject to the EPA New Source Performance Standards and NESHAPs, or are for facilities located within Nonattainment Areas usually require additional time.

The federal Clean Air Act Amendments of 1990 (Title V) will alter the State's air quality permitting process as it applies to the operation of existing facilities. Although the State has regulations in place which govern the operation of air pollutant sources, they are only applied in limited circumstances. The 1990 CAA Amendments contain provisions requiring states to greatly expand their permitting programs to address the ongoing operation of sources that are presently subject only to the regulations governing construction or modification. In addition, authority has been granted to the State's to collect permit fees for processing procedures. The EPA is currently developing regulations to implement these provisions. It is not anticipated that the 1990 Amendments will significantly affect the permitting process as it applies to the construction or modification of stationary sources.

For more information on Virginia's air quality regulatory program contact:

| | |
|---|---|
| Division of Technical Evaluation,<br>Department of Air Pollution Control | (804)786-4867 |
| Department of Air Pollution Control,<br>Hampton Roads Regional Office | (804)424-6707 |

**Sources of additional information:**

Commonwealth of Virginia. Title 10.1, Chapter 13, Code of Virginia, 1950, as amended.

U.S. Environmental Protection Agency. The Clean Air Act Amendments of 1990: Summary Materials. Washington, D.C.: USEPA, 1990.

Virginia Air Pollution Control Board. Regulations for the Control and Abatement of Air Pollution. Richmond, Virginia: VAPCB, revised 1990.

Virginia Department of Air Pollution Control. Air Quality Regulatory Program for Permitting in Virginia. Richmond, Virginia: VDAPC, 1990.

## IX. SOLID AND HAZARDOUS WASTE

In 1986, the Virginia General Assembly passed the Virginia Waste Management Act (Title 10.1, Subtitle II, Chapter 14, Code of Virginia). This legislation consolidated all solid and hazardous waste management activities in the new Virginia Department of Waste Management (VDWM). In addition, the Virginia Board of Waste Management (VBWM) was appointed to oversee the policy formation and approval of associated regulations of the VDWM.

After its appointment and initial strategic planning process, the VBWM adopted the following mission statement: "protect public health and the environment through formulating and implementing policies to assure the proper siting, management, and disposal of solid, hazardous, and low-level radioactive wastes generated in the Commonwealth and through the promotion of recycling and resource conservation." With this mission statement, the Board adopted the following goals:

- Promote sound waste management practices within the regulated community, government and the public.
- Reduce the adverse effects of past waste management practices.
- Increase the public's awareness and participation in waste management practices.
- Promote the effective storage and transportation of hazardous materials.
- Improve the management of departmental resources.

The VBWM is responsible for promulgating State regulations and enforcing both state and federal regulations governing waste management activities in the Commonwealth. Included in this is the permitting of solid waste disposal facilities and hazardous waste generation, transport, and disposal facilities, and insuring that such facilities meet both state and federal minimum design, performance, and financial responsibility requirements.

In order to minimize the amount of waste which will ultimately reach the landfill, thereby prolonging the life of existing facilities and reducing the demand for new ones in the future, it is the policy of the VBWM to promote the development of comprehensive waste management programs for the Commonwealth according to the following hierarchy:

- Planning
- Source reduction

- o Reuse
- o Recycling
- o Resource recovery (waste-to-energy)
- o Incineration (volume reduction)
- o Landfilling

## A. Waste Management Planning

Planning for solid waste management facilities occurs at the federal, state, regional and local levels. At the federal level the EPA administers the regulatory and planning initiatives detailed in the Resource Conservation and Recovery Act (RCRA) of 1976 as amended. RCRA requires states to develop programs which provide for the regulation of waste disposal as well as the elimination of unpermitted or open dumps.

At the state level, Virginia established a process for designating agencies, such as local governments or regional agencies, to prepare solid waste plans at the regional and local levels. In 1989, the Virginia General Assembly enacted legislation requiring that solid waste management plans be prepared, and authorized the Board to promulgate regulations specifying requirements for local and regional solid waste plans (Title 10.1, Subtitle II, Chapter 14). Regulations were adopted in 1990 and encompass all aspects of solid waste management. They require that consideration be given to the handling of all types of nonhazardous solid waste generated in the region or locality. In addition, the regulations require that local or regional plans identify how the following minimum recycling rates shall be achieved: 10% by 1991, 15% by 1993, and 20% by 1995.

To implement regional plans, the Governor may designate regional boundaries. The governing bodies of the counties, cities, and towns within any region so designated shall be responsible for the development and implementation of a comprehensive regional solid waste plan in cooperation with any planning district commission (PDC), commissions ar public service authorities in the region.

Hampton Roads lies within two solid waste planning regions- - the Southeastern Virginia planning area and the Virginia Peninsulas planning area. The designated planning agencies for these areas are the Hampton Roads Planning District Commission and the Virginia Peninsulas Public Service Authority (VPPSA). Plan implementation is the responsibility of the Southeastern Public Service Authority and the VPPSA. Both agencies have adopted the required regional plan for their respective regions.

## B. Solid and Hazardous Waste Management

### Solid Waste

According to the Virginia Waste Management Act of 1986, solid waste means "any garbage, refuse, sludge and other discarded material, including solid, liquid, semisolid or contained gaseous material, resulting from industrial, commercial, mining and agricultural operations, or community activities but does not include (i) solid or dissolved material in domestic sewage, (ii) solid or dissolved material in irrigation return flows or in industrial discharges which are sources subject to a permit from the State Water Control Board, or (iii) source, special nuclear, or byproduct material as defined by the Federal Atomic Energy Act of 1954, as amended." The term "sludge" refers to "any solid, semisolid or liquid wastes with similar characteristics and effects generated from a public, municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, air pollution control facility or any other waste producing facility." Storage and disposal of agricultural animal waste, under the VPA permit program is discussed in detail in Section VI.

Solid waste facilities are designed to collect and/or process domestic garbage, commercial refuse, and sludges from water, wastewater, and air after treatment. RCRA requires that permits be obtained for the construction of new facilities, expansion of permitted disposal areas, or substantial changes in design or processing at existing facilities. Exemptions from this include land clearing debris from agricultural or forestal activities by non-developers, disposal of inert materials ie. bricks, and temporary storage prior to recycling if in recycling business with a requirement of 75% removal at year's end.

In addition to a certification disclosure statement demonstrating financial responsibility, positive operational history, and other information required of the owner/operator when filing a permit application, no application will be deemed complete and ready for review by the VBWM until local governments have been notified of the proposed project. Verification from the local government of compliance with local zoning and other ordinances or regulations must be received by VBWM. VDWM urges owner/operator notification of the proposed facility or modification, as well as contact with the VDWM, early on in the permitting process. Permits are denied by the VBWM if there is failure to complete the application, failure to conform to siting standards set by the State, design, construction or operation does not conform to the permit, adverse impact on health or environment, or failure to meet financial responsibility requirements.

When permits are issued by the VBWM, permits convey no property rights, no right to injure, or violate state or local law, and permitted facilities are shielded against future changes in regulations, subject to periodic inspections, must close in accordance with a closure plan, and are subject to corrective action. Permits

can be terminated for non-compliance with any permit condition, failure to disclose important information prior to permit issuance, or endangerment of human health or environment. Permits may also be amended for major or minor changes. Finally, permits can be revoked or revoked and reissued for the following reasons: violation of any regulation posing a threat of release or hazard to health or environment; operation in the manner of an open dump or as a threat to health or environment; failure to provide measures to control pollution, leachate or residues posing a threat to air, land, surface or groundwater; and/or abandonment, sale, or lease of the facility.

**Construction and Demolition Debris**

It is the responsibility of the generator of construction debris to insure its proper disposal. The generator must deliver the debris for disposal directly to a landfill or other disposal site, or hire a private hauler to dispose of the debris. In the Hampton Roads area there are many inert debris landfills in operation at present. (It can be expected that many, if not all, of the private debris landfills will close by 1992, being unable to comply with the new landfill design criteria.) In addition to the debris specific landfills, several localities and the SPSA operate landfills that accept construction and demolition debris. The City of Chesapeake operates a pilot rubble recycling facility and accepts concrete and asphalt debris at this site.

**Hazardous Waste**

Federal and state hazardous waste management is addressed in RCRA. The intent of RCRA is to provide "cradle to grave" requirements for hazardous waste management and to specifically address solid and liquid wastes posing a substantial hazard to human health or the environment through federal listing. The core of RCRA establishes regulations and permit requirements for hazardous waste generators, transporters, and treatment, storage, and disposal facilities (TSDs). TSDs are subject to design and performance standards, operating and closure/post-closure requirements, and owners and operators are subject to financial responsibility disclosures.

States may administer their own hazardous waste programs, so long as they satisfy or exceed the minimum requirements set by EPA; otherwise, EPA will administer the federal requirements for the state. However, EPA has no discretion to choose to run a state program that meets federal requirements. Virginia has chosen to administer its own hazardous waste program under the VDWM.

## 1. Identification

Under RCRA Subchapter III, the EPA promulgated criteria for identifying the characteristics of hazardous waste and listed particular hazardous wastes which are subject to regulation under RCRA. Toxicity, persistence, and degradability in nature, potential for accumulation in tissue, and other related factors such as flammability, corrosiveness, and reactiveness are the criteria used by EPA when substances are considered for listing.

Hazardous waste is defined by the EPA as a solid waste that is not excluded under 40 CFR Part 261.4(b) and meets any of the following criteria:

- Exhibits any of the characteristics of hazardous waste identified in 40 CFR Part 261.4(c);
- Is listed in 40 CFR Part 261.4(d) and has not been excluded by 40 CFR Parts 260.20 and 260.22;
- Is a mixture of a solid waste and one or more hazardous wastes, not excluded under 40 CFR Parts 260.20 and 260.22.

Wastes excluded from this definition include the following: household wastes, agricultural wastes returned to the soil as fertilizers, mining overburden returned to the site, fly and bottom ash from the burning of coal and other fossil fuels, drilling fluids from energy exploration and production, and certain other special wastes.

Under the Virginia Waste Mangement Act, hazardous waste is defined as "a solid waste or combination of solid wastes which because of its quantity, concentration, or physical, chemical,or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed."

## 2. Generator, Transporter, and Disposal Facility Requirements and Permitting Process

Generator type and actual waste characteristics determine to what extent the generator must follow reporting and disposal requirements. First, generators must determine that they are indeed handling a regulated hazardous waste. If they are, then they must notify both the EPA and the VDWM. Upon notification, the generator will be issued an EPA identification number.

All hazardous waste generators, regardless of amount generated, are subject to standards established by EPA which are necessary to protect human health and the environment. Such standards establish requirements respecting recordkeeping, labeling, use of appropriate containers, furnishing of information on chemical composition of waste, use of a manifest system, and rendering of other related reports to EPA.

Standards applicable to transporters of listed hazardous wastes include recordkeeping of wastes being transported, transportation of such waste only if properly labeled, compliance with the manifest system, and transportation of such waste only to hazardous waste treatment storage and disposal facilities which the shipper designates on the manifest form and which hold a permit.

Design and performance standards have also been established for owners and operators of hazardous waste treatment, storage,and disposal facilities. New facilities may not operate without a permit. The design standards relate to the physical condition of the site material used to make the site leakproof, and the performance standards provide a check on the quality of design to assure non-leakage. Records maintenance of hazardous waste, reporting, monitoring, inspections, contingency plans for spill containment and site remediation, and financial responsibility are also required under these standards.

Operating permits shall contain schedules of compliance for such corrective action and assurances of financial responsibility. Closure and post-closure permits and respective conditions must be integrated with the administration of the Comprehensive Emergency Response and Liability Act (CERCLA), also known as Superfund. The most important post-closure notice requirement is the deed restriction notification of RCRA status.

Exemptions to these requirements include: generators storing hazardous waste in tanks and containers for less than ninety days; farmers disposing own waste on-site, small quantity generators (less than 220 lbs/mo.); totally enclosed hazardous waste treatment facilities; hazardous waste treatment in wastewater treatment units; hazardous waste treatment by elementary neutralization; transporters storing hazardous waste for less than ten days; addition of adsorbent to hazardous waste; and non-hazardous waste facilities accepting wastes from exempt small quantity generators.

Generators of more than 1000 kilograms per month of hazardous waste are the most tightly regulated group and are required to comply with all hazardous waste disposal regulations.

Small quantity generators are those that produce between 100 and 1000 kilograms of hazardous wastes per month. These generators must follow notification procedures and are expected to follow a more relaxed system of disposal.

Those generators which produce less than 100 kilograms must follow notification procedures but are exempt from the regulatory disposal scheme. They are still expected to properly dispose of hazardous wastes. Household generators are exempt from the entire regulatory scheme.

Owners and operators of solid waste facilities and hazardous waste generators, transporters, and treatment, storage and disposal facilities located within the Southeastern Virginia Regional Planning Area should refer to the **Regional Solid Waste Plan for Southeastern Virginia** regarding waste management practices and requirements in the area.

For further information about soild or hazardous waste management, contact:

| | |
|---|---|
| Virginia Department of Waste Management | (804)225-2997 |
| Southeastern Public Service Authority of Virginia (SPSA) | (804)420-4700 |
| Virginia Peninsula Public Service Authority | (804)728-2062 |
| (Insert Local Clean Community Coordinator) | |

**Sources of additional information:**


Commonwealth of Virginia. Title 10.1, Chapter 14, Code of Virginia, 1950, as amended.

_____. VR 672-20-10. "Solid Waste Management Regulations." Richmond, VA: DWM, December, 1988.

Hampton Roads Planning District Commission. "Regional Solid Waste Management Plan for Southeastern Virginia." In cooperation with the Southeastern Public Service Authority of Virginia. Vol. I and Vol. II. Chesapeake, VA: HRPDC, May 1991.

Southeastern Virginia Planning District Commission. "Hazardous Waste in Southeastern Virginia." Chesapeake, VA: SVPDC, April, 1986.

## X. TREE PRESERVATION

Shading and aesthetic enhancement have been traditionally recognized as the primary benefits provided by trees. Research conducted over the last several decades has found that trees provide a number of additional environmental benefits. These include filtering of both water and air pollutants, energy conservation, noise reduction, improved groundwater recharge, erosion control and enhanced wildlife habitat. In recognition of these benefits, a number of Hampton Roads localities have either adopted tree preservation ordinances or have incorporated tree preservation provisions into other land development ordinances. Localities with tree preservation programs include the Cities of Chesapeake, Newport News, Suffolk and Virginia Beach, and York County.

In 1989, the Virginia General Assembly passed legislation (Title 15.1, Chapter 1, Code of Virginia) allowing localities with population densities of at least 75 persons per square mile to adopt ordinances which require tree preservation on private property. This legislation, as amended in 1990, requires that minimum performance criteria and administrative procedures be adhered to, should a locality elect to implement a tree preservation ordinance.

Local ordinances must require that site plans indicate how, through the preservation and/or planting of trees, minimum tree canopies will be achieved over a twenty year period. Tree canopy shall include "all areas of coverage by plant material exceeding five feet in height, and the extent of the canopy at maturity shall be based on published reference texts." Minimum tree canopies for different land uses and densities are as follows:

- Ten percent tree canopy for site zoned business, commercial or industrial
- Ten percent tree canopy for residential site zoned twenty or more units per acre
- Fifteen percent tree canopy for residential site zoned more than ten but less than twenty units per acre
- Twenty percent tree canopy for residential site zoned ten units or less per acre

The City of Chesapeake recently adopted a tree preservation ordinance which is stricter than the state law, requiring that minimum tree canopies be achieved over a ten year period, as opposed to a twenty year period.

Ordinances must exempt dedicated school sites; playing fields and other non-wooded recreation areas; wetland preservation activities; and, any situation where the requirements would result in unnecessary or unreasonable hardship to a developer. Reasonable exceptions to or deviations from these requirements to allow for reasonable development of farm land or other areas devoid of woody materials must also be provided for in these ordinances.

In addition to the 1989 tree preservation legislation, the landscaping provisions of the Chesapeake Bay Preservation Act (CBPA) regulations promote the preservation of trees and other vegetation located in Chesapeake Bay Preservation Areas. The CBPA regulations contain general performance criteria for all Chesapeake Bay Preservation Areas as well as performance criteria that are specific to Resource Protection Areas (RPAs). Under the general performance criteria, indigenous vegetation must be preserved to the maximum extent possible given the land use and development intensity allowed under existing zoning. Under the RPA performance criteria, indigenous vegetation in the 100 foot Buffer Area may only be removed to provide for reasonable sight lines, access paths, general woodlot management and best management practices. The specific regulations developed to implement these criteria are contained in local CBPA ordinances and/or in other land development ordinances used to implement the CBPA. More information on the requirements of the CBPA can be found in Section II.

For more information on local tree preservation regulations, contact:

Virginia Department of Forestry,
Region 8 (804)465-6840

(Insert name and number of local agency responsible for implementing tree preservation program)

(Insert name and number of local Chesapeake Bay staff contact.)

**Source of additional information:**

Commonwealth of Virginia. Title 15.1, Chapter 1, Code of Virginia, 1950, as amended.

## XI. ENDANGERED AND THREATENED SPECIES

During the twentieth century, many plant and animal species have either become extinct, or are in imminent danger of extinction. This phenomenon is seen as a threat to the natural diversity required for balanced ecosystems, and to the maintenance of adequate gene pools for future generations. Although natural processes may be partially responsible, human activity, primarily habitat destruction, is considered to be the primary cause of species extinction. The federal listing of endangered and threatened species includes approximately 575 domestic and 510 foreign species. Candidates for the list include 600 known and 3,000 probable threatened and endangered species. Federal-listed threatened and endangered animal and plant species that are found in Virginia are shown in Tables 1 and 2.

The federal and State governments have responded to this problem in a variety of ways. The Endangered Species Act (ESA) of 1973, as amended, establishes a program for the protection of species considered to be endangered or threatened with extinction. The ESA requires a federal listing of endangered and threatened species. An endangered species is defined as one that is on the verge of extinction in all or a portion of its range, while a threatened species is one that could become endangered in the foreseeable future.

Most of the responsibility for implementing the ESA lies with the U.S. Fish and Wildlife Service (USF&WS) which is charged with the protection of all terrestrial and inland species. The National Marine Fisheries Service (NMFS) is responsible for all marine species while the Department of Agriculture oversees import/export inspections. For each federally listed species, a recovery plan must be prepared by the USF&WS.

Once a species is placed on the federal listing, any project or activity undertaken by the federal government, occurring on federal land or in federal waters, or involving federal money or a federal permit cannot jeopardize that species through direct harm or habitat destruction. A "no jeopardy" opinion must be granted by the USF&WS and the NMFS in order for the project to proceed.

Under Sec. 9 of the ESA, the taking of any listed species by anyone is strictly prohibited. The ESA defines as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, transport, collect, or to attempt to engage in other such conduct which would result in any sort of negative impact to a listed species." Development activities that directly harm an endangered or threatened species may be considered a taking. Violation of the Act can result in a fine of $50,000 and a year in jail.

An incidental take permit process is provided for in Sec. 10 of the ESA. If a proposed land development project will most likely result in the taking of a listed species, then the developer must go to either the USFWS or the NMFS, depending on the jurisdiction, and state this anticipated taking. A Habitat Conservation Plan (HCP) must then be developed so that the remainder of the that species on site will not be significantly undermined. Lands may be offered, in mitigation, as part of the HCP in order for the proposed project to receive a "no jeopardy" opinion.

In addition to the federal listing, the State has established a list of species that are not on the federal list, but are considered to be threatened or endangered in Virginia. Any person found possessing, hurting or harassing any of the species that are state-listed may face a fine of up to $20,000. State-listed animal and plant species can also be found in Tables 1 and 2.

For more information on protection of endangered and threatened species contact:

| | |
|---|---|
| Virginia Department of Game and Inland Fisheries | (804)367-1000 |
| Local Office - Williamsburg | (804)253-7072 |
| Virginia Department of Conservation and Recreation, Division of Natural Heritage | (804)786-7951 |
| The Nature Conservancy - Charlottesville | (804)295-6106 |
| U.S. Fish and Wildlife Service | |
| National Marine Fisheries Service | |

**Sources of additional information:**

Commonwealth of Virginia. Title 29, Chapter 11, Code of Virginia, 1950, as amended.

Pague, Christopher A. "Natural Heritage Resources of Virginia: Rare Animals." Virginia Department of Conservation and Recreation, Division of Natural Heritage. Richmond, VA: VDCR, August 1, 1991.

U.S. Congress. Endangered Species Act of 1973, as amended. 16 U.S.C. 1531-1543.

Virginia Department of Conservation and Recreation, Division of Natural Heritage. "Virginia Rare Plant List." Richmond, VA: VDCR, March 1, 1991.

## TABLE 1

## THREATENED AND ENDANGERED ANIMAL SPECIES FOUND IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened,
(SE) State Endangered, (ST) State Threatened
* denotes effective 1/1/92

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| **Amphibians:** | | | | |
| * Salamander, Mabee's | | | | X |
| Salamander, Shenendoah | X | | X | |
| Salamander, eastern tiger | | | X | |
| * Treefrog, barking | | | | X |
| **Birds:** | | | | |
| Eagle, bald | X | | X | |
| Falcon, peregrine | X | | X | |
| Pelican, brown | X | | | |
| Plover, Wilson's | | | X | |
| Plover, piping | | X | | X |
| * Sandpiper, upland | | | | X |
| Shrike, loggerhead | | | X | |
| Shrike, migrant loggerhead | | | X | |
| Sparrow, Bachman's | | | | X |
| Sparrow, Henslow's | | | | X |
| * Tern, gull-billed | | | | X |
| Tern, roseate | X | | X | |
| Warbler, Bachman's | X | | X | |
| Warbler, Kirtland's | X | | | |
| Woodpecker, red-cockaded | X | | X | |
| Wren, Appalachian Bewick's | | | X | |
| **Crustaceans:** | | | | |
| Isopod, Madison Cave | | X | | X |
| **Fishes:** | | | | |
| Chub, slender | | X | | X |
| Chub, spotfin | | X | | X |
| * Dance, Tennessee | | | X | |
| Darter, Carolina | | | X | |
| Darter, Tippecanoe | | | X | |

TABLE 1 (Continued)

## THREATENED AND ENDANGERED ANIMAL SPECIES FOUND IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened,
(SE) State Endangered, (ST) State Threatened
* denotes effective 1/1/92

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| **Fishes (cont'd):** | | | | |
| Darter, blueside | | | X | |
| * Darter, duskytail | | | X | |
| * Darter, greenfin | | | | X |
| * Darter, longhead | | | | X |
| Darter, sharphead | | | | X |
| * Darter, western sand | | | | X |
| * Darter, variegate | | | X | |
| Logperch, Roanoke | X | | | |
| * Madtom, orange | | | | X |
| Madtom, yellowfin | | X | | X |
| * Paddlefish | | | | X |
| * Shiner, emerald | | | | X |
| * Shiner, steelcolor | | | | X |
| * Shiner, whitemouth | | | | X |
| Sturgeon, shortnose | X | | X | |
| Sunfish, blackbanded | | | X | |
| **Freshwater Mussels:** | | | | |
| Mussel, Appalachian monkeyface | X | | X | |
| * Mussel, Atlantic pigtoe | | | | X |
| Mussel, Cumberland bean | X | | X | |
| Mussel, Cumberland combshell | | | X | |
| Mussel, Cumberland monkeyface | X | | X | |
| Mussel, James spiny | X | | X | |
| * Mussel, Ohio pigtoe | | | X | |
| * Mussel, Tennessee heelsplitter | | | | X |
| Mussel, birdwing pearly | X | | X | |
| * Mussel, black sandshell | | | | X |
| * Mussel, brook floater | | | X | |
| Mussel, cracking pearly | X | | | |
| * Mussel, deertoe | | | X | |

TABLE 1 (Continued)

## THREATENED AND ENDANGERED ANIMAL SPECIES FOUND IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened,
(SE) State Endangered, (ST) State Threatened
* denotes effective 1/1/92

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| Mussel, dromedary pearly | X | | X | |
| Mussel, dwarf wedge | X | | X | |
| * Mussel, elephant-ear | | | X | |
| Mussel, fanshell | X | | | |
| Mussel, fine-rayed pigtoe | X | | X | |
| * Mussel, fragile papershell | | | | X |
| Mussel, green blossom pearly | X | | X | |
| Mussel, little-wing pearly | X | | X | |
| Mussel, oyster | | | X | |
| * Mussel, pimpleback | | | | X |
| Mussel, pink mucket | X | | | |
| * Mussel, pink pigtoe | | | X | |
| * Mussel, purple bean | | | X | |
| * Mussel, purple lilliput | | | X | |
| Mussel, rough pigtoe | X | | X | |
| * Mussel, rough rabbitsfoot | | | | X |
| * Mussel, sheepnose | | | | X |
| Mussel, shiny pigtoe | X | | X | |
| * Mussel, slabside pearly | | | | X |
| * Mussel, slippershell | | | X | |
| Mussel, snuffbox | | | X | |
| * Mussel, spectaclecase | | | X | |
| Mussel, tan riffleshell | X | | X | |
| **Gastropods:** | | | | |
| Coil, Virginia | X | | X | |
| * Coil, brown super | | | | X |
| * Coil, rubble | | | X | |
| * Coil, shaggy | | | X | |
| * Coil, spirit super | | | X | |
| Snail, Virginia fringed mountain | X | | | |

TABLE 1 (Continued)

THREATENED AND ENDANGERED
ANIMAL SPECIES FOUND IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened,
(SE) State Endangered, (ST) State Threatened
* denotes effective 1/1/92

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| * Snail, spiny river | | | | X |
| * Snail, unthanks cave | | | X | |
| **Insects:** | | | | |
| Beetle, American burying | X | | | |
| Dragonfly, spring blue darner | | | | X |
| **Mammals:** | | | | |
| Bat, Indiana | X | | X | |
| Bat, Virginia big-eared | X | | X | |
| Bat, eastern big-eared | | | X | |
| Bat, gray | X | | X | |
| Cougar, eastern | X | | | |
| Fisher | | | X | |
| * Hare, snowshoe | | | X | |
| Shrew, Dismal Swamp southeastern | | X | | X |
| Squirrel, Delmarva Peninsula fox | X | | X | |
| Squirrel, northern flying | X | | X | |
| * Vole, rock | | | X | |
| **Marine Mammals:** | | | | |
| Manatee, Florida | X | | | |
| Whale, blue | X | | | |
| Whale, fin | X | | | |
| Whale, humpback | X | | | |
| Whale, northern right | X | | | |
| Whale, sei | X | | | |
| Whale, sperm | X | | | |

TABLE 1 (Continued)

THREATENED AND ENDANGERED
ANIMAL SPECIES FOUND IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened,
(SE) State Endangered, (ST) State Threatened
* denotes effective 1/1/92

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| **Reptiles:** | | | | |
| * Lizard, eastern glass | | | | X |
| * Rattlesnake, canebrake | | | X | |
| Turtle, Atlantic green sea | | X | | |
| Turtle, Kemp's Ridley sea | X | | X | |
| Turtle, bog | | | X | |
| Turtle, eastern chicken | | | X | |
| Turtle, hawksbill sea | X | | | |
| Turtle, leatherback sea | X | | | |
| Turtle, loggerhead sea | | X | | X |
| * Turtle, wood | | | | X |

Source: Virginia Department of Conservation and Recreation, Division of Natural Heritage. "Natural Heritage Resources of Virginia: Rare Animals and Rare Plants." Comp. by Christopher A. Pague. VDCR: Richmond, VA, 8/1/91, 3/1/91.

Virginia Department of Game and Inland Fisheries. "Federal and State Listed Threatened and Endangered Species in Virginia as of 9/15/90, 1/1/92." VDGIF: Richmond, VA, 1990,1991.

## TABLE 2

## THREATENED AND ENDANGERED PLANT SPECIES IN VIRGINIA

Legend: (FE) Federal Endangered, (FT) Federal Threatened
(SE) State Engdangered, (ST) State Threatened

| SPECIES | STATUS (FE) | (FT) | (SE) | (ST) |
|---|---|---|---|---|
| Shale-Barren Rockress | X | | X | |
| Small Anthered-Bittercress | X | | | |
| Peter's Mountain Mallow | X | | X | |
| Northeastern Bulrush | X | | X | |
| Virginia Round-Leaf Birch | X | | X | |
| Swamp-Pink | | X | X | |
| Small Whorled Pogonia | X | | X | |
| Variable Sedge | | | X | |
| Virginia Sneezeweed | | | X | |
| Long-Stalked Holly | | | X | |
| Tropical Water-Hyssop | | | X | |
| Piratebush | | | X | |
| Harper's Fimbristylis | | | X | |
| Nestronia | | | X | |
| Virginia Spiraea | | X | X | |

Source: Virginia Department of Conservation and Recreation, Division of Natural Heritage. "Natural Heritage Resources of Virginia: Rare Animals and Rare Plants." Comp. by Christopher A. Pague. VDCR: Richmond, VA, 8/1/91, 3/1/91.

Virginia Department of Game and Inland Fisheries. "Federal and State Listed Threatened and Endangered Species in Virginia as of 9/15/90, 1/1/92." VDGIF: Richmond, VA, 1990, 1991.

## XII. NATURAL AREA PRESERVATION

Most people are aware that numerous species of wild animals and plants are on the verge of extinction because of human actions; but, many people are not aware that most of our nation's native animal species and many plants are in a state of decline due to habitat degradation or loss. More than 500 species in the U.S. alone are now officially listed under the Endangered Species Act as either endangered or threatened by extinction.

While it is the federal government that has responsibility for federally listed threatened and endangered species and migratory species, it is the states that bear responsibility for most of their resident wildlife. State fish and wildlife agencies have generally emphasized management programs for game animals desired by hunters and fishermen. Traditionally, the agencies have had neither the funds nor, in many cases, the motivation, to safeguard the health and abundance of all wildlife in their states.

In 1980, Congress passed the Fish and Wildlife Conservation Act to aid efforts aimed at halting the decline of species, primarily through destruction of natural habitat. Popularly referred to as the "Nongame Act," the legislation deals with wild animals that are not hunted, fished, or trapped. Those fauna comprise about 90% of our indigenous vertebrate wildlife, including 350 species of mammals, 654 species of birds, 470 species of amphibians and reptiles, and 630 species of fish. The many thousands of invertebrate species are not now covered by the Act.

The Fish and Wildlife Act is meant to provide funds for more comprehensive programs to help protect nongame wildlife through matching grants to the states. When reauthorized by Congress in 1986 and 1988, the Act set an annual appropriations ceiling and envisioned the development of additional sources of funds. The money is to be used for a matching grant program to reimburse states for development and implementation of nongame conservation plans. Under these plans, state fish and wildlife agencies are to evaluate the status of nongame species, identify critical habitats, and ultimately find the most cost-effective means for protecting the habitat and preventing the decline of nongame wildlife.

In Hampton Roads, there are many publicly owned areas that have been established to protect sensitive environmental features and manage wildlife habitat. These areas include National Wildlife Refuges, State Wildlife Management Areas, State Parks, and regional parks with natural area components. It is likely, however, that there are numerous other areas throughout the region that contain significant natural features worthy of protection. The State, in cooperation with The Nature Conservancy (TNC), has established the Virginia Natural Heritage Program (VNHP) to identify and protect such areas. The goal of this program is to inventory the state's significant natural areas and establish a statewide system of

natural area preserves. A number of sites in Hampton Roads are being investigated for possible inclusion in this system. Although State regulations which specifically control the impacts of development on such areas do not exist, local governments may consider such impacts during their development review processes.

The VNHP was established in 1986 as a joint contract venture between the State and TNC. In 1988, the VNHP became an organizational component of the Virginia Department of Conservation and Recreation (VDCR) in the Division of Natural Heritage. The main objectives of the VNHP are to expose information gaps, guide future research and identify significant natural features for establishing conservation priorities. The VNHP is the first comprehensive attempt to identify Virginia's most significant natural areas through an intensive statewide inventory. Resources being inventoried include rare plants, rare animals, geologic landmarks, natural communities and other unique natural features. It is anticipated that this inventory will provide information to the private sector and public agencies for making informed decisions with respect to development projects. The Division of Natural Heritage is currently conducting inventories in the Cities of Virginia Beach and Williamsburg, and in the Counties of James City and York. Inventory work in the City of Suffolk and the Counties of Isle of Wight and Southampton will begin in late 1991.

In 1989, the Virginia General Assembly passed the Virginia Natural Area Preserves Act (Title 10.1, Chapter 2, Code of Virginia) which expanded the VNHP by charging the VDCR with establishing and managing a State Natural Area Preserve system. The Act also established the Natural Area Preservation Fund to finance this effort. Establishment of the Preserve System will be accomplished by fee simple acquisition by the State and/or TNC; the use of conservation easements on private land; a voluntary, non- regulatory preservation program for public and private land; and, the use of legal or administrative means to establish special research or management areas on federal lands. Dedication as a State Natural Area Preserve affords a natural area formal recognition and provides it with legal protection in that it cannot be condemned by local or State government.

For more information on the Virginia Natural Heritage Program contact:

| | |
|---|---|
| Virginia Department of Conservation and Recreation, Division of Natural Heritage | (804)796-7951 |
| The Nature Conservancy - Charlottesville | (804)295-6106 |

**Source of additional information:**

Commonwealth of Virginia. Title 10.1, Chapter 2, Article 3, Code of Virginia, 1950, as amended.

## XIII. NOISE

Noise is receiving widespread recognition as one of the significant environmental problems of our age, as it effects both the human and the natural environments. Plainly stated, noise is unwanted sound. It is usually rated according to peak noise as measured in decibels on the A scale of a sound meter and referred to as "so many dbA." Noise abatement focuses on reducing to an acceptable level, or preferably lower, the amount of sound emitted from a source and transmitted along a path to a recipient.

Projected levels of "sound pressure" can be measured with precision, but the "effects" of noise upon the recipient are dependent upon many other factors, such as duration. Recent studies have shown that noise at intervals or long duration, besides bringing on gradual deafness, damages the heart and vision, produces indigestion and stomach ulcers, builds up hypertension, and causes mental disorder that sometimes leads to suicide. Generally, however, it is the amount of noise that is of utmost concern. Tests in which animals are assailed with noise at levels not far above those many people are routinely subjected to produce such results as cannibalism, homosexuality, loss of fertility, and heart failure within a short time.

A decibel rating of 70 dbA outside dwellings or public buildings is about the maximum acceptable for humans under most conditions. Every reduction of 10 decibels corresponds to halving the apparent loudness of sound.

Federal recognition of the problems associated with environmental noise came with the passage of the Noise Control Act of 1972 (P.L. 92-574) and the Occupational Health and Safety Act of 1970 (P.L. 91-596). These legislative mandates prompted federal agencies along with state and local governments to develop measures to control the harmful effects of noise on man. In addition, the Noise Control Act gave the U.S. Environmental Protection Agency (EPA) broad authority to set maximum allowable sound pressure levels for all major noise sources manufactured after 1972, including construction equipment, transportation equipment, electrical equipment, and motors (except aircraft). The EPA was also charged with proposing noise standards for aircraft for implementation by the Federal Aviation Administration. By 1983, the EPA had issued noise level regulations for air conditioners, buses, motorcycles, power mowers, some trucks and trains, and some construction equipment.

The Occupational Health and Safety Administration (OSHA) currently sets the standards for overexposure to noise in any workplace at 90 dbA for eight hours a day. This amount is still significantly higher than the standard of 85 dbA considered to be a minimum safe level.

Congress later passed the Quiet Communities Act in 1978, which authorizes the EPA to develop programs to help state and local governments combat excessive noise. Since then, the EPA has assisted a number of cities, including the City of Newport News, and more than half of the states in launching noise control programs.

On the other hand, the problem of incompatible development- - primarily residential-- in areas surrounding airports has become a matter of public concern, especially in Hampton Roads, due to a large number of military installations within the region. The cause of the problem stems primarily from the following factors: (i) introduction of jet aircraft in the early 1950s and the subsequent development and use of higher performance aircraft; (ii) dramatic increase in the use of aircraft as a mode of transportation and as a primary defense weapon; (iii) immense population growth with the accompanying needs for additional housing; (iv) availability of unimproved land near airports with access roads and utilities in place; and (v) construction of housing or incompatible facilities within the immediate airport environs.

The importance of unobstructed and controlled airspace in proximity to airports was one of the primary factors that influenced the siting of military air installation and the retention and expansion of these facilities. Over the past few years, however, rapid urbanization has adversely affected both military and civilian airports alike. For example, communities are becoming more critical of aircraft noise and increasing pressure has been applied by local government and citizens groups to restrict flight operations. Of all the military services, the Navy has faced the most intense pressure because the majority of its air stations are located in coastal areas. Population growth in the Hampton Roads area has been particularly vigorous and has expanded to the point that development has occurred within the undeveloped areas surrounding NAS Oceana in Virginia Beach, ALF Fentress in Chesapeake, and Langley AFB in Hampton.

In order to consider and deal with the problem of land development around military air facilities, the Noise Control Act also gave the U.S. Department of Defense (DOD) the authority to institute a study known as the Air Installation Compatible Use Zones (AICUZ) Program. This program requires that a plan be developed and implemented whereby all military air installations will be studied in depth to determine those land areas for which development should be significantly influenced by the function and operation of the installations. The composite of those land areas at each installation is thus designated as the AICUZ for that installation.

The AICUZ study addresses two major concerns: aircraft noise and accident potential for surrounding areas. The noise impact studies are based on a technique known as the day-night average &sound level (LDN) system. The LDN system takes into account the type aircraft, the distance to the aircraft, the type

of aircraft operations, number of operations both day and night, and it has as its base the A scale measurement of sound level.

Three general noise zones around the airports are defined which can be associated with human response as follows:

| Noise Zone | Associated Characteristics |
|---|---|
| 3 | Zone of highest intensity; frequency and intensity of noise is such as to be loud and annoying. |
| 2 | Second most intensive zone; noise is more moderate in character. |
| 1 | Lowest noise level zone; the noise may interfere occasionally with certain residential activities. |

In a similar manner the accident potential studies served to define three groupings of Accident Potential Zones (APZ). The three groupings are divided by degree of accident potential as follows: APZ "A"-- zone of highest accident potential; APZ "B"- - zone of significant accident potential but less critical than Zone "A;" and APZ "C"-- zone with some potential for accidents but less critical than Zone "B."

Both of these types of zones are then placed on a map, showing the airport and surrounding land areas; such maps should be consulting during the plan of development process. With these two general types of zones defined, noise impact and accident potential, development of the land around the airport needs to occur in a manner that is compatible with the zone character. The AICUZ is not intended as a zoning document, but as a decision making tool to be used by those involved in the planning process, whether they be planning authorities, a land owner determining the best use of his property, or a potential home owner selecting a site for a new home. The AICUZ provides definite zones with supporting documentation as to the impact the airport operation has on each zone. In addition, a wide range of compatible land uses are recommended for each zone to be used as a development guide.

Noise will never be completely eliminated from our living and working places, and will continue to impact natural areas surrounding them. The problems, however, can be greatly alleviated by the grouping of land uses in relation to their relative noise production and their limits of tolerance. Most controls on noise pollution from new development or land uses are primarily found within local zoning ordinances. On the other hand, many local government bodies have

chosen not to use their zoning powers to prohibit construction for new residential and institutional uses beneath or adjacent to airport approach zones, departure zones, and other areas where aircraft noise may affect the quality of life. As a result, a person considering the purchase of property within the vicinity of an airport may not be aware of a noise problem.

Therefore, the Virginia General Assembly has urged all local governing bodies to prohibit in their zoning ordinances construction for residential and institutional use beneath or adjacent to airport approach or departure zones. If such construction is allowed, the seller must state in writing to the "potential" buyer the fact that the property is affected by aircraft noise. Any property that has been purchased by the military and resold to private land users for a lesser price is restricted in terms of land use by the DOD, primarily for safety reasons.

In addition, lending agencies such as the Federal Housing Administration (FHA) and the Veteran's Administration (VA) have adopted construction standards which are prerequisites for obtaining financing for home construction within AICUZ. Financing for construction within Noise Zone 3 will only be approved if certain criteria are met, such as insulation and air conditioners are installed, in order to reduce outside noise levels. Local zoning codes for noise control may be an acceptable substitute for financing criteria if code conditions are at or higher than FHA or VA construction standards.

For more information regading potential constraints on development within AICUZ, contact local planning office and/or:

Federal Housing Administration Loans Division
Veteran's Administration Loans Division

**Sources of additional information:**

"AICUZ for Naval Air Station Norfolk - Norfolk, VA.; Naval Air Station Oceana - Virginia Beach, VA., and; Naval Auxiliary Landing Field Fentress - Chesapeake, VA."

U.S. Congress. Noise Control Act of 1972. (P.L. 92-574), C.F.R. 32 (1-11).

U.S. Department of Defense. Air Installations Compatible Use Zones - AICUZ. (49 U.S.C. 4901)

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# MODEL ENVIRONMENTAL ASSESSMENT PROCEDURE

## COMPREHENSIVE WATER QUALITY IMPACT ASSESSMENT

# COMPREHENSIVE WATER QUALITY IMPACT ASSESSMENT

# PROCEDURE GUIDANCE

## INTRODUCTION AND USE

### Methodology

For land disturbing activities associated with development, to date, the only requirement for water quality impact assessment (WQIA) in the Commonwealth of Virginia is found in Sec. 5.6E of the Chesapeake Bay Preservation Area Designation and Management Final Regulations (VR 173-02-01); hereinafter referred to as the "Final Regulations." Subsequently, a WQIA procedure was developed by the Chesapeake Bay Local Assistance Department (CBLAD) in Sec. 111 of the CBLAD Model Chesapeake Bay Preservation Area (CBPA) Ordinance; hereinafter referred to as the "CBLAD MO." All localities within Tidewater Virginia were required to develop and adopt local CBPA ordinances which complied with the Final Regulations by November 15, 1991. Therefore, provisions for a WQIA procedure are also found within each locally adopted CBPA ordinance.

As the titles suggest, these WQIA requirements and procedures specifically address water quality in the Chesapeake Bay and its tributaries. They have been found by state and local officials to be administratively and politically acceptable. While recognizing the importance of such a procedure in the efforts to restore the vitality of Chesapeake Bay, it is equally important to consider land uses outside of locally-designated CBPAs that may influence the quality of other waters within the region. In other words, the need exists for more comprehensive water resource planning and management.

Therefore, in addition to meeting the requirements of the Final Regulations, a model Comprehensive WQIA (CWQIA) procedure has been developed which could be applied to other locally-designated environmentally-sensitive areas. It is not the intent of the CWQIA to expand the scope and jurisdiction of the WQIA requirements of the Final Regulations or the CBLAD MO WQIA procedure; rather, it is intended to be an umbrella procedure, applicable to all development and redevelopment. It is also not the intent to create two separate water quality impact assessment procedures. The CBPA WQIA requirements, which must be met at a minimum for all land disturbing activities occurring within CBPAs, can be found within this comprehensive framework. Where the CWQIA it is to be applicable outside of CBPAs is largely left to local discretion.

The CWQIA procedure guidance which follows provides examples of when a CWQIA should be required, as well as a detailed discussion of when CBPA WQIA requirements must be met in accordance with the Final Regulations. By also

providing a Model CWQIA Procedure, localities will have a tool for developing a more comprehensive WQIA procedure in addition to that currently provided for in local CBPA ordinances. For the purposes of developing this guidance and model, and as a basis for comparison, a review of all WQIA procedures within model CBPA ordinances in Tidewater Virginia and locally-adopted CBPA ordinances within Hampton Roads was undertaken. However, the guidance and model reflect the physical characteristics and administrative implementation needs of Hampton Roads localities.

The model includes provisions from existing CBPA WQIA procedures presently used in the region that are considered to be optimal. In addition to those provisions, others have also been included in order to ensure meaningful water quality protection in a more comprehensive manner. These provisions address local, state, and federal regulations pertaining to the following: surface water and groundwater quality and quantity, erosion and sediment control, point and nonpoint source pollution, wetlands, and coastal resources. For a more detailed discussion of such regulations, refer to the Guidance Text which accompanies the Initial Environmental Review Questionnaire (IERQ) in Part I of this document. The model provided herein should also be used to complement local ordinances and procedures regarding site plan review and plan of development considerations.

**Use of the CWQIA Procedure**

It is anticipated that the preparation of a CWQIA by a land development project applicant would be subsequent to completion, by the same, of the IERQ.

With the exception of #3 as stated below, the following is a review of the evaluation procedure used for the IERQ.

1. **Negative Declaration:** a finding that the proposed project could not have significant adverse impacts on the environment as categorized in the Questionnaire.

2. **Mitigated Negative Declaration:** a finding that, although the project could have significant adverse impacts on the environment as categorized in the Questionnaire, the proposed mitigation measures detailed and/or agreed upon by the project applicant will remedy those impacts.

3. **CWQIA Required:** a finding that the project, as proposed, will have a significant adverse impact on either surface water or groundwater quality and/or quantity; and/or the project will be located within or encroach upon a Resource Protection Area as designated under the local CBPA Ordinance. Therefore, a comprehensive water quality impact assessment of the proposed project is necessary.

If a determination is made by the local planning staff that a CWQIA is required for the proposed project, such an assessment can be prepared according the Model CWQIA Procedure. This should be done prior to any clearing or grading of the site. Such assessment should also include, in detail, all proposed mitigation measures to be incorporated within the site plan and plan of development. All expenses incurred during the preparation of the CWQIA should be borne by the applicant. Examples of data needs and recommended sources of assessment information, which can be used in the preparation of information to be submitted in the CWQIA, are provided in Appendix A.

Once the CWQIA has been completed and submitted for review to the local designated authority, one decision regarding building permit issuance should be made by weighing specified evaluation criteria against the assessment findings. If it is determined that the project as proposed will cause a significant adverse impact (or whatever threshold is selected by the locality) to water quality, then the project applicant should be requested to submit additional mitigation plans where potential impacts have not been adequately addressed. Thresholds could include specific land uses, land use changes, area of land disturbance or change in water quality conditions. A finding of environmental inconsistency regarding water quality should be made when impacts created by the project cannot be mitigated.

Definitions

The following words and terms are used in this discussion and model. Those which have been defined in the CBPA Final Regulations (VR 173-02-01) under Sec. 4.1 and Sec. 10.1-2101 of the Chesapeake Bay Preservation Act are in bold print. Those definitions which are not in bold print have been cited from publications by the Environmental Protection Agency (EPA).

**"Best Management Practice" means a practice, or combination of practices, that is determined by a state or designated area wide planning agency to be the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.**

"Best Management System" is a combination of conservation practices or management measures, which when applied, will achieve nonpoint source pollution control through reduced transport of sediment, nutrients and chemicals into the surface and groundwater. This term applies to agricultural, forestry, and urban nonpoint source control measures. The concept is based on the need to promote combinations of practices that most effectively protect or improve water quality and they can include structural and management practices.

**"Buffer Area" means an area of natural or established vegetation managed to protect other components of a Resource Protection Area and state waters from**

significant degradation due to land disturbances.

"Chesapeake Bay Preservation Area" means any land designated by a local government pursuant to Part III of the CBPA Final Regulations and Sec. 10.1-2107 of the Act. A Chesapeake Bay Preservation Area shall consist of a Resource Protection Area and a Resource Management Area.

"Development" means the construction or substantial alteration of residential, commercial, industrial, institutional, recreation, transportation, or utility facilities or structures.

"Floodplain" means all lands that would be inundated by flood water as a result of a storm event of a 100-year return interval.

"Highly erodible soils" means soils (excluding vegetation) with an erodibility index (EI) from sheet and rill erosion equal to or greater than eight. The erodibility index for any soil is defined as the product of the formula RKLS/T, as defined by the "Food Security Act (F.S.A.) Manual" of August, 1988 in the "Field Office Technical Guide" of the U.S. Department of Agriculture Soil Conservation Service, where K is the soil susceptibility to water erosion in the surface layer; R is the rainfall and runoff; LS is the combined effects of slope length and steepness; and T is the soil loss tolerance.

"Highly permeable soils" means soils with a given potential to transmit water through the soil profile. Highly permeable soils are identified as any soil having a permeability equal to or greater than six inches of water movement per hour in any part of the soil profile to a depth of 72 inches (permeability groups "rapid" and "very rapid") as found in the "National Soils Handbook" of July 1983 in the "Field Office Technical Guide" of the U.S. Department of Agriculture Soil Conservation Service.

"Impervious cover" means a surface composed of any material that significantly impedes or prevents natural infiltration of water into the soil. Impervious surfaces include, but are not limited to , roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.

"Infill" means utilization of vacant land in previously developed areas.

"Intensely Developed Areas" means those areas designated by the local government pursuant to Sec. 3.4 of the CBPA Final Regulations.

"Nonpoint source pollution" is the pollution that reaches surface water or groundwater that cannot be traced to an identifiable source such as a point source. In coastal areas, this can include but is not limited to: agricultural runoff, urban runoff (including developing and developed areas), silvicultural (forestry)

runoff, marinas and recreational boating, hydromodification, dams and levees, shoreline erosion, oil and gas operations, mining activities, land disposal of wastes, and on- site sewage disposal.

**"Nontidal wetlands" means those wetlands other than tidal wetlands that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined by the U.S. Environmental Protection Agency pursuant to Sec. 404 of the federal Clean Water Act, in 33 C.F.R. 328.3b, dated November 13, 1986.** (This definition is subject to change pending revisions to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, which are currently being considered.)

**"Plan of development" means any process for site plan review in local zoning and land development regulations designed to ensure compliance with Sec. 10.1-2109 of the Act and these regulations, prior to issuance of a building permit.**

**"Redevelopment" means the process of developing land that is or has been previously developed.**

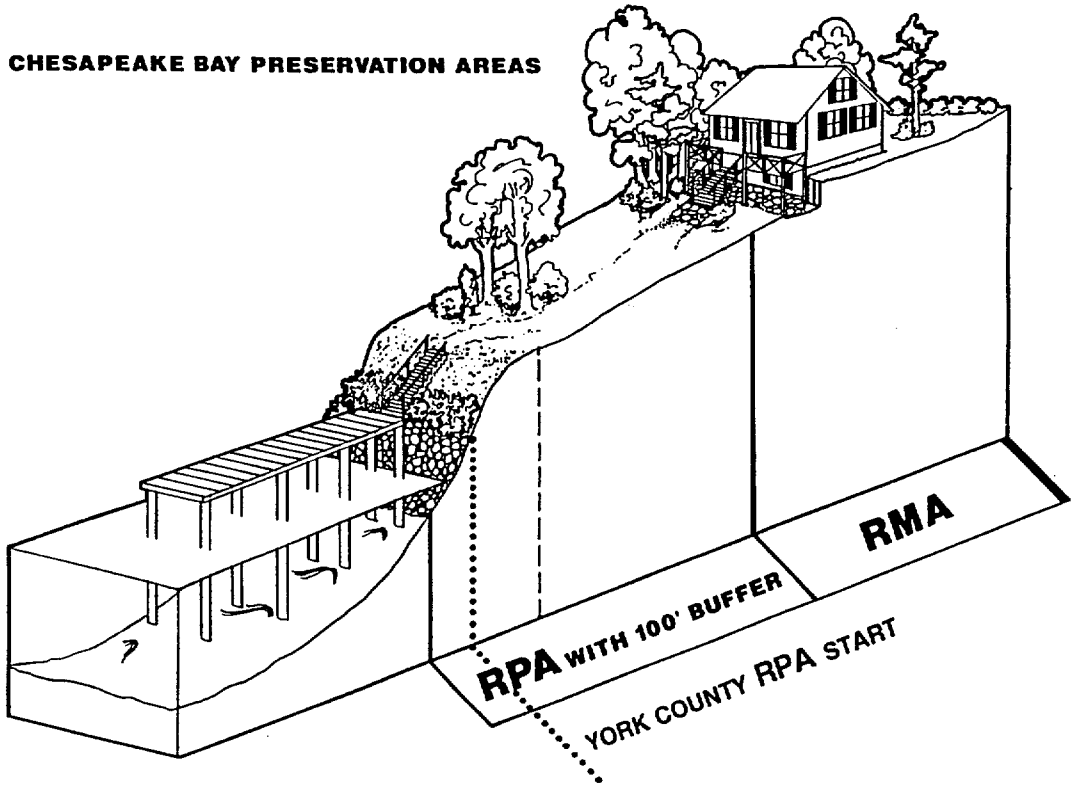
**"Resource Management Area" means that component of the Chesapeake Bay Preservation Area that is not classified as the Resource Protection Area.**

(The Final Regulations establish the Resource Management Area or RMA as the landward component of Chesapeake Bay Preservation Areas. Land to be considered for designation as RMAs include the following: non-tidal wetlands, floodplains, highly erodible soils, highly permeable soils, other lands at local discretion. Unlike the delineation of Resource Protection Areas, the designation of RMAs has been left in large part to local discretion. See Figures 3A and 3B.)

**Resource Protection Area" means that component of the Chesapeake Bay Preservation Area comprised of lands at or near the shoreline that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts which may result in significant degradation to the quality of state waters.**

(The Final Regulations establish the Resource Protection Area or RPA as the shoreward component of the Chesapeake Bay Preservation Area. Lands to be included in the RPA designation include the following: tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, tidal shores, other lands at local discretion, and a buffer area not less than 100 feet in width landward of all other components of RPAs and along both sides of any tributary stream. See Figures 3A, 3B and 4.)

FIGURE 3A AND 3B



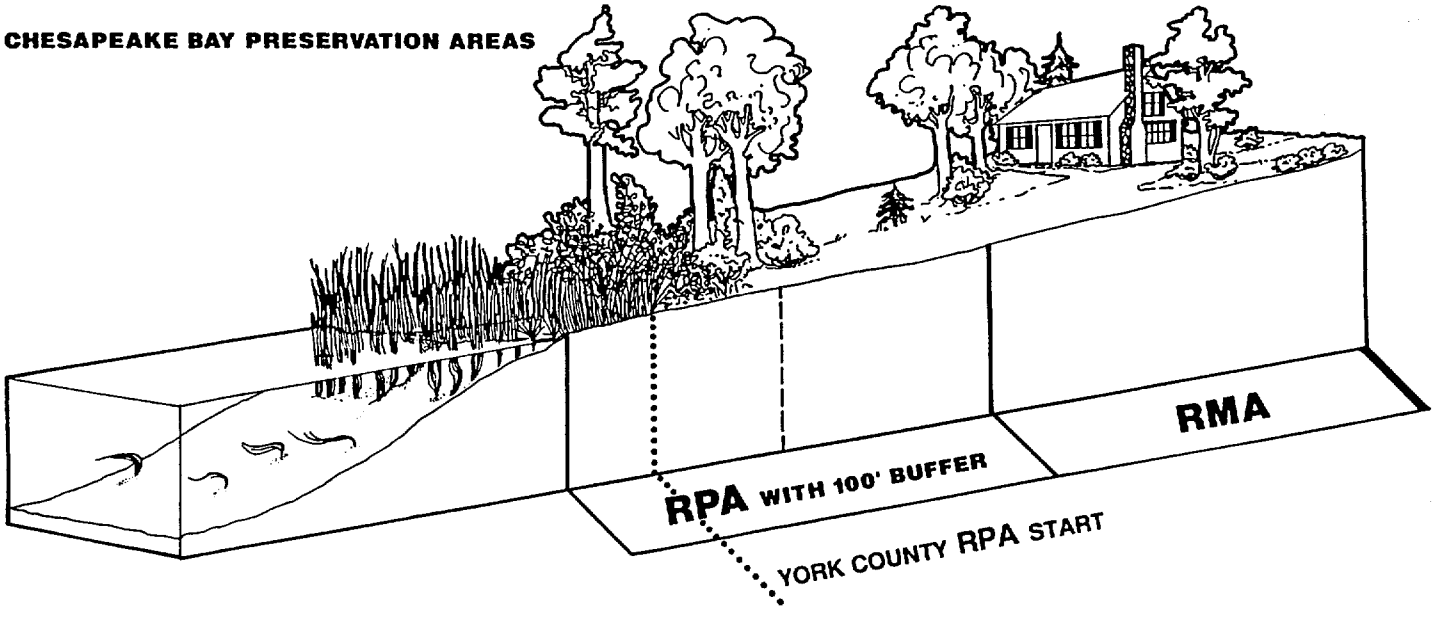




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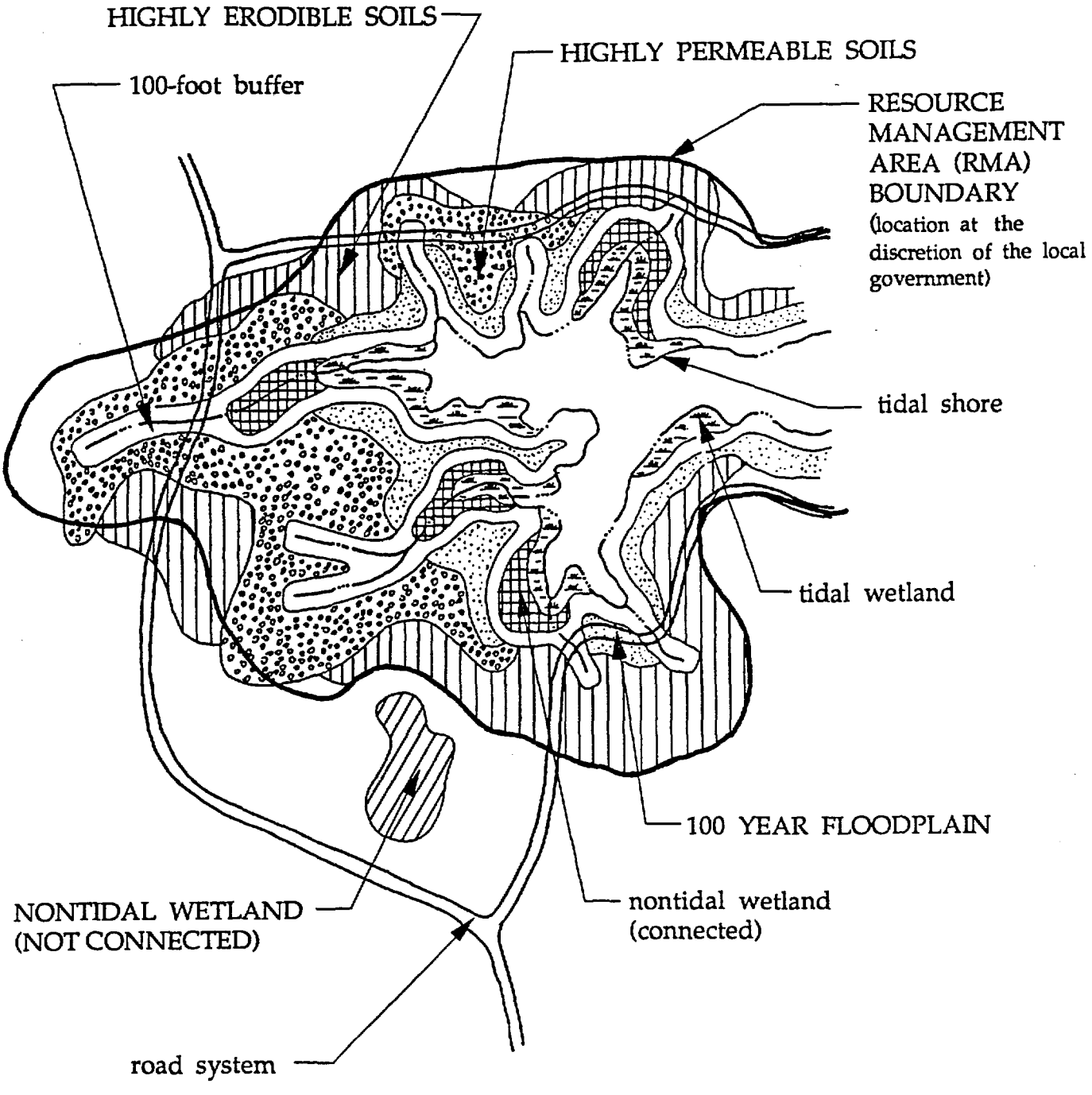
FIGURE 4

*HYPOTHETICAL RMA COMPONENTS*




NOTE: items in lower case letters indicate the feature that the symbol depicts. ITEMS IN UPPER CASE LETTERS INDICATE THE FEATURE SHOULD BE MAPPED AS AN RMA FEATURE

Source: CBLAD Local Assistance Manual, III-43 11-89.

"Riparian area" is the vegetated area along a waterbody that is typically part of a riparian system or complex assemblage or organisms and their environment existing adjacent to and near waterbodies, generally associated with bays, estuaries, rivers, lakes, reservoirs, springs, seeps, and ephemeral, intermittent, or perennial streams. These areas are strongly influenced by the adjacent aquatic environment, have linear characteristics, and experience hydrological fluxes, ie. flooding or inundation, at least once within the growing season.

**"Substantial alteration" means expansion or modification of a building or development which would result in a disturbance of land exceeding an area of 2,500 sf. in the Resource Management Area only.**

**"Tidal shore" or "shore" means lands contiguous to a tidal body of water between the mean low water level and the mean high water level.**

**"Tidal wetlands" means vegetated and nonvegetated wetlands as defined in Sec. 62.1-13.2 of the Code of Virginia.**

**"Tributary stream" means any perennial stream that is so depicted on the most recent U.S. Geological Survey 7-1/2 minute topographic quadrangle map (scale 1:24,000)**

"Vegetative filter strips" are permanent, maintained strips of planted or indigenous vegetation located between nonpoint sources of pollution and receiving water bodies for the purpose of removing or mitigating the effects of nonpoint source pollutants such as nutrients, pesticides, sediment and suspended solids.

**"Water-dependent facility" means a development of land that cannot exist outside of the Resource Protection Area and must be located on the shoreline by reason of the intrinsic nature of its operation. These facilities include, but are not limited to (i) ports; (ii) the intake and outfall structures of power plants, water treatment plants, sewage treatment plants, and storm sewers; (iii) marinas and other boat docking structures; (iv) beaches and other public water-oriented recreation areas; and (v) fisheries or other marine resources facilities.**

"Wetlands" are those areas that are inundated or saturated by surface or groundwater and a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands include both tidal and nontidal wetlands as defined previously; they are generally waters of the U.S. and, as such, afforded protection under the Clean Water Act. (This definition is subject to change pending revisions to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, which are currently being considered.)

## Overview of the Relationship between Land Use and Water Quality

High water quality and the sound environmental health of Chesapeake Bay are integrally related. Moreover, according to a recent book by the Chesapeake Bay Foundation entitled, Turning the Tide,

> "It's health is equally inseparable from the quality of the air above it and the great, invisible seepages of groundwater from beneath it. What the growing human population does to transform the land and puts in the air is as important as what it discharges directly into the water." (Horton & Eichbaum, 1991)

Should the optimal balance of nature which makes Chesapeake Bay the most productive estuary in the United States be upset, then life within and the quality of life derived from it is in jeopardy.

Unfortunately, this is the reality facing Tidewater Virginia and the other Bay regions, today. Essential steps are being taken to restore the natural productivity of the Bay and to preserve its waters for present and future generations to enjoy. However, to focus all of our efforts on this unique resource and all that contributes to its continued decline or potential improvement can be short-sighted, however, if it is done to the mutual exclusion of all other important water resources and environmentally-sensitive areas within the region.

Water is continuously recycled. The sun is the energy source that keeps water moving through an endless process called the water cycle, or hydrologic cycle. Water is exchanged among clouds, land, and the oceans, which makes it our most recycled resource. While this process transports water, some of it is purified through decomposition, settling, and filtering as water travels down a river and through wetlands, the soil, and other natural filters. The effectiveness of the purification process is reduced by such factors as vegetation removal, atmospheric pollution, and the introduction of such pollutants as heavy metals and some chemicals that do not break down into harmless substances.

We use our lakes and rivers as sources of clean, safe water for water supply, recreational, industrial and agricultural uses, and for fisheries and wildlife habitat. The amount of water that is available for use, by man and by nature, depends on its quantity and its quality. In addition to the effects of natural processes, water quality is vulnerable to change from human activities which add substances such as bacteria, oxygen-demanding substances, nutrients, toxic

chemicals, sediment, oil-based compounds, debris, and waste heat to the water, as well as what is diffused into the air. The result of our day-to-day lifestyles can change the chemical, biological, and physical characteristics of our water, and the cumulative effect of this on Chesapeake Bay, and its tributaries, is of particular concern in Virginia.

Because we use the same water over and over again as it is recycled by nature or people, its quality is important. Polluted water can spread disease, kill aquatic life, destroy plants and animals, and make rivers and other water bodies unfit for recreation. Since our water supply is limited, cleaning our used water and safeguarding our clean water is an important part of using this resource and our land wisely.

There are two types of pollution from land use activities which can have an impact on water quality-- nonpoint and point. Nonpoint source pollution is pollution of water from diffuse sources, caused by rainfall or snowmelt moving over and through the ground and carrying natural and manmade pollutants into lakes, rivers, streams, wetlands, embayments, estuaries, and other surface waters and groundwater. Nonpoint source runoff volume and pollutant loadings tend to increase as the amount of paved or impervious surface increases.

During the first fifteen years of the national program to abate and control water pollution, the Environmental Protection Agency (EPA) and the States focused most of their water pollution control activities upon traditional point sources, such as discharges through pipes from sewage treatment plants and industrial facilities. These point sources have been regulated by EPA and the States through the National Pollutant Discharge Elimination System (NPDES) permit program, established by Sec. 402 of the federal Clean Water Act (CWA). In Virginia, point source discharges are permitted through the State's own VPDES permit program. For a more detailed discussion of point source controls, refer to the Guidance Text which accompanies the IERQ in Part I of this document. Discharges of dredged and fill materials into wetlands have also been regulated by the U.S. Army Corps of Engineers and EPA under Sec. 404 of the CWA, and under Sec. 401 of the CWA by the State Water Control Board. These programs not only manage impacts to the water themselves, but also to both tidal and nontidal wetlands. This is discussed in greater detail in Part I.

As a result of these efforts, pollutant loads from point source discharges have been greatly reduced and considerable progress has been made in restoring and maintaining water quality. However, by focusing primarily on point sources, comprehensive water quality improvements cannot be achieved. Recent studies and surveys by EPA and by State water quality agencies indicate that the majority of remaining water quality impairments in water resources results from nonpoint source pollution and other non-traditional sources such as urban stormwater runoff and combined sewer overflows.

While much progress has been made over the years in regulating and controlling point source pollution, it is generally felt that much work remains before nonpoint pollution prevention efforts can catch up to the level of protection achieved for point sources. This observation holds particularly true in Virginia. A recent comprehensive assessment of the condition of the Chesapeake Bay by the Chesapeake Bay Foundation, for instance, concludes that agricultural runoff, runoff from construction sites, and urban stormwater runoff are major causes of water quality degradation in the Bay (IEN, 1991).

In addition, even though a number of programs have been developed to address nonpoint source pollution, studies indicate that other nonpoint sources of major concern are still not being addressed in water protection planning. A report issued in December 1990 by the EPA Chesapeake Bay Program's Nonpoint Source Evaluation Panel states that:

> We are not persuaded that the present array of programs, if implemented as presently designed at the current resource levels, is sufficient to guarantee achievement of the 40% nutrient reduction goal established by the 1987 Chesapeake Bay Agreement. In general, nutrient management to achieve a net reduction of nitrogen and phosphorous migrating into the atmosphere, surface water and groundwater needs to be the principle which drives program and funding decisions. (EPA Chesapeake Bay Program, 1990)

Another report from the Program's Toxics and Living Resources Subcommittee in May 1991 entitled "Basinwide Toxics Reduction Strategy Commitment Report" provides a "Toxics of Concern List," which identifies those toxic substances representing an immediate or potential threat to the Chesapeake Bay system. This list can be found in Appendix D. Future revisions of this list will incorporate the latest information available to the Program on point and nonpoint source loadings, ambient concentrations, aquatic toxicity, and federal and state regulations and/or restrictions.

Virginia has adopted an "anti-degradation policy" which is intended to ensure that waters that are cleaner than the established water quality standards for those waters be maintained in this condition. This policy and established standards represent an effort to identify desired uses for surface water bodies and to restrict the overall level of pollutant loading to ensure the protection of these

uses. Water quality management plans also exist for each of the State's river basins (with the exception of the Rappahannock River). These are used by the State Water Control Board in establishing discharge limits for point source pollution. In this way, the existing water quality framework does incorporate the concept of cumulative impacts even if that term is not used per se (IEN, 1991). The State's anti-degradation policy and water quality standards for the river and coastal basins within Hampton Roads are included in Appendix B.

In Virginia, substantial progress in managing nonpoint source pollution is occurring through the implementation of the Chesapeake Bay Preservation Act, hereinafter referred to as the "Bay Act," and locally adopted programs throughout the Tidewater region. The State nonpoint source control plan, prepared under Sec. 319 of the federal CWA, also contributes to this effort. Control of nonpoint pollutants is provided through Virginia's Erosion and Sediment Control Regulations, which mandate that localities adopt minimum local erosion and sediment control ordinances. Other new mechanisms to promote more effective local and regional control of stormwater runoff were established by the Virginia Stormwater Management Act. Local governments were given the authority to enact local stormwater management ordinances and state agency projects now require the preparation of stormwater management plans. Coordination of these separate permitting programs may be facilitated under a comprehensive water quality impact assessment (CWQIA) procedure umbrella and related performance standards. In addition, a CWQIA can be used as a means of reinforcing the goals and objectives set forth in the local comprehensive plan and zoning ordinances, where special management areas are addressed.

Protection of groundwater from potentially harmful land use activities is also a priority in Virginia. A detailed discussion of Virginia's Groundwater Protection Strategy is provided in the Guidance Text which follows the IERQ in Part I of this document. Groundwater quantity management is also a priority, especially in the State's two designated "Groundwater Management Areas." All localities in Hampton Roads are included in the Eastern Virginia Groundwater Management Area, and groundwater withdrawal permits are required for any new uses. Changes to the State's Groundwater Act are currently being considered to address the potential problems which have been brought about by overallocation of the groundwater resource in the past; or, in other words, to address and better manage the cumulative impact of the current and potential withdrawals by the many groundwater users in the area.

Land use planning provides a means for managing growth to permit maximum use of a limited resource base and retain for future decisions a maximum number of available alternatives. However, it is not enough to think only of protecting what we already have; it is also important to see protection as part of a larger effort to create what we want in the future. In these efforts, a conflict often arises between conservation and creation. In environmentally sensitive

areas, natural preservation should be an important planning objective. Development needs to respect nature and natural values. In other areas, "creation" must focus less on prohibition than on sensitive accommodation and balance. Natural hazards and resources must be recognized and evaluated, and the information derived from these evaluations must be used in the planning process to make intelligent decisions about land use.

A new type of land use management that is beginning to emerge is the use of performance standards to evaluate and manage development in sensitive environmental areas. Traditional zoning ordinances establish a detailed list of permitted uses, prohibited uses, conditional uses that may occur if specific requirements are met, and site requirements. This approach is limited because of its inability to recognize the complex interrelationships of dynamic ecological and physical systems. In most zoning ordinances, there is no mechanism for considering environmental capabilities beyond a simple exclusion of all uses that might have some impact on a sensitive resource.

The alternative to this method is to establish environmental performance standards by which a community sets specific measurable levels at which key functions of the sensitive environmental system must operate, consonant with proposed changes in land use. The developer, through a licensed engineer, geologist, hydrologist, planner or other professional, must then indicate how the proposed development will meet these standards. This approach encourages innovation and experimentation, which will result in development that is more compatible with the environment.

Water is a resource that can be protected through utilization of performance standards. This can be achieved by maintaining natural runoff patterns and groundwater percolation, by minimizing erosion and siltation, and by minimizing other pollutants at the source including nitrogen, phosphorous, and toxics. Performance control regulations can also be created for protection of groundwater aquifers and aquifer recharge areas.

In conclusion, land use planning concepts apply to both urban and nonurban areas. In recent times land use planning at all levels has become more responsive to environmental considerations. Effective planning calls for environmental awareness and concern in the determination of the location, nature, and extent of development. Land use decisions must take into account the capacity of the land itself, as well as other natural resources such as water, to withstand developmental impacts. Planning efforts to enhance the water quality of the Chesapeake Bay, its tributaries, and other natural resource areas of concern at the regional and local level, must be made to avoid adverse environmental and socioeconomic consequences. One approach to such efforts can be achieved through preliminary evaluation of the environmental factors associated with proposed development and redevelopment projects. This can be accomplished by

conducting a CWQIA of the project's potential impacts prior to land disturbance.

**Purpose and Intent of the CWQIA Procedure**

The Bay Act recognizes that healthy state and local economies are integrally related to each other and to the environmental health of the Chesapeake Bay. The Bay Act also recognizes that balanced economic development and water quality protection are not mutually exclusive. Both of these statements hold particularly true in Hampton Roads. Setting a goal of minimizing point and nonpoint source pollution in local comprehensive plans, and zoning and subdivision ordinances, would be within the spirit of this law. However, the Bay Act encourages locally adopted Chesapeake Bay Preservation Area (CBPA) programs to provide for the **prevention** of an increase in pollution, by requiring that new development or redevelopment activities at least maintain present water quality levels in the Bay watershed and the Bay itself. In addition, local programs should strive to achieve a reduction in existing water pollution where possible.

In order to achieve these goals of prevention, maintenance, and reduction, performance criteria are the vehicle used in the Final Regulations to establish standards for use when evaluating development and redevelopment projects proposed within locally- designated CBPAs. Part IV of the Final Regulations, "Land Use and Development Performance Criteria," sets out the following objectives: "prevent a net increase in nonpoint source pollution from new development and achieve a 10% reduction in nonpoint source pollution from redevelopment."

To meet these objectives, the Final Regulations further set out general performance criteria which include: preserving natural vegetation, minimizing land disturbance, minimizing impervious cover, strictly controlling soil erosion during land clearing and construction, controlling stormwater runoff and its quality, and subjecting all development to site plan review. These same performance criteria can be extended to areas outside of local CBPAs as well, in order to ensure comprehensive water quality protection.

Land use changes, such as when a field used for agricultural production is subdivided for residential lots, can often result in a decrease of nonpoint source pollutant loadings in nearby surface and groundwater streams. On the other hand, new development also has the potential to aggravate poor water quality conditions if left unmanaged. This impact is further exacerbated in environmentally-sensitive areas. Such an impact can be lessened or eliminated through mitigation by incorporating proper land management into the plan of development phase of the project.

New development and redevelopment projects can be fitted and retrofitted, respectively, with best management practices (BMPs) to achieve the Bay Act goals of preventing an increase in or reducing pre-development nonpoint source pollution

as a result of construction, operation, and use maintenance activities. The same should hold true for such activities in other locally-designated, environmentally-sensitive areas. Perhaps the optimal BMP might be proactive land use planning, which utilizes knowledge of the sensitivity of the site at the pre- plan of development stage. This may eliminate the need to install structural or non-structural BMPs in order to react to and mitigate the impacts of construction and the resultant new land use.

Consideration of cumulative impacts by local planning staff when evaluating potential projects can also be used to help achieve the goals set forth above. Cumulative impacts, in this instance, are the combined effect on the watershed of the proposed project's potential water quality impacts along with those of already existing and proposed land uses. This consideration can also be incorporated within the CWQIA evaluation procedure. It is in this exercise at local discretion that improvements in the quality of state waters within the region can also be achieved over the long term.

Sec. 101 of the CBLAD MO states that:

> "...Certain lands that are proximate to shorelines have intrinsic water quality value due to the ecological and biological processes they perform. Other lands have severe development constraints from flooding, erosion, and soil limitations. With proper management, they offer significant ecological benefits by providing water quality maintenance and pollution control, as well as flood and shoreline erosion control. These lands together-- the designated Chesapeake Bay Preservation Areas (CBPAs)-- need to be protected from destruction and damage in order to protect the quality of water in the Bay and consequently the quality of life [in the Bay region] and the Commonwealth of Virginia."

To use the water quality impact assessment as a means of ensuring this, the Final Regulations, which became effective on 10/1/91, state in Part V, Sec. 5.6E that:

> "1. The purpose of the water quality impact assessment is to identify the impacts of proposed development on water quality and land in Resource Protection Areas (RPAs) consistent with the goals and objectives of the Act, these regulations, and local programs, and to determine specific measure for mitigation of those impacts.

**The specific content and procedures for the water quality impact assessment shall be established by local governments."** (Emphasis ours.)

Thus, the purpose and intent of both the Final Regulations and the WQIA procedure requirements are inextricable. Based on this initiative, it should be the intent of the CWQIA to provide a major tool for ensuring that water quality becomes an integral element of all development considerations in all environmentally-sensitive areas; such areas including those that may either have a direct or indirect influence on nearby surface water or groundwater. The following list provides some examples of provisions that can be used to define the purpose and intent of the CWQIA. This list incorporates not only the encouragement given to local CBPA program development to meet the spirit of the Bay Act, as stated in Part II, Sec. 2.1 of the Final Regulations, but it also emphasizes comprehensive water quality impact assessment in other natural areas of concern.

A. To promote the protection of existing high quality state waters and restoration of all other state waters to a condition or quality that will permit all reasonable public uses and will support the propagation and growth of all aquatic life which might reasonably be expected to inhabit them.

B. To safeguard the clean waters of the Commonwealth from pollution.

C. To prevent any increase in pollution.

D. To reduce existing pollution.

E. To identify the impacts of proposed development on water quality and lands within CBPAs, as well as other environmentally-sensitive areas identified by local government.

F. Where development does occur within CBPAs and other environmentally-sensitive areas, to ensure that it is located and constructed in a manner that will minimize disruption to the natural functions of these areas.

G. To ensure that these environmentally-sensitive areas are clearly delineated on local zoning maps and site plans.

H. To conduct site visits by designated authorities to help determine lands which are unsuitable for development because of water-related constraints. For example, such constraints can include non-seasonal high groundwater, erosion potential, vulnerability to flood damage, or

incapability of soils to attenuate contaminants borne in domestic sewage. (Note-- Although this approach may be instrumental in protecting individuals from investing funds in lands which are unsuitable for development, it is ultimately the property owner's responsibility to investigate potential constraints, conflicts, and liabilities.)

I. To specify mitigation measures which will address water quality protection, and which will ensure protection of existing high quality state waters, where applicable, to the maximum extent feasible.

J. To promote water resource conservation in order to provide for the health, safety and welfare of the present and future citizens of the Commonwealth.

**Context for the CWQIA Procedure**

The placement of a CWQIA procedure within the existing context of local administrative procedures will necessarily vary. It should be understood that the recommendations made herein provide maximum flexibility for local implementation of a CWQIA and that each locality is ultimately left with final discretion on placement.

As a basis for comparison, a review of local CBPA WQIA procedures, found in CBPA ordinances or other relevant ordinances, demonstrates several WQIA placement options within existing administrative procedures. One option in a local CBPA ordinance shows the WQIA procedure as a stand-alone element within the CBPA ordinance, and/or stormwater management and erosion and sediment control ordinances. This option is also shown in the CBLAD MO. A second option shows the WQIA procedure to be one of several required elements in a Plan of Development (POD) process, within the CBPA ordinance. In one local CBPA ordinance, for example, the WQIA procedure is included within the Natural Resources Inventory of the site.

In general, the Final Regulations require a POD for all proposed development exceeding 2,500 square feet (sf.) in CBPAs. All development encroaching into a RPA is then required to conduct a WQIA. Guidance within the CBLAD Local Assistance Manual which accompanies the CBLAD MO states:

> "This process for development review, as a key in the effective administration of land use regulations to protect water quality, will provide significant benefits to the developer and the community...Included in this process is information needed to address

> water quality issues which may, however, be over and above what is typically shown on such a plan (ie. information for environmental site assessment, landscaping plan, and stormwater management plan). In all but the most complex development projects, these requirements can be incorporated onto one or two sheets of the site plan."

This guidance document goes on to describe the site plan process as required under the CBPA as follows:

> "A site plan must indicate the nature of the proposed use and include a depiction of all site features, including building location, topography, drainage, utility placement, driveway location and design, on-site circulation facilities, and landscaping. The site plan ordinance establishes basic requirements for plan content, submittal procedures, and administration."

Finally, the guidance document states that, "the approval of all components of the POD process should be required as a **precondition** for any development or redevelopment activity within CBPAs, including any grading and/or clearing of a site."

As a more detailed example of how one locality within Hampton Roads has built the CBPA WQIA procedure into its existing POD and site plan review process, in accordance with the Final Regulations, the following is an excerpted scenario for a request for building permit or site plan review: 1) a request for a building permit or a site plan review is submitted; 2) if the project can be built under existing zoning, then it must be determined if the project is in a CBPA Overlay Zone; 3) if it is not, then the project is subject to the existing administrative process; if it is, then the location within the CBPA Overlay Zone is verified; 4) if the project does not require an exemption, exception or waiver to the CBPA requirements, then it must be determined if the project requires a RPA buffer area modification and/or WQIA; 5) if it does, then requirements for the RPA buffer area modification and/or WQIA are added to the site plan requirements; if not, then the project proceeds in the normal site plan review process; and finally, 6) if the project is approved in the site plan review process, then a building permit is issued.

As previously stated, the WQIA procedure as it exists within the Final

Regulations, pertains only to lands within locally- designated CBPAs. In order to address water quality protection in other environmentally-sensitive areas outside of CBPAs, which may also have an impact on other water bodies of concern within the region, a CWQIA procedure would need to be adopted by the locality. The minimum CBPA WQIA requirements for all development proposed in CBPAs could be incorporated within this comprehensive assessment procedure. Adopting of a CWQIA procedure may first require voluntary amendments to local zoning, subdivision and site plan ordinances, if a CWQIA is to be required for all development and redevelopment. Alternatively, another approach could be local implementation of an overlay zone and creation of a supplemental overlay zone ordinance similar to that used for CBPAs; such implementation would also be done at local discretion. In addition, if a locality does decide to adopt a CWQIA procedure, this procedure should be referenced in all relevant local ordinances and regulations where applicable.

**Elements to be Included in a CWQIA Procedure**

Based on the comparison of models and local ordinances, the following elements are commonly found and should be included in a CWQIA procedure at a minimum:

1. Applicability/General Qualifying Criteria
2. Information to be Submitted for Review
3. Submission and Review Requirements
4. Evaluation Procedure

**Applicability/General Qualifying Criteria**

It is essential that an "Applicability/General Qualifying Criteria" section, which details when a CWQIA is required for a proposed project, be included in the CWQIA procedure. This section should clearly specify what types of development, what threshold of land area disturbance, and in what areas in the locality compliance with a CWQIA procedure is necessary. The reviewed WQIA procedures within CBPA models and locally adopted CBPA ordinances provide a wide range of development types and land area disturbance thresholds, which are considered to have the potential to cause a "significant adverse environmental impact" on water quality and, therefore, initiate the need for a project applicant to complete a WQIA. Where in the localities such a procedure is applicable also varies. However, at a minimum, those projects proposed in areas designated by the locality as Resource Protection Areas must complete a WQIA in order to comply with the CBPA Regulations. These CBPA WQIA requirements could be incorporated within the umbrella CWQIA procedure.

A comparison of WQIA procedures in the CBPA models and locally adopted CBPA ordinances also reveals differences in applicability in terms of the level of assessment to be required. The extent of impact associated with a proposed project can be classified as minor or major, for example, depending on the project intensity or area of land disturbance. This proposed intensity often serves as the basis for requiring that either a minor WQIA or a major WQIA be conducted in the CBPA models and ordinances. Some more simplified approaches use only one level of assessment for all qualifying proposals, regardless of the area of land disturbance. A determination of which level of assessment is more applicable for the type of land use proposed is largely left to the discretion of the locality; however, a general analysis of which path a locality should choose when making such a determination for a CWQIA procedure will be discussed. Consideration should be given to past, as well as proposed uses of the project site. Provisions for inclusion of information on past uses in the CWQIA are not currently found in available WQIA guidance documents from the CBLAD.

Part V, Sec. 5.6E. of the Final Regulations states:

> "A water quality impact assessment shall be required for any proposed development within the RPA consistent with Part IV [of these regulations] and for any other development in Chesapeake Bay Preservation Areas [CBPAs] that may warrant such assessment because of the unique characteristics of the site or intensity of the proposed use or development."

Finally, the guidance document which accompanies the CBLAD (MO) goes on to state that:

> "The WQIA will be an important tool for local governments in identifying and assessing the water quality impacts of proposed development projects within the [CBPA] Overlay District. A WQIA will be required for any development proposed within RPAs, for development within RMAs when deemed necessary by the [Designated Authority], or in granting any exception from the requirements of the Overlay District."

However, only in the performance criteria for RPAs listed in Sec. 4.3 of the CBPA Final Regulations, where "allowable development is defined," does it state that

redevelopment is also subject to a WQIA procedure:

> "A WQIA shall be required for any proposed development in accordance with Part V (Implementation, Assistance, and Determination of Consistency). Land development may be allowed it it is (i) water-dependent or (ii) constitutes redevelopment."

New development has the potential to aggravate an already adverse water quality condition, or could be a contributing factor in the decline of former high water quality levels; primarily, because of nonpoint source pollution associated with the site. Likewise, redevelopment and improvements made to existing structures have the potential to adversely affect water quality if mitigative measures are not incorporated into the plan of development. Some examples include structural stormwater BMPs or nonstructural vegetative filter strips, the flexibility to contribute runoff from impervious areas on-site to a regional stormwater BMP network if more appropriate (the Final Regulations, as currently written, encourage use of on-site stormwater BMPs), and the coordination of separate BMPs employed to address specific site/pollutant source loading characteristics into a Best Management System or BMS.

Through a dialogue between the project applicant and the designated review authority prompted by the CWQIA procedure, such measures incorporated into the plan of development could prevent an increase in pollutant loads being transported off-site and discharged into any receiving waters. In addition, such measures should target urban nonpoint source nutrient loadings which have been identified in various EPA studies as lacking significant consideration; yet, which remain a serious threat to the ecosystem of Chesapeake Bay, and its tributaries, in particular.

Therefore, in order to ensure both beneficial and comprehensive water quality management, all proposals for new development, redevelopment, amd improvements to existing structures should require compliance with a WQIA procedure. Appendix B provides examples of thresholds that could be used when determining CWQIA applicability.

Besides consideration of the types of land disturbing activities which would initiate a CWQIA procedure, it is also necessary to make a determination as to where in the locality compliance with this procedure is applicable. The Bay Act understandably seeks to protect areas where such activities may cause either a direct or an indirect influence on the water quality of the Bay and its tributaries. Thus, the WQIA provisions set forth in model and local CBPA ordinances target delineated CBPAs; this is only required for RPAs, and can include RMAs only when it is deemed necessary.

However, the same types of provisions for water quality protection can also be applied to other natural areas of concern to the locality, which have been determined by the locality to be integrally related to both surface water and groundwater quality and quantity. For example, one locality chose to include all areas with elevations less than 4' above mean sea level, areas with slopes greater than 20%, and coastal and inland marshes, as well as areas designated as CBPAs in its WQIA procedure. Other localities have designated primary sand dunes, stream corridors and ponds within their CBPAs and subjected development in those areas to the CBPA WQIA requirement. Thus, all development, redevelopment and improvements to existing structures which meet pre-determined thresholds should be subject to a CWQIA procedure if proposed in these same or similar environmentally-sensitive areas. All such areas are to be designated at local discretion. To enhance comprehensive water quality planning, in addition to those just listed, areas with highly erodible or permeable soils, upland or forested wetlands, aquifer recharge areas, and delineated wellhead protection zones should also be considered for inclusion in the CWQIA.

Another factor to be considered in this element of the CWQIA procedure is whether one level of assessment should be used for all qualifying project proposals, or if such a procedure should set out two levels of assessment or a two-tiered approach. As a basis for comparison, the CBLAD MO states that "there shall be two levels of water quality impact assessment: a minor assessment and a major assessment." The guidance document accompanying the CBLAD MO goes on to further explain the justification behind this distinction:

> "The two levels of WQIA reflect the nature of the proposed development, the degree of land disturbance, and the sensitivity of areas to be impacted. A minor WQIA is required for development proposals which would only disturb the **landward 50 feet** of the buffer area, as provided for (in the buffer area requirements). The [designated authority will review the minor WQIA in determining whether or not the proposed buffer area modification or reduction is appropriate and the minimum necessary. In most cases, the minor WQIA will be satisfied by the submittal of a site plan. A major WQIA is required for development projects which due to their size or their location have the potential for significant impacts on water quality. The primary purpose of the major WQIA is to identify and evaluate the potential impacts that a development may have on water quality and the most sensitive lands in RPAs and to evaluate measures to mitigate these potential impacts."

These considerations are important and recommended for the CWQIA procedure as well. However, the level of scrutiny desired by the locality and reflected in the information requested, depending on the technical understanding of the designated authority or review body, is just as important. Some of the smaller localities in the region with less technical staff assistance have opted to use a simpler level of assessment; others with larger communities and a greater means of obtaining technical review have selected a more complex approach. At a minimum, however, the CBPA WQIA requirements must be met for projects occurring in CBPAs. Local planning staff are encouraged to seek the assistance of PDCs, the CBLAD, and other appropriate state environmental agencies when reviewing information submitted in the CWQIA.

Whichever approach is selected, it is essential that the information required to be submitted in the assessment be comprehensive enough to provide designated authorities with a clear picture and strong evidence for making a decision on permit issuance. On the other hand, it is equally important that the kind of information to be submitted for a more detailed or major assessment not exceed the level of technical understanding on the part of the designated review authority; nor, should the resultant costs involved for this additional level of assessment be so financially unreasonable for the applicant as to render the preliminary aspects of the project infeasible.

If two levels of assessment are the preferred approach, exactly which proposals should be subject to which level of assessment-- minor or major-- is something that is largely left to local discretion. However, the responses provided by the applicant on the IERQ could serve as a basis for determining the level of scrutiny desired by a locality. In addition, the comprehensive plan and special area management plans should be consulted for projects which are proposed in areas of particular concern; conformity with such plans could be a determining factor in the level of desired scrutiny. Other examples of thresholds which could serve as a guide in making this determination can be found in Appendix B, based on a study conducted by the Pamlico-Tar River Foundation in North Carolina. Some of the land use activities cited in Appendix B include privately-owned wastewater systems (package plants), septic tanks (on-site wastewater disposal), urban, industrial, and commercial development, residential and recreational development, and marinas. In general, it is important to remember the following when making such a determination:

> "Virtually all human activity, and many natural phenomena, can adversely affect the qualities [of the resource for which protection is being sought]. It is not possible, or even practical to identify them all. However, there are certain types of activities which are prevalent [in the region now or which can be expected to come about in the future],

> which may have severe potential impacts, for which alternatives or mitigation measures exist, or about which there is special concern." (PTRF, 1991)

In addition to those general types of activities set forth in that framework for assessment, which might require compliance with a CWQIA procedure, Part IV., Sec. 4.2. of the Final Regulations (General Performance Criteria) states that, "it must be demonstrated to the satisfaction of the local governments that any use, development, or redevelopment of land in CBPAs meets [certain] performance criteria." In particular, Sec. 4.2(4) of the Final Regulations states that, "all development exceeding 2,500 sf. of land disturbance shall be accomplished through a plan of development review process consistent with Sec. 15.1-491(h) of the Code of Virginia. Sec. 4.2(6)of the Final Regulations states:

> "any land disturbing activity that exceeds an area of 2,500 sf. (including construction of all single-family houses, septic tanks and drainfields, but otherwise defined in Sec. 10.1-560 of the Code of Virginia) shall comply with the requirements of the local erosion and sediment contol ordinance."

Under normal circumstances, the State and local erosion and sediment control regulations apply only to areas of land disturbance which exceed 10,000 sf. The CWQIA can be used as a means for integrating some of these separate administrative review and permitting procedures related to water quality planning and protection.

Finally, in addition to the above considerations, it is important for the project applicant to provide the designated review authority with the proposed use of the site. Equally important, the applicant should provide available information on past uses of the site; current models and reviewed ordinances do not address this. This is also requested of the project applicant in the preliminary IERQ in the background information section provided therein.

This information would be helpful in determining if such uses will present a threat to water quality, or if past uses may have already created a previously unknown risk. Even if the project proposal does not otherwise warrant the need to complete a CWQIA, the actual or potential risk created by certain past and proposed land uses might automatically be used to initiate this assessment procedure. Examples of land uses which could be included in this category that have been suggested by local planning officials include solid waste landfills, hazardous waste disposal sites, underground fuel storage areas or aboveground fuel storage facilities, certain commercial and industrial processes, and so forth. Performance criteria or specific prohibitions regarding these particular land uses

should be determined by the locality and should be clearly set forth in the CWQIA procedure under the applicability section.

Specific provisions used in the CBPA ordinances by Hampton Roads localities and others within Tidewater Virginia, regarding WQIA applicability/general qualifying criteria, can be found under that same heading in Appendix E. Recommendations for incorporation of provisions that are considered to be optimal are listed in the Model CWQIA Procedure.

**Information to be Submitted for Review**

**A. General Information**

Once a local government has decided on which criteria to use in determining when a proposed project must comply with a CWQIA procedure, the next step is deciding upon what information regarding impacts to water quality that a project applicant should submit for review. Requests for such information by the locality should be based primarily on the intensity and nature of the proposed project. Information required for the CWQIA would be in addition to that normally required by the locality for the particular development proposal, according to the site plan review ordinance or POD procedure. However, reasonableness should be a guiding factor here.

A review of the CBPA models and local CBPA ordinances suggests that this section may be relatively simple or complex, depending not only on project intensity and proposed usage, but also on the level of local government scrutiny desired. To reiterate what has been previously stated, it is important for the applicant to submit accurate information about the project's potential impacts on water quality. The information provided to the designated review authority should be comprehensive enough to allow for an educated evaluation and reasonable decision regarding the project's environmental consistency. However, it is also important that steps be taken to ensure that the information requested does not pose an unreasonable time constraint or financial burden on the project applicant; and, that it is not too technical in nature so as to render the review authority incapable of understanding the data and calculations provided and, in turn, slow the evaluation process.

If a locality chooses to use only one level of assessment, two things should be incorporated into the assessment to ensure completeness: 1) a site drawing of the proposed project which shows existing environmental features such as CBPAs, beaches, water courses, lakes, ponds, wetlands, marshes, riparian areas, flood hazard areas, areas with steep slopes, and woodlands; and 2) a narrative description (including the CBPA Guidance Calculation Procedure and other locally-adopted relevant calculation procedures) and additional site plans, if necessary, which describe the potential or unavoidable impacts to the inventoried natural

features which may or will occur as a result of the construction, operation, and maintenance of the proposed land use; any proposed mitigation measures to minimize such impacts, and; any other pertinent information relative to water quality and vegetation loss. Included in this description, if possible, should also be identification of the natural processes and ecological relationships inherent to the site, and an assessment of the impact of the proposed use and development of land on these processes and relationships.

Other pertinent information might include topography, soil information (including depth to groundwater and infiltration rate, where appropriate), surface and groundwater hydrology, and, if necessary, drainage patterns from adjacent lands. As well, impacts of the proposed development on the water courses within and adjoining the site, including impacts to aquatic flora and fauna, should also be considered. Inclusion of such items into the CWQIA would be beneficial to know if such information is available and would ensure that comprehensive water resource protection is the goal, in addition to addressing concerns regarding nonpoint source impacts on Chesapeake Bay. Detailed examples showing the use of one level of assessment in the CBPA models and local ordinances can be found in Appendix E.

If using a two-tiered approach to CWQIA, elements which should be included in the preparation and submission of a minor CWQIA are generally not as detailed as those required for a major CWQIA. For example, a minor CWQIA might simply require a scaled site drawing with the information requested; whereas, a major CWQIA may require a narrative description of much more detailed information, with specific data and calculations included in an appendix. Guidance from the CBLAD states:

> "The primary purpose of the minor WQIA is to allow small projects (especially single-family residential) to proceed in a timely and cost-effective manner while providing the [designated authority] adequate information to determine whether encroachment of the RPA is appropriate. The comprehensiveness and detail of information required in the major WQIA is a reflection of the complexity of the hydrological system. The [designated authority], however, may determine that some of the information is not necessary or applicable to the proposed development and indicate this to the preparer."

Regardless of which approach is used-- one or two levels of assessment-- existing hydrogeologic and vegetative characteristics of the site, proposed

changes to these characteristics, and resultant impacts should be inventoried and described. In addition, a wastewater element should be included as part of the assessment when a septic and/or sewage treatment system is part of the site plan, due to the potential impacts which these land uses can have on both surface and groundwater quality. It should be noted, however, that any land disturbing activity which proposes to encroach into the seaward 50' portion of the 100' buffer area must comply with the CBPA major WQIA requirements at a minimum, regardless of the area of land disturbance.

B. Mitigation Plans

It is equally important that proposed mitigation measures addressing how such impacts can be minimized or prevented are described. Examples of what the designated review authority would like to see in terms of mitigation measures can be provided in a guidance document given to the applicant before submittal of a CWQIA. Examples of what has been included as guidance in the CBPA models and local CBPA ordinances for WQIA procedures can be found in Appendix E; recommendations for specific provisions to be included in this section can be found in the Model CWQIA Procedure. Even prior to final review and evaluation of the project, this information can provide an opportunity for both the project applicant and local government staff to conduct a preliminary review of the plan of development. As the CBLAD suggests, "the preparation and evaluation of the WQIA allows the [designated authority] to work with the applicant to reduce impacts through more effective mitigation." Therefore, discussion of potential impacts and mitigation measures, as well as suggestions for project modifications which could be incorporated into the project can occur at this stage, and allow for a more expedient final evaluation in the end.

The following goal was established for Virginia by Sec. 4.1 of the Final Regulations, as reflected in the following performance standards objective: "to prevent a net increase in nonpoint source pollution from new development, achieve a 10% reduction in nonpoint source pollution from redevelopment, and achieve a 40% reduction in nonpoint source pollution from agriculture." Mitigation measures in the form of BMPs are the general recommendation and guidance given by the CBLAD and reflected in the local CBPA ordinances to achieve these goals. However, reliance on BMPs can often be overemphasized as a potential or actual solution to impacts resulting from land development. BMPs should be designed to address the particular source of the problem.

For example, pollutant loadings in surface and groundwater from urban/suburban development and redevelopment typically result from soil erosion associated with land or vegetation disturbance, which causes sedimentation of adjacent or nearby streams; from nutrients carried with the sediment and other materials; from chemicals used in lawn care maintenance once construction has been completed, and; from conversion of natural ground cover to impervious

surfaces. These contaminants are generally washed into the storm sewer system and then into the Bay, its tributaries, or other surface waters. They can be minimized at the source by constructing stormwater BMPs on-site, nonstructural vegetative filter strips, off-site or regional BMPs, or through educated and appropriate use of chemical treatment on lawns.

Both structural and non-structural BMPs, which are encouraged by the CBPA, are used primarily to address overland flow and are to be incorporated into a project plan of development when necessary. Their purpose is to provide for the detention, retention, or infiltration of stormwater runoff and its associated contaminants from impervious surfaces before they reach receiving waters. It has been suggested by some Hampton Roads localities that the Final Regulations limit them and project applicants to using only on-site stormwater BMPs in the plan of development, when incorporation of runoff from one or more sites into a regional BMP network might be more appropriate. The argument is that if use of such regional BMP options were permitted, more of the site could be used for development purposes and more emphasis could then be placed on vegetative buffers in the landscaping plan to control remaining sheet flow. Therefore, based on the individual physical characteristics and needs of the localities, some see greater flexibility from the State as an accommodating solution.

It does well to address these particular nonpoint pollution sources that can occur in both urban and suburban environments; but, there are other nonpoint sources, such as nutrients, which have received less attention and, nonetheless, continue to be a major contributing factor in the degradation of the Chesapeake Bay and its tributaries, as well as other surface and groundwater. For example, pollutant loadings from agricultural uses in rural areas are typically a result of nutrients associated with animal wastes, pesticide, herbicide, and fertilizer application. These either run off the land into nearby surface streams, or are infiltrated into the ground where than can eventually find their way into the groundwater if not attenuated by the soil. In many cases, crops or pastures encroach into the RPA and can often be within a designated RMA. As such, nutrient runoff from these lands has significant potential to impact surface or groundwater or fringe wetland areas, and can be subsequently transported in altered states into Bay waters. While this report focuses on the conversion of land and does not suggest that agricultural lands be subject to the same CWQIA procedure, the potential effects of agricultural practices on water quality should nonetheless be recognized.

It should be understood, however, that the major nutrients of concern in the Bay ecosystem-- nitrogen and phosphorous-- naturally occur in the soil and serve as catalysts for much of the Chesapeake Bay's phytoplakton production. They also nourish the Bay's submerged aquatic vegetation (SAV) beds which, in turn, support higher life forms in the ecosystem. Therefore, these nutrients are good for the Bay; but, only up to a certain extent. In the last several decades, principally

through large increases in the discharge of human sewage, farm fertilizers and animal wastes, and through deforestation and land development, the watershed's contributions of these essential ingredients has been increased to the point where they have become major pollutants. (Horton & Eichbaum, 1991)

Likewise, these nonpoint source pollutants are intensifying and changing in character across the region as a result of continuing rapid urbanization; and, are thereby effecting other surface water and groundwater systems outside of the Chesapeake Bay watershed. Urban and suburban land uses contribute much higher nutrient loads, on a per acre basis, than other land uses. Moreover, development can involve the conversion of forest land and wetlands which, unaltered, can provide positive water quality benefits. In order to address this growing problem, localities should encourage private land owners to protect environmentally-beneficial land uses and cover types.

The 1987 Chesapeake Bay Agreement between the Bay States set a goal for achieving a 40% reduction in nutrient enrichment by the year 2000. Study findings of EPA's Nonpoint Source Evaluation Panel indicate that current nonpoint source programs will not be able to achieve this goal, and that moving beyond the traditional BMP approach toward utilizing a combination of conservation practices or management measures in a Best Management System (BMS) may be the better approach, instead. When applied, a BMS would achieve multiobjective nonpoint source pollution control through reduced transport of sediment, nutrients and chemicals into surface and groundwater and can be incorporated into agricultural, forestry, and urban and nonpoint source control measures.

This concept is based on the need to promote combinations of practices that most effectively protect or improve water quality. The Panel recognizes that:

> "In some instances, traditional soil erosion control BMPs cannot themselves reduce nutrient loadings, and may actually increase nutrient loadings. Nutrient management techniques, such as storage of animal waste and application of fertilizer according to a nutrient management plan, may also be insufficient if soil erosion is not controlled. Best Management Systems take into account the effect of soil erosion control, management of animal wastes, synthetic fertilizers and municipal sludges, application of chemicals, biological uptake of nutrients, establishment of vegetative buffers and other management measures. They can include structural and non-structural management practices." (EPA, Nonpoint Panel, 1990)

Therefore, in stressing the importance of submitting information regarding how potential impacts to water quality will be mitigated, as described and/or shown in the CWQIA and plan of development, local review authorities should selectively encourage the adoption of traditional BMPs that are proven to be effective both in reducing erosion and in controlling nutrient loadings. Where erosion control practices are likely to be ineffective in controlling nutrient loadings, adoption of nutrient management plans should be encouraged in the plan of development for the same acreage; adoption of such plans would promote the accomplishment or multiple environmental quality objectives. However, adoption of such plans should not be a prerequisite for determining project environmental consistency in the CWQIA evaluation procedure, unless deemed necessary at local discretion.

Figure 5 is a comparison of known BMP effects on the quantity and quality of surface and groundwater, which highlights sedimentation, nutrient, pesticide, and water controls. This guidance list could be given to the project applicant by the local review authority prior to submission of the plan of development and assessment information. In addition, the HRPDC has recently prepared a BMP Design Manual which can be used to determine the appropriate BMP(s) for a particular site.

As an addendum to the information which should be included in the assessment, the WQIA procedures set forth in the CBPA models and some local CBPA ordinances have also included provisions for a listing of all requisite permits from all applicable agencies necessary to develop the project. Such a requirement would ensure consistency with other local, state and federal programs with water quality jurisdiction. Use of the preliminary IERQ should also facilitate this requirement, as it contains questions regarding necessary permits to be obtained at the end of each section.

In addition to the recommendations just discussed and the examples in Appendix E , regarding information which should be submitted for review, the following recommendations for provisions to be included within a CWQIA were suggested by local WQIA Administrators during the development of this report:

- Impacts of the proposed project on adjacent or nearby public drinking water supply reservoirs, wellhead protection areas, or aquifer storage and recharge areas.

- Impacts of the proposed project on the "beneficial uses," defined in Title 62.1, Chapter 24, Code of Virginia, of receiving waters, on minimum instream flow requirements, and on drinking water supply reservoirs or tributaries of those.

FIGURE 5

COMPARISON OF BMP EFFECTS ON THE QUANTITY AND QUALITY OF GROUND AND SURFACE WATER

| | IMPACT OF BMPs ON: | | | |
|---|---|---|---|---|
| General BMPs | Ground Water | | Surface Water | |
| SEDIMENTATION CONTROLS | Recharge | Contamination | Recharge | Contamination |
| reduction of runoff velocity | increase | variable | decrease | decrease |
| surface stabilization | variable | variable | variable | decrease |
| filtration of sediments | increase | variable | decrease | decrease |
| settling impoundments | variable | variable | variable | decrease |
| infiltration impoundments | increase | increase | decrease | decrease |
| watercourse stabilization | variable | variable | variable | decrease |
| timing of activities | no effect | decrease | no effect | decrease |
| localized use restriction | variable | decrease | decrease | decrease |
| NUTRIENT CONTROLS | | | | |
| reducing excess in soil | no effect | decrease | no effect | decrease |
| application timing | no effect | decrease | no effect | decrease |
| surface applications | no effect | decrease | no effect | increase |
| shelter of manure sources | decrease | decrease | increase | decrease |
| containment of manure sources | decrease | decrease | decrease | decrease |
| PESTICIDE CONTROLS | | | | |
| biological pest control | no effect | decrease | no effect | decrease |
| mechanical pest control | increase | decrease | decrease | decrease |
| crop selection/rotation | no effect | decrease | no effect | decrease |
| on demand pesticide use | no effect | decrease | no effect | decrease |
| pesticide application timing | no effect | decrease | no effect | decrease |
| WATER CONTROLS | | | | |
| irrigation scheduling | decrease | decrease | decrease | decrease |
| selective irrigation | decrease | variable | decrease | decrease |
| irrigation uniformity | decrease | decrease | decrease | decrease |
| soil moisture control | decrease | decrease | decrease | decrease |

Source: EPA Proposed Guidance Specifying Management Measures for Source of Nonpoint Pollution in Costal Waters- May 1991, pp. B-18, B-19

- Where appropriate and feasible, a site plan demonstrating management of off-site stormwater pollutants loadings with multi-site or regional BMPs.

- Impacts of proposed mitigative BMPs on existing wetlands.

- The relationship of vegetative BMPs to the landscape plan.

In conclusion, a number of other outlines for environmental assessment procedures have been developed besides the WQIA procedures found within the CBPA models and local CBPA ordinances. These include both state and federal environmental assessment procedures. One such approach, which may be helpful in determining the information to be submitted in a CWQIA, is the content format used for a federal Environmental Impact Statement (EIS). It is not suggested that the federal format for a complete EIS be followed. However, certain elements of that format could be used as a general guide and can be tailored to specifically address water quality impacts.

An analysis of environmental impact statements of U.S. Army Corps of Engineers water projects (Ortolano and Hill, 1978) provides some useful information on the overal quality and usefulness of the statements in evaluating environmental impacts. In the survey, statements prepared by the Corps were examined in detail and, in general, the majority of the statements were found to be decidedly less than adequate. They did not appear to be written with the view of providing non-technically oriented readers with the kind of insight and information necessary for effective participation and decision-making in the evaluation process.

The following recommendations were suggested for improvements in information submitted for an impact assessment; some reiterate points previously discussed. These recommendations can be useful to localities as guidance which can be given to the project applicant who is required to conduct a CWQIA:

- Reduce the level of generality
- Identify all significant impacts
- Suggest alternatives to the proposed project
- Objective evaluation of environmental impacts
- Qualifications of individuals preparing reports
- Lengthiness
- Integration with local comprehensive planning and land control practices

Appendix A provides one recognized method for prediction and assessment of impacts on the water environment (Canter, 1977) and examples of recommended data needs and resources, that will be helpful in providing the

information required to be submitted in the CWQIA. This appendix is prefaced by a general primer on water pollution.

**Submission and Review Requirements**

Administrative submission and review procedures will necessarily vary, depending on individual local government structure and procedures. The following items should be determined by each locality and addressed in this section: (i) number of copies to be submitted for review; (ii) the professionals and/or other qualified persons who must certify the CWQIA in order to ensure its accuracy and completeness; (iii) in conjunction with what other procedures as required by the CBPA ordinance or other local ordinances should the CWQIA be prepared and submitted, and; (iv) the designated review authority to whom such assessment shall be submitted.

Section 5.6E of the Final Regulations does not specifically set out the professional qualifications which a person must have to certify the information submitted in the WQIA. The CBLAD MO, however, requires that "all information required [for the WQIA] shall be certified as complete and accurate by a professional engineer or a certified land surveyor. Local CBPA ordinances reflect this requirement, as well, but broaden the range of qualified persons who could prepare the WQIA and/or sign a certification ensuring its completeness and accuracy on behalf of a developer or applicant. Examples of such persons are: Professional Engineer, Certified Land Surveyor, Wetlands Scientist, Licensed Engineer, Licensed Land Surveyor, Licensed Landscape Architect, and other qualified persons acting within the limits of their professional expertise and license. It is recommended that the CWIQA require similar professional certification in order to ensure completeness and accuracy.

Professional state certification, licensing, and registration from Virginia should be a prerequisite for CWQIA certification and/or preparation; these individuals are generally knowledgeable about environmental regulation and practices in the Commonwealth. If consultants or other professionals from outside of Virginia are used, home-state certification, licensing, and registration should be required. One locality, whose CBPA Program was found to be "consistent" with the Final Regulations, eliminated the professional certification requirement in the case of construction of single-family homes. In that procedure, professional preparation or certification will not be required unless deemed necessary by the designated review authority, due to the magnitude of land disturbance or particularly sensitive location. In addition, if state certification for wetlands delineators is approved in Virginia, it is recommended that all wetlands information should be prepared and/or verified by a certified wetlands delineator.

The Final Regulations do not specify in conjunction with what other administrative procedures, as set forth in the CBPA ordinance, the WQIA must be

prepared and submitted to the designated authority for review. However, if two levels of assessment, or a two-tiered approach, is used, the CBLAD MO states that:

> "A minor WQIA shall be prepared and submitted to and reviewed by the (Administrative Authority) in conjunction with the Plan of Development process [as set forth in the CBPA ordinance]. A major WQIA shall be prepared and submitted to and reviewed by the (Administrative Authority) in conjunction with a request for rezoning, special use permit, or in conjunction with the Plan of Development process [as set forth in the CBPA ordinance], as deemed necessary by the (Administrative Authority)."

Almost all of the local CBPA ordinances which use two levels of assessment in the WQIA Procedure follow this same language. It is recommended that any request by the project applicant for encroachment into locally-designated environmentally-sensitive areas, requiring the submittal of a CWQIA, be accompanied by the same administrative requirements as set forth above.

Designation of a review authority, who will be responsible for evaluating the information provided in the CWQIA, will also be left to local discretion To a great extent, this will depend on the administrative structure and procedures of the locality. However, examples of such designated review authorities listed in local CBPA ordinances include: Department of Planning and Community Development, Department of Environmental Affairs, Department of Public Works, the city/county/town Engineer, the city/county/town Zoning Administrator, the city/county/town Manager, and the Planning Commission.

Finally, under Sec. 5.6,E.1. of the Final Regulations, "upon request, the CBLA Board will provide review and comment on any water quality impact assessment within 90 days, in accordance with advisory state review requirements of Sec. 10.1-2112 of the [Bay Act]." In its model, the CBLAD has taken responsibility for accommodating such requests for review rather than having the CBLA Board carry out this exercise. The local CBPA ordinances have followed suit in their language; however, the time limit for incorporation of solicited CBLAD comments for a major WQIA varies from thirty (30) to ninety (90) days. The model CWQIA sets forth similar language but also suggests that local review assistance be sought from PDC's and other relevant state environmental agencies.

Examples of submission and review requirements for the WQIA procedure, as set forth in the CBPA models and local CBPA ordinances, can be found in

Appendix E. An outline of those options that are considered to be optimal for submission and review requirements is provided in the Model CWQIA Procedure. This outline should be used as a guide, however, with actual requirements to be determined by the individual localities.

**Evaluation Procedure**

The last step in the CWQIA process is the final evaluation of all information submitted to the designated review authority. The information should be weighed against specified criteria, and should reflect the level of assessment used. Regardless of the level of assessment being used, it is essential that the evaluation criteria be comprehensive enough to ensure that the proposed project is consistent with the following: (i) the purpose and intent of the CWQIA; (ii) the Final Regulations; (iii) the local CBPA ordinance, and; (iv) other previously discussed environmental regulations and local ordinances.

There are actually two types of evaluations which are involved in the CWQIA procedure. The first is the judgements made, on the part of the project applicant and his certifying professional, when estimating or describing the potential impacts which the proposed project may or may not have on water quality. This particular type of information should be included in what is submitted to the designated authority for review in the final evaluation of the project. The second evaluation is on the part of the review authority, who is called upon to make a professional determination regarding the actual impacts which the project will have on water quality, after the required information is submitted by the project applicant. Here, specific evaluation criteria is used which should reflect exactly what the locality will look for in order to make a determination regarding the project's environmental "consistency" or "inconsistency."

There are several factors that should be considered when defining this final evaluation criteria. As a starting point, the designated review authority should be concerned with impacts to existing hydrology, vegetation, and the affects of wastewater treatment on existing water quality conditions.

At the simplest level, one can intuitively determine prior to land disturbance what the extent of potential impact will be by knowing what the existing physical characteristics of the site are, as well as the characteristics of adjacent watercourses or other natural areas. To take a more academic and scientific approach, however, published state or federal standards related to water quality and quantity, and applicable regulations addressing the specific proposed use of the site should be referred to. On the other hand, if the proposed use of the site does not conform to what the locality has stated is a permitted or preferred use for that site, according to the local comprehensive plan, zoning ordinance, or special management area plan, then the CWQIA procedure can be dispensed with altogether; the proposed use is not allowed.

To be more specific, where water quality is concerned, future pollutant loadings and future water quality conditions which are anticipated to result from the proposed land disturbing activity can be gauged by comparing them to current water quality standards for that stream segment or water body. These standards are established by the State Water Control Board (SWCB) and can be found in Appendix C. In addition, the Final Regulations land use and development performance criteria can be used as a measure against which to weigh the proposed project, if it is to occur in a designated CBPA. When assessing impacts to water quantity, comparing existing flow conditions and stream characteristics to how those will be changed as a result of the proposed project is another factor to be considered. As well, determining whether or not the project has complied with existing stormwater management ordinances and related performance standards is necessary for making a determination of the project's environmental consistency or inconsistency.

Determining to what extent the existing vegetation on or adjacent to the site should be allowed to be disturbed is left to the discretion of the locality. There is a point at which the line must be drawn, but that is primarily a subjective judgment. With the aid of a landscape architect, arborist, or wetlands scientist, the review authority should be able to have a clear idea of what an acceptable threshold number of disturbed trees, or what the permitted extent of other vegetation disturbance will be. Where potential impacts to wetlands or submerged aquatic vegetation are of particular concern, assistance from the Virginia Marine Resources Commission or the Virginia Institute for Marine Science, as well as members of the local Wetlands Board can be extremely helpful.

Where wastewater treatment is applicable, both point source discharges and nonpoint source discharges need to be considered. As previously stated, for point source discharges, the SWCB has established water quality standards for the contaminants most often associated with municipal wastewater treatment. From a policy standpoint, a locality may have determined that is does not want a particular stream segment used for specific purposes and, therefore, can eliminate project proposals based on that policy. For nonpoint source discharges, the adequacy of the proposed on-site wastewater treatment or septic system can be weighed against the Virginia Department of Health Regulations for the construction, operation, and maintenance standards of such systems; the SWCB Regulations can also be referred to in this matter. In addition, the Final Regulations require a 100% reserve capacity drainfield to be incorporated into the plan of development for projects proposed within CBPAS.

One tool which the locality has to help it develop evaluation criteria is the comprehensive plan, which guides the locality in future land use planning decisions over the long-term. By comparing the proposed use of the site to what has been established as the preferred use of that site or area, project consistency in terms of what the locality would like to see in the future can be built into the evaluation

procedure. Most comprehensive plans have an environmental element which can serve as a standard or guide when reviewing projects, and the Final Regulations require that the comprehensive plan contain an element that addresses future land use in designated CBPAs.

It is generally the case in the CBPA models and local CBPA ordinances that, when two levels of WQIA were used, major WQIA submittals required a more stringent evaluation than minor WQIA submittals. For the CWQIA Procedure included in the evaluation procedure element should be a determination of whether the potential impacts of the proposed project have been adequately mitigated in all cases.

The CBLAD guidance states that:

> "The evaluation procedure sets forth the criteria the [designated authority] will use in evaluating the water quality impacts of the proposed development. This evaluation will allow the [designated authority] to determine the consistency of the proposed development project with the provisions of the CBPA Overlay District. Inconsistent proposals can be modified so that the impacts are minimized or the mitigation measures are enhances. Those projects whose impacts cannot be mitigated can be identified."

Thus, it would be appropriate for the designated review authority to require additional mitigation as a condition for approval of the project's environmental consistency, where it has been determined that the potential impacts have not been adequately addressed. The plan of development should be reconfigured by the project applicant and resubmitted for review. If the plan of development is resubmitted and the proposed mitigation measures remain insufficient to prevent a significant degradation to water quality of the Chesapeake Bay and/or its tributaries, it is recommended that a finding of inconsistency with the purpose and intent of the local CBPA ordinance be made. Likewise, if the plan of development is resubmitted and the proposed mitigation measures remain insufficient to prevent a significant degradation to water quality in CBPAs and other natural areas of local concern, it is recommended that a finding of environmental inconsistency with the purpose and intent of the CWQIA be made.

Another criterion which has been used in the WQIA evaluation procedure in CBPA ordinances, is an assessment of the impact of the proposed use and

development of land on the natural processes and ecological relationships inherent in the site. Inclusion of this criterion would take into consideration other natural areas and functions of concern, in addition to trying to preserve the Chesapeake Bay ecosystem. Several localities have suggested that this level of scrutiny would be very difficult to achieve, as there are many factors that are not yet understood about such interrelationships. However, provisions for the submittal of such information has been set forth in the Model CWQIA Procedure. Insofar as available information can be obtained and submitted in the CWQIA, this additional information could prove useful to the designated review authority during the final evaluation process.

The WQIA procedures within the CBLAD MO and some local CBPA ordinances have also inserted a criterion stating that the cumulative impact of the proposed project, will not result in a significant degradation of water quality, when considered in relation to other existing and proposed project development in the vicinity. This is an important consideration for the CWQIA, as well, although the individual environmental impacts of a project may be limited in a "local" sense, the effects of that project on the "region" may be considerable when viewed in combination with the effects of other past, present or proposed projects.

Examples of evaluation procedure provisions used in the WQIA procedures within the CBPA models and local CBPA ordinances can be found in Appendix E.

**Conclusion**

To paraphrase guidance given by one locality in Hampton Roads, the effect of the WQIA/CWQIA procedure and its respective provisions is not necessarily to preclude development or use of CBPAs and other sensitive lands which are integrally related to beneficial water quality. Rather, this process seeks to ensure that the types of development permitted by the underlying zoning district will be undertaken with a deliberate and professionally responsive recognition of the particular environmental qualities and conditions of a proposed development site.

Preserving natural features on site by incorporating them into a plan of development, and building according to specified performance criteria, should not automatically be viewed as a loss of potential economic gain. From one perspective, biological functions can be used in a manner that minimizes construction costs and post-development controls, such as stormwater management, flood control, land erosion, and wind and wave action. From another point of view, having such natural area features as part of a site can add aesthetic value, and loss of buildable area can be recaptured in increased density and value on the remaining buildable area. Compatible development and redevelopment, that recognizes the integral relationship between land use and water quality, draws Hampton Roads localities and Tidewater Virginia one step closer to providing for that unique resource - Chesapeake Bay - which provides a

crucial foundation for the livelihood of both man and nature, alike.

## MODEL COMPREHENSIVE WATER QUALITY IMPACT ASSESSMENT

## PROCEDURE

### PREFACE

The model presented herein should serve as a basis for further development of the water quality impact assessment procedures employed in each community that is subject to the Chesapeake Bay Preservation Act (CBPA). All locally adopted CPBA ordinances currently provide for such a procedure. Whereas the assessment procedures set forth in these ordinances respond specifically to the State mandate for maintenance or restoration of the Bay and its tributaries, comprehensive water quality protection throughout the region-- in addition to Chesapeake Bay-- is the focus of the this model.

As a basis for developing the model, many examples from WQIA procedures in current CBPA models and local CBPA ordinances have been selected. This approach was taken in order to remain consistent with the administrative aspects of plan of development review within Chesapeake Bay Preservation Areas (CBPAs), which are presently being used throughout the communities that comprise Hampton Roads; as well as, to provide a better insight into different approaches to the same situation which affects all of Tidewater Virginia. The scope of this model has been broadened beyond locally-designated Chesapeake Bay Preservation Areas, however, in order to provide for comprehensive water quality protection. To do this, screening of the cumulative impacts of development and redevelopment affecting all waters and other natural areas of concern, which are integrally related to water quality or that provide beneficial water quality functions in and of themselves, has been introduced into the assessment process.

By providing the project applicant with an initial environmental review questionnaire, such as the Model IERQ found in Part I of this document, local governments have a tool to alert themselves and the applicant to the full range of any potential environmental risks inherent with the proposed plan of development. Further evaluation of any water quality impacts, in particular, through a comprehensive water quality impact assessment procedure can then be justified, should preliminary screening of the proposed project warrant such an exercise.

Information submitted in the assessment should be reviewed by such local designated authorities as discussed in the Submission and Review Requirements section of the preceding guidance text. By using the evaluation criteria set forth in this model, an evaluation of the proposed project should then be made regarding its consistency with the purpose and intent of the CWQIA, the CBPA Regulations, and the local CBPA ordinance.

This assessment procedure should facilitate creation of a forum which fosters discussion between the project applicant and the locality, prior to the commencement of any applicable land disturbing activity. Targeted in this discussion should be innovative mitigation measures that are designed specifically for the project in question. These are aimed at reducing or eliminating anticipated adverse impacts to local water resources and the cumulative effects the same may have on water quality in Chesapeake Bay, its tributaries, and other natural areas of concern. Incorporation of such measures into the final plan of development should be the anticipated result. Ultimately, the CWQIA porcedure could be a means of integrating into one process other existing local, state, and federal mandates, regulatory tools, and permitting procedures which have been implemented to address water quality.

## I. PURPOSE AND INTENT

Whereas, considerable state and local economies are dependent to a large extent upon the environmental health and quality of the Chesapeake Bay and its tributaries in the Hampton Roads region; and

Whereas, land use and the quality and quantity of both surface and groundwater resources are integrally related; and

Whereas, certain land uses and land alterations may pose a considerable risk to the maintenance of existing high quality waters or to the integrity of natural ecosystems, or may cause or contribute to an increase in poor water quality levels if planned improperly; and

Whereas, any proposed development, redevelopment, or improvement plans to existing structures within the designated areas of **Jurisdiction Name**, as set forth below, may have the potential to cause degradation to existing water quality in **Jurisdiction Name**, the Chesapeake Bay, or its tributaries which fall within the political boundaries of **Jurisdiction Name**, or may have a related impact on other natural ecosystems which are influenced by water quality within said jurisdiction;

It is the intent of this Comprehensive Water Quality Impact Assessment (CWQIA) Procedure to minimize potential nonpoint source pollution from stormwater runoff, minimize potential erosion and sedimentation of local or regional waterways, reduce the introduction of nutrients and toxics into state waters, and to promote water resource conservation while balancing important economic interests, in order to provide for the health, safety, and welfare of the present and future citizens of Hampton Roads.

Upon a finding by the **Designated Authority** that such an exercise is warranted, based on a completed review of the Initial Environmental Review Questionnaire by such authority, it is the responsibility of the project applicant and the purpose of this procedure:

A. To delineate the components of the Resource Protection Area (RPA) and the Resource Management Area (RMA) on- site, as well as the water courses found on or adjacent to the site.

B. To inventory all other environmentally-sensitive areas or natural features of concern, on or adjacent to the site, which provide beneficial water quality functions.

C. To delineate the extent of proposed development, redevelopment, and improvements to existing structures on a site plan, and where they will encroach into CBPAs and/or other natural features on-site.

D. To provide for site visits by designated authorities, so as to help property owners identify lands which are unsuitable for development because of water-related constraints. Such constraints can include high groundwater, erosion potential, shrink-swell soils, or vulnerability to flood damage.

E. To identify and describe the anticipated impacts of proposed development, redevelopment, and improvements to existing structures on water quality and lands within CBPAs and other natural areas of concern.

F. Where development will occur within CBPAs and other environmentally-sensitive lands, to ensure that it is located and constructed in a manner that will minimize disruption to the natural functions of these areas.

G. To specify mitigation measures which will address anticipated water quality impacts and impacts to natural areas of concern, and which will ensure protection of existing high quality state waters, where applicable, to the maximum extent feasible.

H. To ensure that past and proposed uses of the site do not/will not pose a substantial risk to water quality, to the natural resources present or adjacent to the site, or to future human use of the site.

I. To ensure compliance with the purpose and intent of the CBPA, the CBPA Regulations, the local CBPA ordinance, and other local, state, and federal mandates, regulations, and permitting procedures related to water quality protection.

## II. APPLICABILITY/GENERAL QUALIFYING CRITERIA.

A. General Criteria

Compliance with the CWQIA procedure, as outlined below, applies to any proposed project which meets the following criteria:

1. Any development, redevelopment, or improvements to existing structures which:

   a. will substantially alter the natural water quality functions performed by locally-designated environmentally-sensitive areas on or adjacent to the site. Such areas can include: areas below a designated elevation above mean sea level, other highly erodible or permeable soils, nontidal or upland wetlands, coastal and inland marshes, areas with slopes in excess of 20%, aquifer recharge areas, designated wellhead protection zones, and areas with non-seasonal high groundwater;

   b. encroaches into any component of a RPA,regardless of the area of land disturbance; or

   c. occurs in a RMA and is deemed necessary by the **Designated Authority** because of the unique characteristics of the site or intensity of the proposed development; this may be waived when written findings have been submitted to the **Designated Authority**, demonstrating that the unique characteristics of the site (e.g. soils, topography, groundcover, location of wetlands and tidal shores) will prevent the proposed development from causing a degradation to water quality.

**(If using two levels of assessment, the following provisions should be inserted after "General Criteria.")**

B. There shall be two levels of comprehensive water quality impact assessment: a major assessment and a minor assessment.

1. Minor Comprehensive Water Quality Impact Assessment.

A minor comprehensive water quality impact assessment will be required for any development, redevelopment or improvements to existing structures which:

a. may have a minor impact on the natural water quality functions of locally-designated, environmentally-sensitive areas on or adjacent to the site. (See A.2 above for lands which should be included for consideration in this assessment.);

b. encroaches into the landward 50' of the buffer area in a RPA and causes less than 5,000 sf. of land disturbance; or

c. occurs within a RMA and causes less than 5,000 sf. of land disturbance, and is deemed necessary by the **Designated Authority** due to the unique characteristics of the site or proposed project intensity.

(Alternative thresholds for land disturbing activity occurring within a CBPA, and requiring a minor WQIA/CWQIA, could be 2,500 sf. or 10,000 sf.)

2. Major Comprehensive Water Quality Impact Assessment.

A major comprehensive water quality impact assessment shall be required for any development, redevelopment, or improvements to existing structures which:

a. May have a major impact on the natural water quality functions of locally-designated, environmentally-sensitive areas, on or adjacent to the site. (See A.2. above for lands which should be included for consideration in this assessment.);

b. requires any modification or reduction of the landward 50' of the 100' buffer area in a RPA and which exceeds 5,000 sf. of land disturbance, or disturbs any portion of the seaward 50' of the 100' buffer area or any other component of a RPA, regardless of the area of land disturbance; or

c. occurs within a RMA and causes more than 5,000 sf. of land disturbance, and is deemed necessary by the **Designated Authority** due to the unique characteristic of the site or proposed project intensity.

(Alternative thresholds for land disturbing activity occurring in a CBPA, and requiring a major WQIA/CWQIA, could be 2,500 sf. and 10,000 sf.)

## III. INFORMATION TO BE SUBMITTED FOR REVIEW

A. The comprehensive water quality impact assessment shall identity the impacts of the proposed development, redevelopment, or improvements to existing structures on water quality in CBPAs and other locally-designated, environmentally-sensitive areas. The assessment shall also address all point and nonpoint sources of pollution associated with the project and recommend measures for mitigation of these impacts.

B. The following required information to be submitted by the project applicant for review by the **Designated Authority** shall be considered a minimum:

**(This list is a comprehensive guide. It may be used in its entirety if using only one level of assessment, but the degree of scrutiny desired is left to local government discretion. Should two levels of assessment be used, then it is recommended that the provisions set forth in Subsection B.1. and B.2. be required for a minor CWQIA; the provisions set forth in Subsection B.3. and B.4. should be required for a major CWQIA, in addition to those provisions required for a minor CWQIA.)**

1. A scaled site plan which shows the following:

   a. Clear delineation of the CBPAs, including the 100' RPA buffer where applicable, and the type and location of the existing characteristics and conditions of the CBPAs.

   b. Area of proposed land disturbance on site.

   c. Location of any proposed encroachment into the RPA, buffer area, RMA, or other designated area as applicable.

   d. Location of all significant vegetative material on site prior to proposed land disturbance, including all trees six (6)

inches in diameter or greater at breast height and the delineation of tree drip lines.

e. All vegetation which will be disturbed or removed and the limits of land disturbance.

f. Inventory and location of all other natural features/resources on site, including beaches, water courses, lakes, ponds, wetlands, marshes, flood hazard areas, areas with steep slopes (greater than 20%) and woodlands.

g. Location of anticipated drainfield or wastewater irrigation areas, if applicable.

h. Location of proposed mitigative BMPs. This should include facilities or BMPs for stormwater management, either on-site or to be included as part of a regional system, which would comply with established performance standards for stormwater management.

2. Demonstration through acceptable calculations that the remaining buffer area and necessary mitigative BMPs will result in meeting the "no net increase" in post-development pollutant loadings goal for new development or improvements to existing structures, or the 10% reduction in pre-development pollutant loadings conditions for redevelopment goal, as set forth in the CBPA Regulations.

3. A narrative description of the following: (inclusion of this information is to be considered a minimum, unless the **Designated Authority** determines that some of the information is unnecessary due to the scope and nature of the proposed use and development of land.)

a. Nature of the proposed encroachment into the 100' RPA buffer where applicable, including roadways, paving materials, utilities, and wetland mitigation sites.

b. Existing topography, soils, hydrology, and geology of the site and adjacent lands.

c. Impacts of the proposed project on the topography, soils, hydrology, and geology of the site, including but not limited to source, location, and placement of fill material,

disturbance or destruction of wetlands, and disruption and reduction of water flow and circulation patterns.

d. Impacts of the proposed development on water courses within the adjoining site, including impacts to aquatic flora and fauna (e.g. shellfish beds, submerged aquatic vegetation, and fish spawning areas).

e. Percent of proposed land disturbance on the site, or percentage of land to be cleared for construction.

f. Pre- and post-development nonpoint source pollution loads in runoff and supporting documentation of all utilized coefficients and calculations. For projects in CBPAs, the CBLAD Guidance Calculation Procedure, or other locally-developed calculation procedures, should be utilized.

g. Percentage increase in impervious surface on site and the types of surfacing materials to be used.

h. Channel, direction, flow rate, volume, and quality of stormwater that will be conveyed from the site, with a comparison to the pre- development conditions.

i. Significant vegetative material on site, including plant species; measures for the preservation of vegetation.

j. Calculations of anticipated drainfield or wastewater irrigation areas, justification for sewer lines and a description of construction techniques and standards, if applicable.

k. Any proposed on-site or off-site collection and treatment systems for sewage and stormwater, including the impacts on receiving water courses.

l. Verification of structural soundness of stormwater management facilities, including professional certification.

m. Plan to establish a long term schedule for inspection and maintenance of stormwater management facilities that include all maintenance requirements, and persons responsible for performing maintenance.

n. Proposed mitigation measures for the potential hydrogeological impacts. Potential mitigation measures include:

(i) Proposed erosion and sediment control measures; concepts may include minimizing the extent of the cleared area, perimeter controls, reduction of runoff velocities, measures to stabilize disturbed areas, schedule and personnel for site inspection.

(ii) Proposed stormwater management system.

(iii) Creation of wetlands to replace those lost;

(iv) Minimizing cut and fill.

o. Proposed measures for mitigation of vegetative impacts. Possible mitigation measures include:

(i) Replanting schedule for trees and other significant vegetation removed for construction, including a list of possible plants and trees to be used;

(ii) Demonstration that the design of the plan will preserve to the greatest extent possible any significant trees and vegetation on the site and will provide maximum erosion control and overland flow benefits from such vegetation;

(iii) Demonstration that indigenous plants are to be used to the greatest extent possible.

p. Mitigative measures for impacts of proposed wastewater treatment systems.

3. Anticipated duration and phasing schedule of construction of proposed project.

4. Listing and status of all requisite permits from all applicable local, state, and federal agencies, including wetlands permits.

5. Assessment of the impact of the proposed development on the natural processes and ecological relationships inherent in the site shall be made and considered.

6. Available information about past uses of the site and detailed information regarding the proposed use of the site.

7. Any other information which the project applicant or the **Designated Authority** believes is reasonably necessary for an evaluation of the proposed project.

## IV. SUBMISSION AND REVIEW REQUIREMENTS.

A. **(X number of)** copies of all site drawings and other applicable information as required must be submitted to the **Designated Authority** for review, prior to the beginning of any land disturbance.

B. Such plan must be of sufficient scale and detail to depict the location and area of all natural features and natural resources present on the site.

C. Such plan must also depict the development, if any, and the methods and procedures proposed to ensure the protection of such natural features/resources including water quality during and after construction. This plan may simply note that such areas are not to be disturbed during or after site development.

D. The **Designated Authority** may waive some of the CWQIA requirements if they are unnecessary due to the scope and nature of the proposal.

E. The CWQIA should be certified as complete and accurate by (designated professional) or by such other professional as may be specifically certified, licensed, or registered by the State of Virginia or other state to provide such certification, prior to submission to the designated review authority. Evidence of professional qualifications should be also be submitted.

(Optional-- If state certification for wetlands delineators is approved in Virginia, all wetlands information should be prepared and/or verified by a certified wetlands delineator.)

F. Any CWQIA must be submitted to and reviewed by the **Designated Authority** in conjunction with the Plan of Development process, or concurrent with the submission of application for review and approval of site or subdivision plans, variances or application for land disturbing, erosion and sediment control, or building permits.

G. As part of any CWQIA submittal, the **Designated Authority** may require outside review of the CWQIA. The **Designated Authority** will determine if such review is warranted. The Chesapeake Bay Local Assistance Department (CBLAD), the Hampton Roads Planning District Commission (HRPDC), and/or any other state or federal agency which has a related interest and/or jurisdiction in the proposed project, may be asked to review the assessment and respond with written comments. Such agencies can provide comments to the designated review authority which will be incorporated into the final review and project evaluation, at the discretion of the latter. The deadline for submittal of such comments by relevant agencies to the designated review authority will be ___ days following such request.

(Options for deadline of submittal of comments to be incorporated into the final evaluation could be 30, 60, or 90 days.)

## V. EVALUATION PROCEDURE.

A. General

1. Upon submission by the project applicant of all information required for a CWQIA and any other relevant information as may be provided by the project applicant to the **Designated Authority**, such authority will weigh the information submitted against evaluation criteria specified in Subsection B. below in order to determine if the proposed project is consistent with the purpose and intent of this CWQIA procedure, the CBPA, the Final Regulations, and the local CBPA ordinance.

2. The **Designated Authority** may seek the assistance of the CBLAD, HRPDC, and/or other appropriate state or federal agency for review and comment upon any water quality impact assessment.

3. The **Designated Authority** will include in the determination whether the potential impacts of the proposed development or redevelopment have been adequately mitigated.

4. Upon determining that the impacts have not been adequately mitigated, the **Designated Authority** shall require additional mitigation as a condition for finding project consistency. The project applicant shall resubmit all information regarding improved mitigation measures.

5. When the proposed or resubmitted mitigation measures are

determined to be inadequate to minimize or eliminate the anticipated impacts to water quality, the **Designated Authority** shall disapprove the proposal as inconsistent with this assessment procedure.

6. In making a determination, the **Designated Authority** shall consider the cumulative impacts of the proposed development, redevelopment, or improvements to existing structures on water quality in relation to other development and redevelopment in the locality.

7. The **Designated Authority** shall also consider the impacts of the proposed project on the natural processes and ecological relationships inherent in the site and adjacent lands.

B. Evaluation Criteria.

**(If only one level of assessment is used, then Subsections B.1 and B.2. shall be used to evaluate the proposed project.)**

1. In the case of development where a minor CWQIA is required, the reduced buffer area, in combination with the proposed BMPs, will achieve water quality protection, pollutant removal, and water resource conservation which is at least the equivalent to the full 100' buffer area.

   The following criteria will be used:

   a. The necessity of the proposed encroachment and the ability to place improvements elsewhere on the site to avoid disturbance of the buffer area.

   b. Impervious surface is minimized.

   c. The cumulative impact of the proposed development, when considered in relation to other development in the vicinity, will not result in a significant degradation of water quality, or substantial alteration of any other natural features/resources on or adjacent to the project site.

2. In the case of developments where a major WQIA is required, the following are established in addition to the criteria set out for a minor WQIA:

a. Within any RPA, the proposed development is water-dependent.

b. The disturbance of wetlands will be minimized.

c. The development will not result in significant disruption to the hydrology of the site.

d. The development will not result in severe degradation to the aquatic vegetation or wildlife.

e. The development will not result in unnecessary destruction of plant material on site.

f. Proposed erosion and sediment control measures are adequate to achieve the reduction in runoff and prevent off-site sedimentation.

g. Proposed stormwater management measures are adequate to control the stormwater runoff to achieve "no net increase" in pre-development pollutant loadings for new development and improvements to existing structures, and will achieve a 10% reduction in previous pollutant loadings for redevelopment.

h. Proposed re-vegetation of disturbed areas will provide optimum erosion and sediment control benefits.

i. The design and location of any proposed drainfield will be in accordance with any designated performance standards set forth in relevant ordinances or regulations.

k. The relationship and cumulative impact of the proposed development on water quality, CBPAs, and other so designated environmentally- sensitive areas, both on-site and on adjacent lands.

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# MODEL ENVIRONMENTAL ASSESSMENT PROCEDURE

## APPENDICES

# APPENDIX A

# PREDICTION AND ASSESSMENT OF IMPACTS ON THE WATER ENVIRONMENT

## DATA NEEDS AND RESOURCES

Primary Source: Canter, 1977

# PREDICTION AND ASSESSMENT OF IMPACTS ON THE WATER ENVIRONMENT

## Basic Information on Water Pollution

Water pollution can be defined in a number of ways; however, the basic elements of most definitions are the concentrations of particular pollutants in water for sufficient periods of time to cause certain effects. If the effects are health related, such as those caused by pathogenic bacterial intrusion, the term "contamination" is appropriate. Effects that have to do with limitations on water availability due to certain water quality requirements related to usage can serve as a basis for defining a condition of water pollution. "Nuisance" refers to aesthetically displeasing effects created by oils, grease, or other floating materials.

Potential water quality impacts must be considered based on a clear delineation of various water quality characteristics. Water quality can be described in terms of physical, chemical, and bacteriological parameters.

Physical parameters include color, odor, temperature, solids (residues), oils, and grease. Color can be defined relative to type and density, the type being related to whether it is true color (dissolved) or apparent color (filterable). Odor is described by type and threshold odor number, which is related to odor-free water required for diluting an odorous water sample to a nonodorous level. Total solids are comprised of suspended and dissolved solids, and each of these fractions can be further divided into organic (volatile) and inorganic related to light transmittance through water. Settleable solids describe the materials present in solution that will settle by gravity in a one- hour period. Specific conductance (conductivity) is a measure of the inorganic dissolved solids present in ionic form. In surface watercourses oil and grease is of interest relative to nuisance considerations.

Chemical parameters can be subdivided into organic and inorganic constituents. Several tests can be employed to describe the organic characteristics of water. The most-used test is the BOD (biochemical oxygen demand). BOD is the amount of dissolved oxygen that effluent takes from its receiving water. It is a measurement of the quantity of organic waste in the water, since this material takes oxygen from the water as it decomposes. Technically, it is defined as the amount of oxygen required by bacteria in a sample under aerobic conditions at 20 degrees Celsius over a 5-day incubation period. The first-stage BOD represents the carbonaceous demand plus the nitrogenous oxygen demand (NOD). Other test that describe the organic content of water include the chemical oxygen demand, total organic carbon, and total oxygen demand.

Inorganic parameters of potential interest in water quality characterization include salinity, hardness, pH, acidity, alkalinity, and the content of iron, manganese, chlorides, sulfates, sulfides, heavy metals (Hg, Pb, Cr, Cu, Zn), nitrogen (organic, ammonia, nitrite, nitrate, and phosphorous. Salinity and chloride content are a measure of the salt in the water. Hardness is caused primarily by divalent metallic cations that have soap=consuming potential, the major ones being calcium and magnesium. Nitrogen and phosphorus contents are of interest due to their nutrient characteristics, especially in Chesapeake Bay and Chowan River where special standards have ben set for these substances.

Bacteriological parameters include coliforms, fecal coliforms, specific pathogens, and viruses. Total coliform and fecal coliform organisms are used as indicators of the presence of pathogens. specific pathogens such as salmonella organisms may be relevant for certain environmental impact studies.

There are two main sources of water pollutants in surface watercourses, namely, point sources and nonpoint sources. The total waste load in a stream is represented by the sum of all point and nonpoint pollutant sources. Refer to Guidance Text which follows the Initial Environmental Review Questionnaire for a more detailed discussion of these in the Surface and Groundwater Quality sections.

Agricultural wastes include irrigation return flows as well as runoff from feedlots. These waters exhibit salinities that are several-fold greater than unused irrigation water; also, hardness, total dissolved solids (TDS), and turbidity are at increased levels. Irrigation return flows may also exhibit increases in nitrogen, phosphorus, and pesticide contents. Runoff waters from feedlots have high organic, nutrient, and solids concentrations and contain microorganisms that are potentially pathogenic to animals and humans.

Soil erosion is another major water pollutant in terms of quantity. The total quantity of solids from soil erosion is approximately 700 times greater than the total from municipal waste-water discharges.

Accidental spillage of oil and other hazardous substances into watercourses is also prevalent and can cause devastating and extensive damage to the aqueous environment. Watercraft that navigate waters discharge sanitary wastes, oils, litter, ballast, and bilge waters. Although the total quantities of waste discharged from watercraft are small relative to other pollutant sources, they are important since most of the discharges are in high-use shoreline and harbor areas. This is of particular consequence in Hampton Roads.

The effects of water pollutants on receiving water quality are diverse and dependent upon the type and concentrations of pollutants. Soluble organics, as represented by high BOD wastes, cause depletion of oxygen. Trace quantities of

certain organic cause undesirable tastes and odors, and some may be biomagnified in the food web. suspended solids decrease water clarity and hinder photosynthetic processes; if solids settle and form sludge deposits, changes in benthic (lacustrine) ecosystems result. Color, turbidity, oils, and floating materials are often of concern due to their aesthetic undesirability and possible influence on water clarity and photosynthetic processes. Excessive nitrogen and phosphorus can lead to algal overgrowth with accompanying water treatment problems resulting from algae decay and interference with treatment processes. Chlorides cause a salty taste to be imparted to water, and in sufficient concentration limitations on water usage can occur. Acids, alkalis, and toxic substances have the potential for causing fish kills and creating other imbalances in stream ecosystems. Thermal discharges can also cause imbalances as well as reductions in stream waste assimilative capacity. Stratified flows from thermal discharges minimize normal mixing patterns in receiving streams and reservoirs.

**Impact Assessment Steps**

One of the major results from land disturbance and land use activity is evidenced by changes in water quality both in the vicinity and downstream from project areas. Construction will cause short-term impacts on the water environment at the local or site level, and operation of the same will result in longer-term impacts on a regional scale.

These following twelve steps are directed toward determining the water impacts of alternatives on the local and regional levels. Microscale (on-site or local) assessment involves comparisons of calculated concentrations of water pollutants applicable to water quality standards. Macroscale (regional) assessment considers the contribution of alternatives to area water pollutant sources, both point and nonpoint. Both levels of impact assessments are necessary in order to adequately address water quality impacts associated with proposed actions.

Data needs and associated resources for predicting and assessing impacts of proposed actions on water quality are as follows:

1. **Determine types and quantities of water pollutants emitted from all sources for meeting a given need during both construction and operational phases.**

   The first step in prediction and assessment of water quality impacts involves identification of types and quantities of water pollutants emitted from construction and operation of each alternative under consideration. One approach for identifying water pollutants is to review EISs prepared for similar projects. Another approach is to utilize the unit waste generation factor, which is defined as the rate at which a pollutant is released to a drainage area or watercourse as a result of some activity, such as land clearing or production by industry, divided by that activity.

2. **Determine the existing water quantity and quality levels for the surface watercourses in the area. Examine the frequency distributions and the median and mean data for both water quantity and quality. If possible, consider historical trends of water quality. Note particularly the low flow or minimum instream flow ratio utilized by the state for maintenance of water quality standards.**

The second step involves assembling information on existing water quantity and quality levels in the area of the project, particularly focusing on quality parameters related to anticipated water pollutants to be emitted from construction and operational phases of the project. Sources of water quality information include relevant city, county, regional, and state water resources agencies and private industries that have monitoring programs. Another source is the storage and retrieval of water quality data (STORET) system of the EPA.

Since water quality standards vary with the beneficial uses assigned for particular stream or stream segments, it may be necessary to evaluate existing water quality relative to various standards. This step is important for project that may have an impact over large distances in a single stream and for other projects, such as pipelines, that may cross numerous streams and several states.

Interpretation of water quality data involves comparison with water quality standards. The State Water Control Board (SWCB) has established such water quality standards; refer to Appendix B. A rating system can be used for this purpose. The use of a rating system is of value in graphically portraying existing water quality. Stream flow information can be obtained from the U.S. Geological Survey (U.S.G.S.) as well as from the SWCB - Tidewater Regional Office (TRO).

One of the key concerns with regard to stream flow is the flow frequency, which is utilized for calculation of compliance with water quality standards. In some instances the 7-day, 2-year low flow is utilized; in other cases the 7-day, 10- year low flow is required. A 7-day, 2-year low flow indicates that this is the minimum flow that occurs over a 7-day period on a frequency of once every 2 years. Flow frequency information and "minimum instream flow" requirements for specific stream segments are available from the SWCB-TRO.

3. **Document unique pollution problems that have occurred or are existing in local surface watercourses.**

The primary purpose of this step is to identify any unique pollution problems that have occurred in the project area. This is necessary in order to adequately describe the environmental setting, to indicate a familiarity with the area, and to focus on environmentally sensitive parameters. Examples of unique pollution problems that should be identified include fish kills, excessive algal growth, and thermal discharges causing stratified flow conditions.

Many sources can be used to obtain information on unique pollution problems, including the SWCB-TRO, as well as, conservation groups. Local newspapers are another source of historical pollution incidents; this information is generally stored on microfilm at local, regional, or university libraries. Use of aerial photographs can also reveal past uses of the site.

4. **If relevant for the project alternatives, describe groundwater quantity and quality in the area, noting the depth to the water table and direction of water flow. Identify major local uses of groundwater, and delineate historical trends for groundwater depletion and pollution.**

This step may not be required for all project types, but for alternatives that have potential for groundwater impact, this is a necessary step. The basic purpose is to determine the depth to the groundwater table in the area and to identify the direction of groundwater flow. Major users of groundwater from the area should be enumerated, as well as historical trends in groundwater depletion or quality deterioration.

Sources of information include local, regional, and state agencies dealing with water resources. Local public utilities, community development, and zoning offices often have maps showing existing and/or abandoned well sites. The Hampton Roads Planning District Commission, in conjunction with the U.S.G.S., maintains a regional groundwater monitoring system. In addition, the SWCB-TRO administers permits for the Eastern Virginia Groundwater Management Area and must be contacted if a new or modified use of groundwater is proposed. Groundwater quality standards which are applicable statewide are found in Appendix C.

5. **Assemble summary of key meteorological parameters in the area, noting particularly the monthly averages of precipitation, evaporation, and temperature.**

Meteorological data are required in order to predict and assess air quality impacts associated with proposed actions. In addition, certain climatological factors such as precipitation, evaporation, and air temperature are important in terms of predicting and assessing water quality impact. As well, precipitation and temperature information may need to be considered from proper construction scheduling. The primary sources of information include the SWCB-TRO, as well as the National Oceanic and Atmospheric Administration. The Hampton Roads Planning District Commission also has some of this data.

6. **Procure the applicable water quality standards for local surface watercourses and groundwater supplies if relevant. Specify applicability of effluent standards and required treatment technology and state whether the receiving stream is water-quality limited or effluent limited. Consider time schedules required for attaining applicable water quality standards.**

The Clean Water Act Amendments of 1972 (PL 92-500) established basic water quality goals and policies for the U.S. Some of these are:

1) The discharge of pollutants into navigable waters should be eliminated.

2) Wherever attainable, an interim goal of water quality, which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and out of water, should be achieved.

3) The discharge of toxic pollutants in toxic amounts should be prohibited.

These standards were later amended in the 1977, 1987, and 1990 CWA revisions.

Strategies for point source control have been developed, with every point source being subject to an effluent standard and a water quality standards, with the most stringent treatment requirements being applied. Control strategies for nonpoint source pollution have been generally taken the approach of application of Best Management Practices or BMPs. Effluent standards for point sources represent requirements in terms of the quality characteristics of the effluent discharged from municipal and industrial wastewater treatment plants. Water quality standards are applicable to

surface watercourses and represent the quality characteristics required to allow certain water uses.

New industrial point sources are to be planned in accordance with new source performance standards. Pretreatment standards are to be met by industrial sources prior to discharge into publicly-owned treatment works (POTWs).

Water quality-limited segments cannot be expected to meet established water quality standards, even if all point sources achieve effluent limitations such as secondary treatment for POTWs and best practicable treatment for industrial discharges. Effluent-limited segments are those where water quality standards can be achieved after all point sources meet effluent limitations.

Water quality standards vary from state to state, river basin to river basin, and various segments within river basins. State standards also include consideration of present and potential beneficial uses of water. The SWCB has established water quality management plans for the watershed basins which encompass Hampton Roads. Refer to the water quality management plans in Appendix C for the following basins: Chowan and Dismal Swamp, James, York, and Small Coastal Basins and Chesapeake Bay.

7. **Summarize the organic waste local allocation study for the area. Also procure existing information on inorganic, thermal, and bacterial waste loads. Identify known point sources of pollution, focusing specifically on unique discharges or wastewater constituents. Also enumerate the types of water uses in the area and summarize the quantities involved.**

The purpose of this step is to summarize the waste load allocation study for the particular surface watercourses in the vicinity of proposed alternatives. One result of this step is the identification of known point sources of pollution in the vicinity of the study area. Attention should also be directed toward unique discharges or effluent constituents in the area. State studies for compliance with CWA Sec. 305(b) can be a helpful source of this information.

It is also important to identify numbers and types of water users in the area, particularly those downstream from the project site. Water quantity concerns are of major importance in water-deficit areas. The types of water uses are important since quality requirements vary for different uses.

8. **Determine the regional impacts by calculating estimated daily quantities of water pollutants from the alternatives during both construction and operational phases and comparing these to existing waste loads in the drain area. Determine the percentage increase in these waste loads. Note existing water quality parameters that are good or poor relative to current or potential standards.**

   The purpose of this step is to examine the impact of alternatives in terms of their relative contributions to existing waste loads in streams. The approach consists of multiplying unit waste generation factors by their appropriate production quantities and then comparing these calculated waste loads with existing waste loads in the study area. One means of assessing the impact is to calculate percentage changes in pollutant loads resulting from the alternatives relative to existing pollutant loads in the study area. Waste loads should be considered for organic, inorganic, solid, nutrient, bacterial, and thermal pollutants.

9. **Consider construction phase impacts in terms of the following factors:**

   a) **Time period of construction and the resultant time period of decreased water quality. Specify stream discharges and quality variations that would be anticipated during the construction phase.**

   b) **Anticipated distance downstream of decreased water quality.**

   c) **Implications of decreased water quality relative to downstream water users. If there are users that require certain water qualities, identify the required raw water quality characteristics and discuss the effects of decreased quality during the construction phase.**

   d) **Specific construction specifications directed toward pollutant minimization.**

   The primary water quality impact during construction results from sediment that is eroded from the construction site, transported to local surface watercourses, and then dispersed or deposited. Many predictive methods have been developed to describe erosion, transport, and deposition. See the Chesapeake Bay Local Assistance Department's Local Assistance Manual, Appendix C, for a summary of the RPA buffer equivalency calculations to be used in Chesapeake Bay Preservation Areas.

10. **Determine the microscale impacts by calculating specific downstream concentrations resulting from conservative pollutants, dissolved oxygen concentration resulting from organic pollutants, and temperatures resulting from thermal discharges. Consider these on-site or local impacts for both construction and operational phases. Compare calculated downstream concentrations with applicable water quality standards. Check if applicable effluent standards are met for existing facilities, or consider how they will be brought into compliance. In the case of new sources, identify necessary technology for compliance with new source performance standards.**
This step involves the calculation of downstream concentrations of various water pollutants from the project area for each alternative during both the construction and operational phases. Several mathematical models that can be used in microscale impact calculations are presented as examples in the discussion below.

Conservative Pollutants

Conservative pollutants are not biologically degraded in a stream, nor will they be lot from the water phase due to precipitation, sedimentation, or volatilization. The basic approach for prediction of downstream concentrations of conservative pollutants is to consider the dilution capacity of the stream.

Thermal Pollution

Mathematical models of varying degrees of complexity have been developed to predict the persistence of heat in stagnant waters, flowing streams, estuaries, and the ocean. An example has been published on the use of a simplified temperature- predictive equation for calculating downstream temperatures following a waste heat discharge into a flowing stream. (See source) There are also other reference materials available on the subject of thermal pollution.

11. **If water quality or effluent standards are exceeded, consider mitigation through Best Management Practices (BMPs) or other control measures.**

If it is determined that water quality standards are exceeded by the proposed action, than abatement strategies, control measures, or BMPs to mitigate these impacts should be presented. Examples which describe various control technologies that can be used for minimizing pollutant emissions are available from the U.S. Environmental Protection Agency. BMPs can be designed with the advice of a consultant or local planning staff.

12. **Consider operational impacts of alternatives in terms of the following factors:**

    a. Frequency distribution of decreased quality and quantity

    b. Effects of sedimentation on the stream bottom ecosystem

    c. Fate of nutrients by incorporation into biomass

    d. Reconcentration of metals, pesticides, or radionuclides into the food web

    e. Chemical precipitation or oxidation/reduction of inorganic chemicals

    f. Anticipated distance downstream of decreased water quality and the implications for water users and related raw water quality requirements

    g. General effects of any water quality changes on the ecosystem

    h. Unique water quality changes that occur as a result of water impoundment and thermal stratification

    The final step is included as a reminder to consider unique aspects of operational impacts relative to a variety of concerns. These concerns include the frequency distribution of decreased quality or quantity, fate of nutrients by incorporation into biomass, reconcentration of conservative pollutants into the food web, and chemical changes of certain inorganic chemical within aqueous systems.

**Data Needs and Resources**

Local zoning, tax, and special district maps, as well as aerial photos, are generally available in the local planning department, real estate, or Commissioner of the Revenue's offices. Chesapeake Bay Preservation Area overlay maps can be found in local planning and zoning offices.

**Wetlands Information:**

- Virginia Institute of Marine Science Marsh Inventory Maps
- National Wetlands Inventory Maps
- Federal Manual for Identifying and Delineating Jurisdictional Wetlands; 1987, 1989, and 1991 Proposed

- Infrared Aerial Photos
- Virginia Institute of Marine Science - Wetlands Program
- Virginia Marine Resources Commission
- Chesapeake Bay Local Assistance Board
- Local Wetlands Board
- Designated local government planning staff

**Vegetation Information:**

- Virginia Department of Conservation and Recreation-
  Division of Natural Heritage (endangered species inventories)
- Virginia Native Plant Society
- U.S. Forest Service
- The Nature Conservancy
- Local Nurserymen and Arborists
- Designated local government planning staff

**Surfacewater Information:**

- FEMA National Flood Insurance Maps
- State Water Control Board - Tidewater Regional Office
  - -- Basin Water Quality Management Plans
  - -- Water Quality Monitoring Data
  - -- Minimum Instream Flow Requirements
- U.S.G.S. Computer Modelling Data
- Public Water Supply Data - Newport News Waterworks, City/County Department of Public Works

**Groundwater Information:**

- o U.S.G.S.
  - -- Geologic Maps (aquifer boundaries and vulnerability)
  - -- Hydrogeologic Studies (aquifer characteristics, vulnerability, groundwater flow direction, potential recharge areas, surfacewater/groundwater interaction)

- o Public Water Supply Data (water quality, well construction, geology, aquifer characteristics, location of public wells,wellhead protection areas)

- o Domestic Well Data - Virginia Department of Health, local health departments (water quality, well construction standards, geology)

**Stormwater Runoff and Discharge Information:**

- o State Water Control Board - Tidewater Regional Office

- o U.S. Environmental Protection Agency - Region III (Philadelphia)

- o City/County Engineer

**Wastewater/Water Treatment Information:**

- o Hampton Roads Sanitation District

- o Virginia Department of Health

- o City/County Department of Public Works

# APPENDIX B

## SAMPLE IMPACT ASSESSMENT THRESHOLDS

Source: Pamlico-Tar River Foundation, Inc., 1991

# 1. Publicly-Owned Wastewater Treatment Systems (sewer plants)

## *Determinants of Impact Severity*

| | |
|---|---|
| **Design or permitted flow** | |
| <50,000 gallons per day (GPD) | relatively minor impact |
| 50,000 to 100,000 GPD | needs environmental assessment |
| 100,000 to 500,000 GPD | needs full EIS |
| >500,000 GPD | source of major concern |
| **Treatment level** | |
| Tertiary or advanced | acceptable |
| Secondary | needs environmental assessment, especially in estuarine waters |
| Primary only | unacceptable |
| **Disposal of treated wastewater** | |
| Non-discharge (land application) | preferable, if feasible |
| Discharge to wetlands | needs environmental assessment; created wetlands preferred |
| Discharge to surface waters | least desirable |
| **Types of wastewater accepted** | |
| Domestic and sewage only | relatively less concern |
| Industrial wastes | undesirable |
| **Sludge disposal** | |
| Land application | preferable, if feasible |
| Landfilling or incineration | less desirable |
| **Discharge point** | |
| Land application | preferable |
| Nursery areas, shellfish waters, outstanding resource waters, high quality waters, Class B or higher | unacceptable |
| Other waters | needs further scrutiny |
| **Minimum acceptable removal percentages for domestic wastewater** | |
| Biological and chemical oxygen demand | 90% |
| Nitrogen | 50% or 6 mg/liter effluent concentration TN |
| Phosphorus | 30% or 2 mg/liter effluent concentration TP |
| Metals | 70% for freshwater; 90% saltwater |
| Synthetic organics | 70% |
| **Storm sewerage** | |
| Separate wastewater/stormwater | preferable |
| Combined wastewater/stormwater | unacceptable |

**Site characteristics for sludge disposal or effluent irrigation**

| | |
|---|---|
| Seasonal high water table | |
| >10 feet below surface | acceptable |
| >300 feet from surface water | acceptable |
| Seasonal high water table | |
| 6-10 feet below surface | needs environmental assessment |
| <300 feet from surface water | needs environmental assessment |
| Seasonal high water table | |
| <6 feet below surface | undesirable |

**Disinfectant method**

| | |
|---|---|
| Ozone | option to chlorination |
| Activated carbon | option to chlorination |
| Chlorination | unacceptable if trihalomethanes likely to be formed |

# 2. Privately-Owned Wastewater Systems (package plants)

## *Determinants of Impact Severity*

**Design or permitted flow**

| | |
|---|---|
| <50,000 gallons per day (GPD) | relatively minor concern |
| 50,000 to 100,000 GPD | needs environmental assessment |
| >100,000 GPD | source of major concern |

**Treatment level**

| | |
|---|---|
| Tertiary or advanced | acceptable |
| Secondary | needs environmental assessment |
| Primary only | unacceptable |

**Disposal of treated wastewater**

| | |
|---|---|
| Non-discharge (land application) | preferable, if feasible |
| Discharge to wetlands | needs environmental assessment; created wetlands preferred |
| Discharge to surface waters | least desirable |

**Types of wastewater accepted**

| | |
|---|---|
| Domestic and sewage only | relatively less concern |
| Industrial wastes | unacceptable |

**Sludge disposal**

| | |
|---|---|
| Land application | preferable, if feasible |
| Landfilling or incineration | less desirable |

**Discharge point**

| | |
|---|---|
| Land application | preferable, if feasible |
| Nursery areas, shellfish waters, outstanding resource waters, high quality waters, Class B or higher | unacceptable |
| Other waters | needs further scrutiny |

**Minimum acceptable removal efficiencies for domestic wastewater**

| | |
|---|---|
| Biological and chemical oxygen demand | 90% |
| Nitrogen | 50% or 6 mg/liter effluent concentration TN |
| Phosphorus | 30% or 2 mg/liter effluent conc. TP |
| Metals | 70% |
| Synthetic organics | 70% |
| Bacteria | 90% |

**Ownership, funding, and operation**

| | |
|---|---|
| Single owner | desirable |
| Local owner | desirable |
| Owner/operator | desirable |
| Absentee owner | undesirable |
| Group ownership | undesirable; needs performance bonds |
| Contract operator | undesirable; needs performance bonds |

**Local regulatory framework**

| | |
|---|---|
| County package plant ordinance and inspections | good |
| No local ordinance and inspections | unacceptable |

# 3. Industrial Dischargers

## *Determinants of Impact Severity*

| | |
|---|---|
| **Waste disposal approach** | |
| Process modification to reduce pollutants | desirable |
| Recycling/Reuse of wastewater | desirable |
| End-of-pipe control | less desirable |
| **Waste products** | |
| Standard pollutants only | relatively minor concern |
| Biocides | needs environmental assessment |
| Synthetic organics | needs environmental assessment |
| Metals and other toxics | needs environmental assessment; unacceptable in salt water |
| Reusable/recyclable pollutants | unacceptable |
| **Design or permitted flow** | |
| <50,000 gallons per day (GPD) | relatively minor concern |
| 50,000 to 100,000 GPD | needs environmental assessment |
| 100,000 to 500,000 GPD | needs full EIS |
| >500,000 GPD | source of major concern |
| **Disposal of treated wastewater** | |
| Non-discharge (land application) | preferable, if feasible |
| Discharge to wetlands | needs environmental assessment; created wetlands preferred |
| Discharge to surface waters | least desirable |
| **Sludge disposal** | |
| Land application | preferable, if feasible |
| Landfilling or incineration | less desirable |
| **Discharge point** | |
| Land application | preferable, if feasible |
| Nursery areas, shellfish waters, outstanding resource waters, high quality waters, Class B or higher | unacceptable |
| Other waters | needs further scrutiny |
| **Minimum acceptable removal efficiencies for standard pollutants** | |
| Biological and chemical oxygen demand | 90% |
| Nitrogen | 50% or 6 mg/liter effluent concentration TN |
| Phosphorus | 30% or 2 mg/liter effluent conc. TP |
| Metals | 70% freshwater; 90% saltwater |
| Synthetic organics | 70% |
| Temperature | no more than 1° F rise in mixing zone |
| **Storm sewerage** | |
| Separate wastewater/stormwater | acceptable |
| Combined wastewater/stormwater | unacceptable |
| **Site characteristics for sludge disposal or effluent irrigation** | |
| Seasonal high water table >10 feet below surface | acceptable |
| >300 feet from surface water | acceptable |
| Seasonal high water table 6-10 feet below surface | needs environmental assessment |
| <300 feet from surface water | needs environmental assessment |
| Seasonal high water table <6 feet below surface | undesirable |

# 4. Landfills

## *Determinants of Impact Severity*

| | |
|---|---|
| **Type of waste** | always needs environmental assessment |
| **Distance from surface waters** | |
| >1 mile | acceptable |
| 1000 feet to 1 mile | needs environmental assessment |
| <1000 feet | unacceptable |
| **Distance from municipal water supplies** | |
| >2 miles | acceptable |
| 1-2 miles | needs environmental assessment |
| <1 mile | unacceptable |
| **Regulatory floodplain location** | |
| Above 100-year floodplain | acceptable |
| Above 10-year floodplain | needs scrutiny |
| Below 10-year floodplain | unacceptable |
| **Depth of seasonal high water table below bottom of landfill** | |
| >10 feet | needs scrutiny |
| <10 feet | unacceptable |
| **Permeability of landfill bed/liner** | |
| Impermeable material | acceptable |
| Very low permeability clay | needs scrutiny |
| Permeable | unacceptable |
| **Leachate collection and treatment onsite** | |
| Yes | desirable |
| No | undesirable |

# 6. Urban, Industrial, and Commercial Development

For assessement of industrial wastewater treatment, see Guide 3.

## *Determinants of Impact Severity*

**Size or area**

| | |
|---|---|
| <1 acre | relatively minor concern |
| 1-10 acres | needs scrutiny |
| 10-100 acres | needs environmental assessment; mitigation measures probably necessary |
| >100 acres | needs full EIS |

**Impervious surface (built-upon area)**

| | |
|---|---|
| <12% | acceptable |
| 12-30% | needs stormwater and erosion control plus buffers; stormwater controls for 1 inch runoff;minimum buffer of 100 feet for nonsensitive and 300 feet for sensitive waters |
| >30% | needs stormwater and erosion control plus buffers; stormwater controls for 1.5 inches runoff; stormwater measures with performance guarantees; minimum 300 feet buffer for all waters. |

**Wastewater treatment**

| | |
|---|---|
| Connected to public wastewater system | acceptable if system can handle additional flow |
| Septic tanks | undesirable (see Guide 5) |
| Private wastewater system (package plant) | less desirable (see Guide 2) |

**Zoning or land use plan classification**

| | |
|---|---|
| In appropriately zoned area | preferable |
| In zoned area requiring rezoning | needs scrutiny |
| In unzoned area | undesirable; points to need for zoning |

**Land use context**

| | |
|---|---|
| In area of similar or compatible land uses, or area specifically designated as such | preferable |
| In area of incompatible land use or lacks infrastructure | probably unacceptable; needs scrutiny |
| In environmentally sensitive area | unacceptable |
| Within 300 feet of sensitive area | unacceptable |

# 7. Residential and Recreational Development

## *Determinants of Impact Severity*

**Size or area**

| | |
|---|---|
| <1 acre | relatively minor concern |
| 1-10 acres | needs scrutiny |
| 10-100 acres | needs scrutiny; mitigation likely |
| >100 acres | needs environmental assessment |

**Density (dwelling units per unit area)**

| | |
|---|---|
| 0.05 unit/acre | relatively minor concern |
| <0.5 unit/acre | minor concern if not in or near environmentally sensitive areas |
| <1 unit/acre | minor concern if subject to appropriate subdivision controls and not in or near environmentally sensitive areas |
| 1-4 units/acre | needs environmental assessment |
| >4 units/acre | too high except in urban areas |

**Impervious surface (built-upon area)**

| | |
|---|---|
| <6% | preferable |
| 6-12% | needs erosion and sediment control plus minimum 50-foot buffer for non-sensitive and 100-foot buffer for sensitive riparian areas |
| 12-30% | needs stormwater and erosion control plus buffers; stormwater controls for 1 1/2" runoff; minimum buffer of 100 feet for nonsensitive and 300 feet for sensitive waters |
| >30% | unacceptable |

**Wastewater treatment**

| | |
|---|---|
| Septic tanks | desirable if site characteristics meet criteria in Guide 5 above and if overall density <1/acre; less desirable or unacceptable otherwise |
| Connected to public wastewater system | acceptable if existing system can handle additional flow. New sewer lines need environmental assessment since their costs typically lead to pressure for more development. |
| Private wastewater system (package plant) | undesirable (see Guide 2 above) |

**Zoning or land use plan classification**

| | |
|---|---|
| In appropriately zoned area | preferable |
| In zoned area requiring rezoning | needs scrutiny |
| In unzoned area | undesirable; points to need for zoning |

**Land use context**

| | |
|---|---|
| In area of similar or compatible land uses, or area specifically designated as such | preferable |
| In area of incompatible land use or lacks infrastructure | probably unacceptable; needs scrutiny |
| In environmentally sensitive area | unacceptable |

# 8. Marinas

## *Determinants of Impact Severity*

**Water characteristics**

- Shellfish, outstanding resource or high quality waters, nursery areas, water supplies, class B or higher . . . . . unacceptable
- Urban or developed waterfronts . . . . . probably OK but needs scrutiny
- Other undeveloped waters . . . . . needs environmental assessment

**Terrestrial, wetland, and aquatic habitats**

- Mitigated wetland alteration . . . . . needs scrutiny
- Endangered or threatened species habitat . . . . . unacceptable
- Unmitigated wetland alteration . . . . . unacceptable
- Primary nursery area . . . . . unacceptable

**Size (number of slips)**

- <5 . . . . . relatively minor concern
- 5-10 . . . . . relatively minor concern, but needs scrutiny
- 10-100 . . . . . needs environmental assessment
- 100-300 . . . . . needs full EIS
- >300 . . . . . unacceptable

**Construction**

- Excavated upland basin . . . . . preferable, if feasible
- Open water . . . . . unacceptable if upland alterative exists
- Excavated wetlands . . . . . unacceptable

**Flushing characteristics (maximum water turnover time)**

- <2 days . . . . . acceptable
- 2-4 days . . . . . probably acceptable but needs scrutiny
- 4-10 days . . . . . needs environmental assessment
- >10 days . . . . . unacceptable

**Waste control**

- No onshore restrooms/pumpout facilities . . . . . unacceptable
- No "locked head" policy with signage . . . . . unacceptable

**Impervious surface and wastewater disposal**

- Same as for residential/recreational development in Guide 7

**Degree of shoreline alteration (other than upland basin entrance)**

- None . . . . . acceptable
- Minor, but shoreline character unchanged and sensitive areas unharmed . . . . . acceptable
- Significant . . . . . needs scrutiny
- Major . . . . . unacceptable

**Public waterfront access provided**

- None . . . . . unacceptable
- Walking access only . . . . . acceptable
- Free public boat launching . . . . . desirable

# 9. Agriculture

## *Determinants of Impact Severity*

There is such a wide variety of agricultural systems, even within eastern North Carolina, that even the broad generalities used in other categories are not possible here. Instead, some basic questions to ask regarding agricultural operations are listed.

*Are wetlands or lands designated highly erodible being converted to production? If in production, can/will it be retired and enrolled in the Conservation Reserve?

*Has a soil and water conservation plan been drafted and implemented? Are Best Management Practices (BMPs) in use? Can/will the operation qualify for BMP cost-sharing?

*Are nutrient and integrated pest management strategies being utilized? Are other "low-input" or organic approaches to reducing synthetic chemical use used?

*Is livestock contact with streams minimized? Are livestock wastes handled properly?

*Is the area artificially drained? If so, are water management practices to reduce runoff during the non-growing season used?

*Are vegetated buffers maintained between agricultural operations and surface waters?

*Is there a potential for groundwater contamination by nitrates and pesticides?

*Are fertilizer and pesticide wastes properly disposed of?

# 10. Forestry

## *Determinants of Impact Severity*

**Harvesting method**

| | |
|---|---|
| Intensive selection | best |
| Partial clearcut | better |
| Extensive selective cutting | better still |
| Extensive clearcut | worst |

**Silvicultural practice**

| | |
|---|---|
| Mixed-age, mixed species | best |
| Even-age monoculture | worst |

**Artificial drainage**

| | |
|---|---|
| No | desirable |
| Yes, with water management | suboptimal |
| Yes, without water management | undesirable |

**Fire control**

| | |
|---|---|
| Partial suppression or controlled burns | more desirable |
| Complete suppression; no controlled burns | undesirable |

**Vegetated riparian buffer zones**

| | |
|---|---|
| >15 meter wide | undesirable to acceptable |
| <15 meter wide | undesirable |
| None | unacceptable |

**During and post-harvest erosion control**

| | |
|---|---|
| Mulching, reseeding, buffers, terracing, diversions, water control, slope adjustment | desirable |
| Mulching and reseeding | probably inadequate |
| None | unacceptable |

**Logging roads and skid trails**

| | |
|---|---|
| Adjacent to streams | unacceptable |
| No erosion control | unacceptable |
| More than minimum neccesary for operation | unacceptable |

# 11. Commercial Fishing

## *Determinants of Impact Severity*

**Fishing methods (inshore)**

Degree of benthic disturbance

| | |
|---|---|
| Low | preferable |
| High | needs scrutiny in environmentally sensitive areas |

Degree of selectivity of catch

| | |
|---|---|
| High | desirable |
| Low | needs scrutiny |

**Areas fished**

| | |
|---|---|
| Non-nursery areas | acceptable |
| Secondary nursery areas | needs scrutiny |
| Primary nursery areas | unacceptable for bottom-disturbing |
| Submerged aquatic vegetation | unacceptable for bottom-disturbing |

**Fisheries management and regulation**

| | |
|---|---|
| Emphasis on habitat and water quality maintenance | desirable |
| Emphasis on long-term stock maintenance | acceptable |
| Emphasis on short-term stocks | unacceptable |

# 12. Air Pollution Point Sources

## *Determinants of Impact Severity*

**Size of discharge (tons/yr of most abundant regulated pollutant)**

- <10 . . . . . relatively minor concern
- 10 to 100 . . . . . needs scrutiny
- 100 to 250 . . . . . needs environmental assessment
- >250 . . . . . needs full EIS

**Substances discharged**

- Regulated "criteria" pollutants only . . . . . needs scrutiny
- Toxics (regulated or unregulated) . . . . . needs environmental assessment
- Radionuclides . . . . . unacceptable

**Effect on local/regional air quality standards ***
**(all values in micrograms per cubic meter)**

- Suspended particulates (24-hour mean)
  - <75 . . . . . tolerable
  - 75-260 . . . . . suboptimal
  - 260-375 . . . . . undesirable
  - >375 . . . . . unacceptable
- Sulfur dioxide (24-hour mean)
  - <80 . . . . . tolerable
  - 80-365 . . . . . suboptimal
  - 365-800 . . . . . undesirable
  - >800 . . . . . unacceptable
- Carbon monoxide (8-hour mean)
  - <5 . . . . . tolerable
  - 5-10 . . . . . suboptimal
  - 10-17 . . . . . undesirable
  - >17 . . . . . unacceptable
- Ozone (1-hour mean)
  - <120 . . . . . tolerable
  - 120-240 . . . . . suboptimal
  - 240-400 . . . . . undesirable
  - >400 . . . . . unacceptable
- Nitrogen dioxide (1-hour mean)
  - <100 . . . . . tolerable
  - 100-1130 . . . . . suboptimal
  - >1130 . . . . . unacceptable
- Lead (3-month mean)
  - none . . . . . tolerable
  - 0-1.5 . . . . . undesirable
  - >1.5 . . . . . unacceptable
- Hydrocarbons (3-hour mean)
  - <80 . . . . . tolerable
  - 80-160 . . . . . suboptimal
  - >160 . . . . . unacceptable

* Modeled or predicted effect of emissions on ambient air quality during annual worst-case meteorological conditions

**General pollution control approach**

| | |
|---|---|
| Source reduction | best |
| Recycling and reuse | good |
| Process modification | good |
| Emission controls | least desirable if other approaches feasible |

**Climatology**

| | |
|---|---|
| Limited vertical air movement | undesirable |
| Restricted horizontal air flow | undesirable |
| Prone to inversions | undesirable |

# 13. Solid and Hazardous Waste Disposal

For water quality impacts of landfills, see Guide 4.
For air quality impacts of incinerators, see Guide 12.

***Determinants of Impact Severity*** **(major solid waste disposal plans or facilities will always require expert assistance for assessment)**

**General approach to solid waste management**

| | |
|---|---|
| Reduce waste stream input via decreased consumption, increased efficiency and reuse | good |
| Reduce waste stream via recycling | good |
| Entirely disposal oriented | unacceptable |

**Type of waste**

| | |
|---|---|
| High-level radioactive | needs full EIS; disposal at generation site preferred |
| Low-level radioactive | needs full EIS |
| Hazardous/toxic | needs full EIS |
| Other | needs environmental assessment |

**Waste Disposal Method**

| | |
|---|---|
| Landfilling | increasingly less viable. Alternatives must be explored. |
| Incineration | beware of air quality impacts and ash disposal problems. If incineration occurs, energy generation should be considered. |
| Ocean dumping | probably unacceptable; needs full EIS |
| Ocean incineration | needs full EIS |

# 14. Roads, Highways, and Parking Lots

See also Guides 6, 7.

## *Determinants of Impact Severity*

**General approach to transportation planning**

- Mass transit . . . . . the more the better
- Complete reliance on roads and highways . . . . . unacceptable

**Type of land/water affected**

- Mitigated wetland alteration . . . . . : needs environmental assessment
- Environmentally sensitive areas . . . . . needs full EIS
- Unmitigated wetland alteration . . . . . unacceptable
- Other areas . . . . . needs scrutiny

**Erosion/sediment control**

- Mulching & revegetation of exposed surfaces; stabilization of all slopes >15%; silt fencing; berms . . . . . acceptable
- Anything less . . . . . unacceptable

**Vegetated buffer zones between paved surfaces and surface waters**

- >100 meters . . . . . acceptable
- 15-100 meters . . . . . needs scrutiny
- <15 meters . . . . . unacceptable

**Drainage interference by roadways and base**

- Flow blockage mitigated by drainage structures, roadway elevation, permeable roadbeds, and orientation parallel to hydraulic gradients . . . . . acceptable
- No significant flow blockage . . . . . acceptable
- Blocks ground or surface flow . . . . . unacceptable

**Zoning/land use planning**

- Development restricted except in designated nodes . . . . . desirable
- Controlled access . . . . . desirable
- No zoning or land use control . . . . . undesirable; points to need for county zoning
- Development allowed along entire corridor . . . . . undesirable

**Land use planning context**

- Road/highway construction consistent with local land use planning goals and policies . . . . . desirable
- Inconsistent with local goals and policies . . . . . undesirable
- Local goals/policies absent or unclear . . . . . undesirable

**Environmental impact assessment**

- Full EIS conducted for all major projects . . . . . acceptable
- Anything less . . . . . unacceptable

# APPENDIX C

## STATE WATER QUALITY STANDARDS

Source: State Water Control Board, 1988, 1990.

## INTRODUCTION

The State Water Control Law mandates the protection of existing high quality State waters and provides for the restoration of all other State waters to such condition of quality that any such waters will permit all reasonable public uses and will support the propagation and growth of all aquatic life that might reasonably be expected to inhabit them (Section 62.1-44.2). The adoption of water quality standards under Section 62.1-44.15(3) of the Law is one of the Board's methods of accomplishing the Law's purpose.

Water quality standards consist of narrative statements that describe water quality requirements in general terms, and of numeric limits for specific physical, chemical, biological or radiological characteristics of water. These narrative statements and numeric limits describe water quality necessary to meet and maintain reasonable and beneficial uses such as swimming and other water based recreation, public water supply and the propagation and growth of aquatic life. Standards include general as well as specific descriptions, since not all requirements for water quality protection can be numerically defined. Standards are not static. They will change and be constantly adjusted to reflect changes in law, technology and information available to the Board and its staff.

The standards are intended to protect all State waters for recreational use and for the propagation and growth of a balanced population of fish and wildlife. Through the protection of these two uses, which usually require the most stringent standards and the highest degree of protection, other usually less restrictive uses like industrial water supply, irrigation and navigation are usually also protected. Should additional standards be needed to protect other uses as dictated by changing circumstances or improved knowledge, they can be formulated and adopted.

VR680-21-01 SURFACE WATER STANDARDS WITH GENERAL, STATEWIDE APPLICATION

VR680-21-01.1 Use Designations

All State waters are designated for recreational use, except for reasonably-sized mixing zones in waters immediately below municipal and industrial discharges, for example as provided in VR680-21-02.2 below, and for the propagation and growth of a balanced, indigenous population of fish, shellfish and wildlife.

VR680-21-01.2 General Standard

A. All state waters shall be maintained at such quality as will permit all reasonable, beneficial uses and will support the propagation and growth of all aquatic life, including game fish, which might reasonably be expected to inhabit them. Reasonable beneficial uses include, but are not limited to, recreational uses, e.g. swimming and boating; and production of edible and marketable natural resources, e.g., fish and shellfish.

B. All State waters shall be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or interfere directly or indirectly with reasonable, beneficial uses of such water or which are inimical or harmful to human, animal, plant, or aquatic life. Specific substances to be controlled include, but are not limited to: floating debris, oil, scum, and other floating materials; toxic substances; substances that produce color, tastes, turbidity, odors, or settle to form sludge deposits, and substances which nourish undesirable or nuisance aquatic plant life. Effluents which tend to raise the temperature of the receiving water will also be controlled.

C. Zones for mixing wastes with receiving waters shall be determined on a case-by-case basis; shall be kept as small as practical; shall not be used for, or considered as, a substitute for minimum treatment technology required by the Clean Water Act and other applicable State and Federal laws; shall be implemented, to the greatest extent practicable, in accordance with the provisions of subsections A and B hereof, and shall not contain toxic substances in

acutely toxic concentrations. An area of initial dilution may be allowed. This area of initial dilution will be determined on a case-by-case basis and shall not at any time exceed the lethal concentration for appropriate representative species for time periods of exposures likely to be encountered by that species and likely to cause acute effects. Mixing within these zones shall be as quick as practical and may require the installation and use of devices which ensure that waste is mixed with the allocated receiving waters in the smallest practical area. The need for such devices shall be determined on a case-by-case basis. The boundaries of these zones of admixture shall also be such as to provide a suitable passageway for fish and other aquatic organisms. In an area where more than one discharge occurs and several mixing zones are close together, these mixing zones shall be so situated that this passageway is continuous.

VR680-21-01.3 Anti-degradation Policy

A. High Quality Waters

Waters whose existing quality is better than the established standards as of the date on which such standards become effective will be maintained at high quality; provided that the Board has the power to authorize any project or development, which would constitute a new or an increased discharge of effluent to high quality water, when it has been affirmatively demonstrated that a change is justifiable to provide necessary economic or social development; and provided, further, that the necessary degree of waste treatment to maintain high water quality will be required where physically and economically feasible. Present and anticipated use of such waters will be preserved and protected. (Section 62.1-44.4 of the State Water Control Law.)

Guidelines for Implementation

Existing instream beneficial water uses will be maintained and protected, and actions that would interfere with or become injurious to existing uses should not be undertaken.

In considering whether a possible change is justifiable to provide necessary economic or social development, the Board will provide notice and

opportunity for a public hearing so that interested persons will have an opportunity to present information.

Upon a finding that such change is justifiable, the change nevertheless, must not result in violation of those water quality characteristics necessary to attain the national water quality goal of protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water. Further, if a change is considered justifiable, it must not result in any significant loss of marketability of fish, shellfish or other marine resources, and all practical measures should be taken to eliminate or minimize the impact on water quality.

When degradation or lower water quality is allowed, the owner shall nevertheless employ all cost-effective and reasonable best management practices for nonpoint source control.

Any determinations concerning thermal discharge limitations made under Section 316(a) of the Clean Water Act will be considered to be in compliance with the anti-degradation policy.

B. High Quality State Resource Waters

Where high quality waters constitute an outstanding resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected to prevent permanent or long-term degradation or impairment of beneficial uses of the water. When proposing a designation of any waters as outstanding resource waters, under this section, the Board shall convene a public hearing to receive data, views, and argument on the proposal.

VR680-21-01.4 Standards Application: Stream Flow

Stream Standards shall apply whenever flows are equal to, or greater than, the lowest flow which, on a statistical basis, would occur for a 7-consecutive-day period once every 10 years.

Manmade alterations in stream flow shall not contravene reasonable, beneficial uses including protection of the propagation and growth of aquatic life.

VR680-21-01.5 Standards for Dissolved Oxygen, pH, and Maximum Temperature

| CLASS | DESCRIPTION OF WATERS | DISS. OXYGEN(mg/l) Min. | Daily Avg. | pH | Max.Temp. (°C) |
|---|---|---|---|---|---|
| I | Open Ocean | 5.0 | -- | 6.0-9.0 | -- |
| II | Estuarine Waters (Tidal Water-Coastal Zone to Fall Line) | 4.0 | 5.0 | 6.0-9.0 | -- |
| III | Non-tidal Waters (Coastal and Piedmont Zones) | 4.0 | 5.0 | 6.0-9.0 | 32 |
| IV | Mountainous Zones Waters | 4.0 | 5.0 | 6.0-9.0 | 31 |
| V | Put and Take Trout Waters | 5.0 | 6.0 | 6.0-9.0 | 21 |
| VI | Natural Trout Waters | 6.0 | 7.0 | 6.0-9.0 | 20 |
| VII | Swamp Water | * | * | * | ** |

* This classification recognizes that the natural quality of swamp water may fall outside of the ranges for D.O. and pH set forth above as water quality standards; therefore, on a case-by-case basis, standards for specific swamp waters can be developed that reflect what natural quality is.

** Maximum temperature will be the same as that for Classes I through VI waters as appropriate.

VR680-21-01.10 Mercury in Fresh Water

A. Standard

0.05 ug/l (ppb) total recoverable mercury in fresh water.
0.01 ug/l (ppb) methyl mercury in fresh water.

B. Policy

1. The Board, pursuant to Section 62.1-44.15(3)(a) of the Code of Virginia (1950), as amended, hereby sets forth its policy that, with respect to any State waters in which the water quality standard for total recoverable mercury and/or methyl mercury is exceeded, the Board shall identify the point and nonpoint sources of mercury contamination and institute appropriate abatement action against such sources to reduce the level of mercury in such State waters to a concentration less than or equal to the Water Quality Standard. Such abatement action shall include the submittal, by the owner of the source, of a plan and schedule for the reduction of such mercury

contamination and an evaluation of the potential for environmental cleanup with a plan and schedule for said cleanup as appropriate.

2. The Board, pursuant to Section 62.1-44.15(3)(a) of the Code of Virginia (1950), as amended, hereby sets forth its policy that the level of methyl mercury in edible fish tissue in fresh water, as an arithmetic mean of a representative sampling of the fish population tested by or at the direction of the Board, shall not exceed a concentration of 750 ng/g (ppb). A representative sampling shall consist of individuals of at least two species representing two trophic levels, including a predator species, chosen at the direction of the Board. The edible tissue of the individual fish shall be analyzed and, wherever practicable, when more than one location is sampled the same species shall be collected at all locations.

   With respect to any State waters in which the foregoing concentration is exceeded, the Board shall identify the point and nonpoint sources of mercury contamination and institute abatement action against such sources, as appropriate, to reduce the level of methyl mercury in edible fish tissue in such State waters, as an arithmetic mean of a representative sampling of the fish population tested by or at the direction of the Board, to a concentration not exceeding 750 ng/g (ppb). Such abatement action shall include the submittal, by the owner of the source, of a plan and schedule for the reduction of such mercury contamination and an evaluation of the potential for environmental cleanup with a plan and schedule for said cleanup, as appropriate.

3. Further, the Board, pursuant to Section 62.1-44.15(3)(a) of the Code of Virginia (1950), as amended, hereby sets forth its policy that a concentration of total mercury in the freshwater river sediments in excess of 300 nanograms per gram (parts per

billion-ppb) shall be an index of potential mercury contamination. Wherever this level is exceeded, the staff shall determine mercury levels in edible fish tissue and the water column and take appropriate action pursuant to Sections A and B of this policy.

4. Compliance with any Order issued by the Board to any such owner for cause involving mercury shall constitute "appropriate abatement action" under the terms of this policy for the duration of such Order.

5. Notwithstanding the above, pursuant to Section 62.1-44.4 of the Code of Virginia, in waters in which the mercury concentrations are below this standard or any level enumerated in this policy, the Board may initiate action under this policy to ensure that State waters are maintained at, or returned to, the quality existing at the time of adoption of this standard.

VR680-21-01.11 Chlorine in Surface Waters

A. Standard

1. The average daily concentration of total residual chlorine (TRC) in freshwater shall not exceed 11 parts per billion (ug/l) and the average daily concentration of chlorine produced oxidant (CPO) in saline waters (annual mean salinity of 5 parts per thousand or greater) shall not exceed 7.5 parts per billion (ug/l).

2. The one-hour average concentration of total residual chlorine (TRC) in freshwater shall not exceed 19 parts per billion (ug/l) and the one hour average concentration of chlorine produced oxidant (CPO) in saline waters shall not exceed 13 parts per billion (ug/l).

B. Policy

The Board, pursuant to Section 62.1-44.15(3a) of the Code of Virginia (1950), as amended, hereby sets forth its policy for implementation of the chlorine standard in surface waters of the Commonwealth. These concentrations shall apply to all surface waters of the Commonwealth except where the permittee can demonstrate to the Board that exceptions may be allowed without resulting in damage to aquatic life.

1. Mixing zones may be established on a case-by-case basis according to Section VR680-21-01.2C. Since Section VR680-21-01.2C does not allow acutely toxic concentrations within the mixing zone, chlorine residuals within the mixing zone shall not exceed the one hour average of 19 ug/l TRC in freshwater or 13 ug/l CPO in saline waters.

2. Effluent limitations on chlorine shall be imposed to assure compliance with paragraphs A.1. and A.2. at the boundary of the mixing zone and paragraph A.2. within the mixing zone. These effluent limitations shall be calculated presuming complete mixing.

3. The permittee may present to the Board site specific analytical data showing that a modified effluent limit will result in compliance with Sections A.1. and A.2. of the Standard.

4. Exceptions to these concentrations may be allowed by the Board only upon a case-by-case demonstration by the permittee. These case-by-case demonstrations shall contain both alternative instream concentrations and appropriate permit limitations to protect beneficial uses. Exceptions may be considered for only the following situations:

a. The nature of the receiving waters or the nature and composition of the chlorine discharged are such that this TRC or CPO concentration is not necessary to protect aquatic life.

b. Receiving streams such as drainage ditches whose nature is such that they cannot reasonably be expected to support the propagation and growth of aquatic life and do not provide reasonable beneficial uses with respect to aquatic life. Compliance shall nonetheless be required where these waters discharge into other State waters capable of sustaining reasonable beneficial uses. In such situations, the Board may place effluent limits at the confluence of these two waters.

c. Discharge of intermittently chlorinated water (not more than two hours in any eight hour period).

5. Notwithstanding the foregoing, chlorine or other halogen compounds [1] shall not be used for disinfection purposes or other treatment purposes including biocide applications for any treatment facility with a permitted flow of 20,000 gallons per day or more discharging to waters containing endangered or threatened species as identified in Section VR680-21-07.2 or to waters classified as natural trout waters except for dischargers who intermittently chlorinate. Dischargers of less than 20,000 gallons per day shall dechlorinate to the requirements of subsections A.1 and A.2 or to a non-detectable chlorine residual. Dischargers who intermittently chlorinate (not more than two hours in any eight hour period) shall be required to install equipment and/or employ procedures to assure dechlorination to a chlorine residual that meets the requirements of subsections A.1 and A.2, and to apply effective best management practices for chlorine. Dischargers who intermittently chlorinate shall, in order to address a possible malfunction of the dechlorination system, either have storage sufficient to contain the chlorinated water until it can be dechlorinated prior to discharge or have an online redundant and operational back-up dechlorination system.

Variance to this requirement shall not be made unless it has been affirmatively demonstrated that the beneficial uses of the water will be maintained and that either a change is justifiable to provide necessary economic or social development or the degree of waste treatment necessary to preserve the existing quality can not be economically or socially justified.

[1] Bromine, bromine chloride, hypochlorite and chlorine dioxide.

VR680-21-01.12 Radiological Quality Standards

| Substance | Standard | |
|---|---|---|
| Total Radium (Ra-226 & Ra-228) | 5 | pCi/1 |
| Radium 226 | 3 | pCi/1 |
| Gross Beta Activity* | 50 | pCi/1 |
| Gross Alpha Activity (excluding Radon & Uranium) | 15 | pCi/1 |
| Tritium | 20,000 | pCi/1 |

| | | |
|---|---|---|
| Strontium-90 | 8 | pCi/l |
| Manmade Radioactivity - Total Dose Equiv.** | 4 | mrem/yr |

pCi/l = picocurie per liter
mrem/yr = millirems per year

*The gross beta value shall be used as a screening value only. If exceeded the water must be analyzed to determine the presence and quantity of radionuclides to determine compliance with the tritium, strontium, and manmade radioactivity standards.

**Combination of all sources should not exceed total dose equivalent of 4 mrem/year.

VR680-21-01.13 Tributyltin in Surface Waters

The concentration of tributyltin (TBT) in freshwater shall not exceed 0.026 parts per billion (ug/l), and the concentration of tributyltin in saltwater shall not exceed 0.001 parts per billion (ug/l).

VR680-21-01.15 Surface Water Standards for the Protection of Human Heath

A. Dioxin

For the protection of human health from the toxic properties of dioxing ingested through water and contaminated aquatic organisms, the ambient concentration of all surface waters shall not exceed 1.2 parts per quadrillion (ppq) based upon a risk level of $10^{-5}$ and a potency of $1.75 \times 10^{4}$ $(mg/kg\text{-}day)^{-1}$.

B. The applicability of the standard in calculating an average effluent limit is based on the mean annual stream flow.

C. Variances to Water Quality Standards in Section VR680-21-01.15.A

The Board may consider site-specific modifications to the numerical standard in Section VR680-21-01.15.A where the applicant demonstrates that the alternative numerical water quality standard is sufficient to protect human health. Any demonstration provided to the Board for review shall utilize the previously referenced risk level and potency as its basis.

## VR680-21-02 STANDARDS WITH MORE SPECIFIC APPLICATION

### VR680-21.02.1 Fecal Coliform Bacteria - Shellfish Waters

In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, and including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following standard for fecal coliform bacteria shall apply:

The median fecal coliform value for a sampling station shall not exceed an MPN (most probable number) of 14 per 100 milliliters. Not more than 10% of samples shall exceed an MPN of 43 for a 5-tube, 3-dilution test or 49 for a 3-tube, 3-dilution test.

### VR680-21-02.2 Fecal Coliform Bacteria - Other Waters

A. General Requirements

In all surface waters, except shellfish waters and certain waters addressed in B. below, the fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a 30-day period, or a fecal coliform bacteria level of 1000 per 100 ml at any time.

B. Disinfection Policy

In waters that receive sewage discharges, all the reasonable, beneficial, seasonal uses in these waters shall be protected. The Board's Disinfection Policy applies to these waters.

1. Sewage Discharges in Relation to Water Supply Intakes

Discharges located within fifteen miles upstream or one tidal cycle downstream of a water supply intake shall be disinfected in order to achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters.

2. Sewage Discharges into Shellfish Waters

When sewage discharges are permitted to or within five miles upstream of shellfish waters, they shall be disinfected in order to achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters.

3. Sewage Discharges into Other Waters

Sewage discharges into other waters shall be adequately treated and disinfected as necessary to protect all the reasonable beneficial seasonal uses in these waters. Generally, these discharges shall achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters. However, the Board, with the advice of the State Department of Health, may determine that reduced disinfection of a discharge is appropriate on a seasonal or year-round basis. In making such a determination, the Board shall consider the actual and potential beneficial uses of these waters and the seasonal nature of those uses. Such determinations will be made during the process of approving, issuing, or reissuing the discharge permit and shall be in conformance with a Board approved site specific beneficial use-attainability analysis performed by the permittee. When making a case-by-case determination concerning the appropriate level of disinfection for sewage discharges into these waters, the Board shall provide a 45-day public notice period and opportunity for a public hearing.

VR680-21-02.3 Surface Water Standards for Surface Public Water Supplies

In addition to other standards established for the protection of public or municipal water supplies, the following standards apply at the water intake; the standards also apply to any upstream or downstream reach specified in the appropriate river basin table. The standards apply to both the water supply main stream and its tributaries within the designated distance.

| CONSTITUENT | CONCENTRATION (MG/L) |
|---|---|
| Arsenic | 0.05 |
| Barium | 1.0 |
| Cadmium* | 0.01 |
| Chloride | 250 |
| Chromium (Total) | 0.05 |
| Copper* | 1.0 |
| Foaming agents (measured as methylene blue active substances) | 0.5 |
| Iron (soluble) | 0.3 |
| Lead | 0.05 |
| Manganese (soluble) | 0.05 |
| Mercury* | 0.002 |
| Nitrate (as N) | 10 |
| Phenols | 0.001 |
| Selenium* | 0.01 |
| Silver* | 0.05 |
| Sulfate | 250 |
| Total dissolved solids | 500 |
| Zinc* | 5.0 |
| Chlorinated Hydrocarbon Insecticides: | |
| Endrin* | 0.0002 |
| Lindane* | 0.004 |
| Methoxychlor* | 0.1 |
| Toxaphene* | 0.005 |
| Chlorophenoxy Herbicides: | |
| 2,4-D | 0.1 |
| Silvex | 0.01 |

* The numeric standards for the constituents above are designed to protect public water supplies for human consumption. The limits established for those chemicals marked with an asterisk (*) may not protect aquatic life. Therefore, when a request to classify a

stream as a public water supply is received, an evaluation shall be made to determine whether more stringent limits are needed for those chemicals in order to ensure protection of aquatic life.

## VR680-21-03 WATER QUALITY CRITERIA FOR SURFACE WATER

### VR680-21-03.1 General Requirements

Section VR680-21-03.2 below establishes water quality criteria for certain substances in surface waters. Groundwater criteria are found in VR680-21-04.4. One basic distinction differentiates water quality criteria from water quality standards found in VR680-21-01 and VR680-21-04 of these regulations. The standards are always mandatory while the criteria are not. Criteria shall be utilized as mandatory requirements when in the judgement of the Board they are necessary to ensure the protection of the beneficial uses of the water body. The agency will employ the criteria values or any others it deems appropriate in establishing effluent limitations or other limitations necessary to protect the beneficial uses. The Board may consider modifications to these criteria, on a case-by-case basis, dependent upon a site-specific determination performed by the permittee which demonstrates that alternate criteria are sufficient to ensure protection of water quality.

VR680-21-03.2 Water Quality Criteria for Surface Water

Chronic Criteria for Protection of Aquatic Life ug/l

| Substance* | Value | Applicability |
|---|---|---|
| Aldrin | 0.03<br>0.003 | Freshwater<br>Saltwater |
| Ammonia | SEE TABLE ATTACHED | Freshwater |
| Arsenic-trivalent, inorganic, total recoverable | 190<br>36 | Freshwater<br>Saltwater |
| Cadmium total recoverable | $e^{0.7852(\ln(\text{hardness}))-3.490}$<br>9.3 | Freshwater<br>saltwater |
| Chlordane | 0.0043<br>0.004 | Freshwater<br>Saltwater |
| Chromium-hexavalent, total recoverable | 11<br>50 | Freshwater<br>Saltwater |
| trivalent, total recoverable | $e^{0.819(\ln(\text{hardness}))+1.561}$<br>No saltwater Value | Freshwater |
| Copper, total recoverable | $e^{0.8545(\ln(\text{hardness}))-1.465}$<br>2.9 | Freshwater<br>Saltwater |
| Cyanide, total | 5.2<br>1.0 | Freshwater<br>Saltwater |
| DDT | 0.001 | All Waters |
| Demeton | 0.1 | All Waters |
| Dieldrin | 0.0019 | All Waters |
| Endosulfan | 0.056<br>0.0087 | Freshwater<br>Saltwater |
| Endrin | 0.0023 | All Waters |
| Guthion | 0.01 | All Waters |
| Heptachlor | 0.0038<br>0.0036 | Freshwater<br>Saltwater |
| Hydrogen Sulfide | 2.0 | All Waters |
| Iron | 1,000<br>No Saltwater value | Freshwater |

*Total unless otherwise indicated

## Chronic Criteria for Protection of Aquatic Life ug/l

| Substance* | Value | Applicability |
|---|---|---|
| Kepone | Zero | All Waters |
| Lead, total recoverable | $e^{1.266(\ln(\text{hardness}))-4.661}$ | Freshwater |
| | 5.6 | Saltwater |
| Lindane | 0.080 | Freshwater |
| | 0.0016 | Saltwater |
| Malathion | 0.1 | All Waters |
| Manganese | 100 | Saltwater |
| Mercury | 0.10 | Saltwater |
| Methoxychlor | 0.03 | All Waters |
| Mirex | Zero | All Waters |
| Nickel total recoverable | $e^{0.76(\ln(\text{hardness}))+1.06}$ | Freshwater |
| | 7.1 | Saltwater |
| Parathion | 0.04 | All Waters |
| Phenol | 1.0 | All Waters |
| Phthalate Esters | 3.0 | All Waters |
| Polychlorinated Biphenyls | 0.014 | Freshwater |
| | 0.03 | Saltwater |
| Selenium, total inorganic | 35 | Freshwater |
| | 54 | Saltwater |
| Silver, total recoverable | $e^{1.72(\ln(\text{hardness}))-6.52}$ x0.01 | Freshwater |
| | 0.023 | Saltwater |
| Toxaphene | 0.013 | Freshwater |
| | 0.0007 | Saltwater |
| Zinc, total recoverable | 47 | Freshwater |
| | 58 | Saltwater |

*Total unless otherwise indicated

## Ammonia Criteria

| pH | 0 C | 5 C | 10 C | 15 C | 20 C | 25C | 30C |
|---|---|---|---|---|---|---|---|
| A. Salmonids or Other Sensitive Coldwater Species Present | | | | | | | |
| Un-ionized Ammonia (mg/liter $NH_3$) | | | | | | | |
| 6.50 | 0.0007 | 0.0009 | 0.0013 | 0.0019 | 0.0019 | 0.0019 | 0.0019 |
| 6.75 | 0.0012 | 0.0017 | 0.0023 | 0.0033 | 0.0033 | 0.0033 | 0.0033 |
| 7.00 | 0.0021 | 0.0029 | 0.0042 | 0.0059 | 0.0059 | 0.0059 | 0.0059 |
| 7.25 | 0.0037 | 0.0052 | 0.0074 | 0.0105 | 0.0105 | 0.0105 | 0.0105 |
| 7.50 | 0.0066 | 0.0093 | 0.0132 | 0.0186 | 0.0186 | 0.0186 | 0.0186 |
| 7.75 | 0.0109 | 0.0153 | 0.022 | 0.031 | 0.031 | 0.031 | 0.031 |
| 8.00 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.035 | 0.035 | 0.035 |
| 8.25 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.035 | 0.035 | 0.035 |
| 8.50 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.035 | 0.035 | 0.035 |
| 8.75 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.035 | 0.035 | 0.035 |
| 9.00 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.035 | 0.035 | 0.035 |
| Total Ammonia (mg/liter $NH_3$) | | | | | | | |
| 6.50 | 2.5 | 2.4 | 2.2 | 2.2 | 1.49 | 1.04 | 0.73 |
| 6.75 | 2.5 | 2.4 | 2.2 | 2.2 | 1.49 | 1.04 | 0.73 |
| 7.00 | 2.5 | 2.4 | 2.2 | 2.2 | 1.49 | 1.04 | 0.74 |
| 7.25 | 2.5 | 2.4 | 2.2 | 2.2 | 1.50 | 1.04 | 0.74 |
| 7.50 | 2.5 | 2.4 | 2.2 | 2.2 | 1.50 | 1.05 | 0.74 |
| 7.75 | 2.3 | 2.2 | 2.1 | 2.0 | 1.40 | 0.99 | 0.71 |
| 8.00 | 1.53 | 1.44 | 1.37 | 1.33 | 0.93 | 0.66 | 0.47 |
| 8.25 | 0.87 | 0.82 | 0.78 | 0.76 | 0.54 | 0.39 | 0.28 |
| 8.50 | 0.49 | 0.47 | 0.45 | 0.44 | 0.32 | 0.23 | 0.17 |
| 8.75 | 0.28 | 0.27 | 0.26 | 0.27 | 0.19 | 0.15 | 0.11 |
| 9.00 | 0.16 | 0.16 | 0.16 | 0.16 | 0.13 | 0.10 | 0.08 |
| B. Salmonids and Other Sensitive Coldwater Species Absent | | | | | | | |
| Un-ionized Ammonia (mg/liter $NH_3$) | | | | | | | |
| 6.50 | 0.0007 | 0.0009 | 0.0013 | 0.0019 | 0.0026 | 0.0026 | 0.0026 |
| 6.75 | 0.0012 | 0.0017 | 0.0023 | 0.0033 | 0.0047 | 0.0047 | 0.0047 |
| 7.00 | 0.0021 | 0.0029 | 0.0042 | 0.0059 | 0.0083 | 0.0083 | 0.0083 |
| 7.25 | 0.0037 | 0.0052 | 0.0074 | 0.0105 | 0.0148 | 0.0148 | 0.0148 |
| 7.50 | 0.0066 | 0.0093 | 0.0132 | 0.0186 | 0.026 | 0.026 | 0.026 |
| 7.75 | 0.0109 | 0.0153 | 0.022 | 0.031 | 0.043 | 0.043 | 0.043 |
| 8.00 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.050 | 0.050 | 0.050 |
| 8.25 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.050 | 0.050 | 0.050 |
| 8.50 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.050 | 0.050 | 0.050 |
| 8.75 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.050 | 0.050 | 0.050 |
| 9.00 | 0.0126 | 0.0177 | 0.025 | 0.035 | 0.050 | 0.050 | 0.050 |

B. Salmonids and Other Sensitive Coldwater Species Absent (cont.)

Total Ammonia (mg/liter $NH_3$)

| pH | 0C | 5C | 10C | 15C | 20C | 25C | 30C |
|---|---|---|---|---|---|---|---|
| 6.50 | 2.5 | 2.4 | 2.2 | 2.2 | 2.1 | 1.46 | 1.03 |
| 6.75 | 2.5 | 2.4 | 2.2 | 2.2 | 2.1 | 1.47 | 1.04 |
| 7.00 | 2.5 | 2.4 | 2.2 | 2.2 | 2.1 | 1.47 | 1.04 |
| 7.25 | 2.5 | 2.4 | 2.2 | 2.2 | 2.1 | 1.48 | 1.05 |
| 7.50 | 2.5 | 2.4 | 2.2 | 2.2 | 2.1 | 1.49 | 1.06 |
| 7.75 | 2.3 | 2.2 | 2.1 | 2.0 | 1.98 | 1.39 | 1.00 |
| 8.00 | 1.53 | 1.44 | 1.37 | 1.33 | 1.31 | 0.93 | 0.67 |
| 8.25 | 0.87 | 0.82 | 0.78 | 0.76 | 0.76 | 0.54 | 0.40 |
| 8.50 | 0.49 | 0.47 | 0.45 | 0.44 | 0.45 | 0.33 | 0.25 |
| 8.75 | 0.28 | 0.27 | 0.26 | 0.27 | 0.27 | 0.21 | 0.16 |
| 9.00 | 0.16 | 0.16 | 0.16 | 0.16 | 0.17 | 0.14 | 0.11 |

Site-specific criteria development is strongly suggested at temperatures above 20°C because of the limited data available to generate the criteria recommendation, and at temperatures below 20°C because of the limited data and because small changes in the criteria may have significant impact on the level of treatment required in meeting the recommended criteria.

## VR680-21-04 GROUNDWATER STANDARDS

### VR680-21-04.1 General Requirements

Except where otherwise specified, groundwater quality standards shall apply statewide and shall apply to all groundwater occurring at and below the uppermost seasonal limits of the water table. In order to prevent the entry of pollutants into groundwater occurring in any aquifer, a soil zone or alternate protective measure or device sufficient to preserve and protect present and anticipated uses of groundwater shall be maintained at all times. Zones for mixing wastes with groundwater may be allowed, upon request, but shall be determined on a case-by-case basis and shall be kept as small as possible. It is recognized that natural groundwater quality varies from area to area. Virginia is divided into four Physiographic Provinces, namely the Coastal Plain, Piedmont and Blue Ridge, Valley and Ridge, and Cumberland Plateau. See Figure 1. Accordingly, the Board has established certain groundwater standards specific to each individual Physiographic Province.

### VR680-21-04.2 - Anti-degradation Policy for Groundwater

If the concentration of any constituent in groundwater is less than the limit set forth by groundwater standards, the natural quality for the constituent shall be maintained; natural quality shall also be maintained for all constituents, . . . including temperature, not set forth in groundwater standards. If the concentration of any constituent in groundwater exceeds the limit in the standard for that constituent, no addition of that constituent to the naturally occurring concentration shall be made. Variance to this policy shall not be made unless it has been affirmatively demonstrated that a change is justifiable to provide necessary economic or social development, that the degree of waste treatment necessary to preserve the existing quality cannot be economically or socially justified, and that the present and anticipated uses of such water will be preserved and protected.

# GROUNDWATER QUALITY STANDARDS

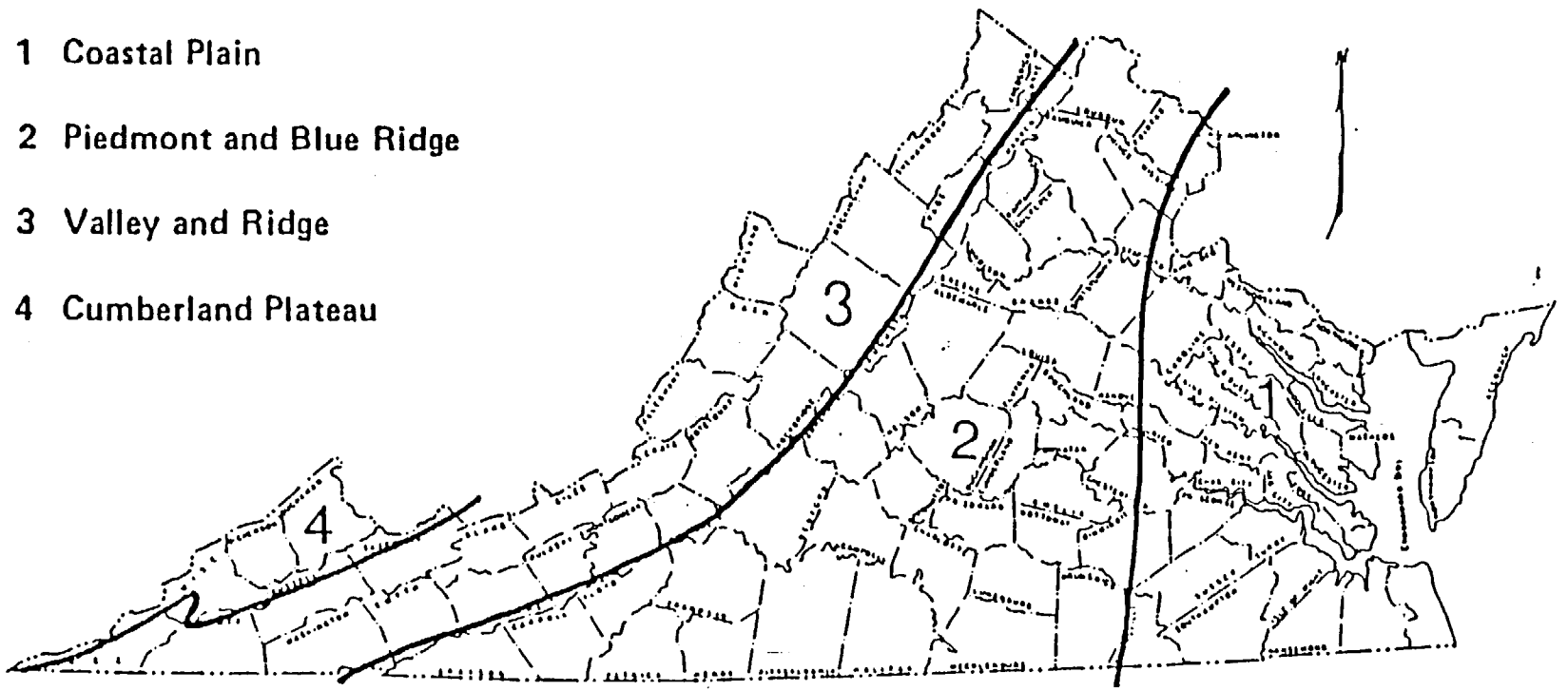
## PHYSIOGRAPHIC PROVINCES

1 Coastal Plain

2 Piedmont and Blue Ridge

3 Valley and Ridge

4 Cumberland Plateau



## GROUNDWATER STANDARDS APPLICABLE STATEWIDE

| Constituent | Concentration | |
|---|---|---|
| Sodium | 270 | mg/1 |
| Foaming Agents as methylene blue active substances | 0.05 | mg/1 |
| Petroleum hydrocarbons | 1.0 | mg/1 |
| Arsenic | 0.05 | mg/1 |
| Barium | 1.0 | mg/1 |
| Cadmium | 0.0004 | mg/1 |
| Chromium | 0.05 | mg/1 |
| Copper | 1.0 | mg/1 |
| Cyanide | 0.005 | mg/1 |
| Lead | 0.05 | mg/1 |
| Mercury | 0.00005 | mg/1 |
| Phenols | 0.001 | mg/1 |
| Selenium | 0.01 | mg/1 |
| Silver | None | |
| Zinc | 0.05 | mg/1 |
| **Chlorinated Hydrocarbon Insecticides** | | |
| Aldrin/Dieldrin | 0.003 | ug/1 |
| Chlordane | 0.01 | ug/1 |
| DDT | 0.001 | ug/1 |
| Endrin | 0.004 | ug/1 |
| Heptachlor | 0.001 | ug/1 |
| Heptachlor Epoxide | 0.001 | ug/1 |
| Kepone | None | |
| Lindane | 0.01 | ug/1 |
| Methoxychlor | 0.03 | ug/1 |
| Mirex | None | |
| Toxaphene | None | |

## GROUNDWATER STANDARDS APPLICABLE STATEWIDE

| Constituent | Concentration | |
|---|---|---|
| **Chlorophenoxy Herbicides** | | |
| 2,4-D | 0.1 | mg/1 |
| Silvex | 0.01 | mg/1 |
| **Radioactivity** | | |
| Total Radium (Ra-226 & Ra-228) | 5 | pCi/1 |
| Radium 226 | 3 | pCi/1 |
| Gross Beta Activity* | 50 | pCi/1 |
| Gross Alpha Activity (excluding Radon & Uranium) | 15 | pCi/1 |
| Tritium | 20,000 | pCi/1 |
| Strontium-90 | 8 | pCi/1 |
| Manmade Radioactivity - Total Dose Equiv, ** | 4 | mrem/yr |

PCi/1 = picocurie per liter

Mrem/yr = millirems per year

*The gross beta value shall be used as a screening value only. If exceeded the water must be analyzed to determine the presence and quanity of radionuclids to determine compliance with the tritium, strontium, and manmade radioactivity standards.

**Combination of all sources should not exceed total dose equivalent of 4 mrem/year.

Source: Virginia State Water Control Board, 1989.

## GROUNDWATER STANDARDS APPLICABLE BY STATE

## PHYSIOGRAPHIC PROVINCE

| CONSTITUENT | CONCENTRATION | | | |
|---|---|---|---|---|
| | Coastal Plain | Piedmont and Blue Ridge | Valley and Ridge | Cumberland Plateau |
| pH | 6.5 - 9 | 5.5 - 8.5 | 6 - 9 | 5 - 8.5 |
| Ammonia Nitrogen | 0.025 mg/1 | 0.025 mg/1 | 0.025 mg/1 | 0.025 mg/1 |
| Nitrite Nitrogen | 0.025 mg/1 | 0.025 mg/1 | 0.025 mg/1 | 0.025 mg/1 |
| Nitrate Nitrogen | 5.0 mg/1 | 5.0 mg/1 | 5.0 mg/1 | 0.5 mg/1 |

Source: Virginia State Water Control Board, 1989.

VR680-21-05 WATER QUALITY CRITERIA FOR GROUNDWATER

VR680-21-05.1 General Requirements

These groundwater quality criteria apply primarily to groundwater constituents that occur naturally. Since natural groundwater quality can vary greatly from area to area for these constituents, enforceable standards were not adopted. These criteria are intended to provide guidance in preventing groundwater pollution. Groundwater criteria carry the same regulatory limitation as surface water criteria: they are not mandatory.

VR680-21-05.2 Groundwater Criteria

| CONSTITUENT (mg/l) | GROUNDWATER CRITERIA BY PHYSIOGRAPHIC PROVINCE*** | | | |
|---|---|---|---|---|
| | Coastal Plain | Piedmont & Blue Ridge | Valley & Ridge | Cumberland Plateau |
| Alkalinity | 30-500 | 10-200 | 30-500 | 30-200 |
| Total Diss. Solids | 1000 | 250 | 500 | 500 |
| Chloride | 50* | 25 | 25 | 25 |
| Sulfate | 50 | 25 | 100 | 150 |
| Total Organic Carbon | 10 | 10 | 10 | 10 |
| Color units | 15 | 15 | 15 | 15 |
| Iron | 0.3 | 0.3 | 0.3 | 0.01-10 |
| Manganese | 0.05 | 0.05 | 0.05 | 0.01-0.5 |
| Sodium | 100* | 25 | 25 | 100 |
| Fluoride | 1.4** | 1.4 | 1.4 | 1.4 |
| Hardness | 120 | 120 | 300 | 180 |

* It is recognized that naturally occurring concentrations will exceed this limit in the eastern part of the Coastal Plain, especially toward the shoreline and with increased depth.

** Except within the cretaceous aquifer: concentration up to 5 mg/l and higher.

*** See Figure 1, for delineation of physiographic provinces.

VR680-21-07 SPECIAL STANDARDS AND DESIGNATIONS

VR680-21-07.1 Special Standards and Requirements

The special standards are shown in small letters to correspond to lettering in the basin tables. The special standards are as follows:

a. Shellfish Waters

In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following standard for fecal coliform bacteria will apply:

The median fecal coliform value for a sampling station shall not exceed an MPN of 14 per 100 ml of sample and not more than 10% of samples shall exceed 43 for a 5-tube, 3-dilution test or 49 for a 3-tube, 3-dilution test.

The shellfish area is not to be so contaminated by radionuclides, pesticides, herbicides, or fecal material that the consumption of shellfish might be hazardous.

m. The following effluent standards apply to the entire Chickahominy Watershed above Walker's Dam:

| | CONSTITUENT | CONCENTRATION |
|---|---|---|
| 1. | Bio-chemical Oxygen demand 5-day at 20° | 6.0 mg/l monthly average, with not more than 5% of individual samples to exceed 8.0 mg/l |
| 2. | Settleable Solids | Not to exceed 0.1 ml/l |
| 3. | Suspended Solids | 5.0 mg/l monthly average, with not more than 5% of individual samples to exceed 7.5 mg/l |
| 4. | Ammonia Nitrogen | Not to exceed 2.0 mg/l as N |
| 5. | Total Phosphorus | Not to exceed 0.1 mg/l monthly average for all discharges with the exception of Holly Farms Poultry Industries, Inc. which shall meet 0.3 mg/l monthly average and 0.5 mg/l daily maximum. |
| 6. | Other Physical and Chemical Constituents | Other physical or chemical constituents not specifically mentioned will be covered by additional specifications as conditions detrimental to the stream arise. The specific mention of items 1 through 5 does not necessarily mean that the addition of other physical or chemical constituents will be condoned. |

n. No sewage discharges, regardless of degree of treatment, should be allowed into the James River between Bosher and Williams Island Dams.

o. The concentration and total amount of impurities in Tuckahoe Creek and its tributaries of sewage origin shall be limited to those amounts from sewage, industrial wastes, and other wastes which are now present in the stream from natural sources and from existing discharges in the watershed.

p. Cancelled.

VR680-21-07.2 Outstanding State Resource Waters.

The following section recognizes waters which the General Assembly, Board and/or other State agencies have determined to be of special ecological or recreational significance to the State. The designation of a Scenic River and the significance of this designation are the subject of the Scenic Rivers Act (Section 10-167 et seq. of the Code of Virginia). The listing of Outstanding State Resource Waters that follows constitutes those waters which the Board has designated as high quality state resource waters subject to the protections found in the anti-degradation policy in Section VR680-21-01.3.

A. Scenic Rivers

The purpose of the Scenic Rivers Act is to provide for identification, preservation, and protection of certain rivers which possess natural beauty of high quality to assure their use and enjoyment for their scenic, recreational, geologic, fish and wildlife, historic, cultural or other values. According to the Act "in all planning for the use and development of

water and related land resources including the construction of impoundments, diversions, roadways, crossings, channelization, locks, canals, or other uses which change the character of a stream or waterway or destroy its scenic values, full consideration and evaluation of the river as a scenic resource shall be given before alternative plans for use and development are approved".

The following have been included by the General Assembly in the Scenic Rivers System:

POTOMAC RIVER BASIN

POTOMAC RIVER SUBBASIN

SR-1 Goose Creek from its confluence with the Potomac River upstream to the Fauquier-Loudoun County line (about 28 miles).

SR-2 Catoctin Creek in Loudoun County from its confluence with the Potomac River upstream to the Town of Waterford.

SHENANDOAH RIVER SUBBASIN

SR-3 The Shenandoah River in Clarke County from the Warren-Clarke County line to Lockes Landing.

JAMES RIVER BASIN

SR-4 The Saint Marys River in Augusta County within the George Washington National Forest.

SR-5 Rivanna River from its confluence with the James River upstream to the Fluvanna-Albemarle County line.

SR-6 Appomattox River from the Route 36 bridge crossing in the City of Petersburg upstream to the abutment dam located about 1.3 miles below Lake Chesdin (about 5 miles).

SR-9 The James River from Orleans Street extended in the City of Richmond westward to the 1970 corporate limits of the City.

SR-10 The Upper James River from a point two miles below Eagle Rock to the Route 630 bridge in Springwood, 14+/- miles.

RAPPAHANNOCK RIVER BASIN

SR-11 The Rappahannock River from its headwaters near Chester Gap to the confluence of Deep Run at the Fauquier/Stafford County line, 64+/- miles.

ROANOKE RIVER BASIN

SR-7 Roanoke (Staunton) River from Brookneal upstream to Long Island.

CHOWAN AND DISMAL SWAMP BASIN

CHOWAN RIVER SUBBASIN

SR-8 The Nottoway River in Sussex County from the Route 40 bridge at Stony Creek to the Southampton County line.

B. Trout Streams

Trout streams that are Class I and II according to the Commission of Game and Inland Fisheries Classification System are indicated by Trout Stream subclassifications i and ii in this booklet.

C. Waters Containing Endangered or Threatened Species.

The following waters provide essential or critical habitat for endangered or threatened species which have been identified by the United States Fish and Wildlife Service under the Endangered Species Act of 1973, as amended. If the U.S. Fish and Wildlife Service identifies new waters containing endangered or threatened species, the Board shall consider the need to protect these beneficial uses in reviewing discharge permits and other actions until such time as the waters are officially added to the list in this section.

VR680-21-07.3 Nutrient Enriched Waters

§ 1. Purpose.

The board recognizes that nutrients are contributing to undesirable growths of aquatic plant life in surface waters of the Commonwealth. This standard establishes a designation of "nutrient enriched waters". Designations of surface waters of the Commonwealth as "nutrient enriched waters" are determined by the board based upon an evaluation of the historical water quality data for one or more of the following indicators of nutrient enrichment: chlorophyll "a" concentrations, dissolved oxygen fluctuations, and concentrations of total phosphorus.

§ 2. Authority.

This standard is adopted under the authority of §§ 62.1-44.15(3) and 62.1-44.15(10) of the Code of Virginia.

§ 3, Designation of nutrient enriched waters.

A. The following State waters are hereby designated as "nutrient enriched waters":

1. Smith Mountain Lake and all tributaries* of the impoundment upstream to their headwaters.

2. Lake Chesdin from its dam upstream to where the Route 360 bridge (Goodes Bridge) crosses the Appomattox River, including all tributaries to their headwaters that enter between the dam and the Route 360 bridge.

3. South Fork Rivanna Reservoir and all tributaries of the impoundment upstream to their headwaters.

4. Peak Creek from its headwaters to its mouth (confluence with Claytor Lake), including all tributaries to their headwaters.

5. Aquia Creek from its headwaters to the state line.

6. Fourmile Run from its headwaters to the state line.

7. Hunting Creek from its headwaters to the state line.

8. Little Hunting Creek from its headwaters to the state line.

9. Gunston Cove from its headwaters to the state line.

10. Belmont and Occoquan Bays from their headwaters to the state line.

11. Potomac Creek from its headwaters to the state line.

12. Neabsco Creek from its headwaters to the state line.

13. Williams Creek from its headwaters to its confluence with Lower Machodoc Creek.

14. Tidal freshwater Rappahannock River from the fall line to Buoy 44, near Leedstown, Virginia, including all tributaries to their headwaters that enter the tidal freshwater Rappahannock River.

15. Estuarine portion of the Rappahannock River from Buoy 44, near Leedstown, Virginia, to the mouth of the Rappahannock River (Buoy 6), including all tributaries to their headwaters that enter the estuarine portion of the Rappahannock River.

16. Estuarine portion of the Mattaponi River from Clifton, Virginia, and estuarine portion of the Pamunkey River from Sweet Hall Landing, Virginia to West Point, Virginia, and the York River from West Point, Virginia, to the mouth of the York River (Tue Marsh Light) including all tributaries to their headwaters that enter the estuarine portions of the Mattaponi River, the Pamunkey River and the York River.

17. Tidal freshwater James River from the fall line to the confluence of the Chickahominy River (Buoy 70) including all tributaries to a distance five river miles above their fall lines that enter the tidal freshwater James River.

18. Estuarine portion of the James River from its confluence with the Chickahominy River (Buoy 70) to the mouth of the James River (Buoy

25), including all tributaries to their headwaters.

19. Chesapeake Bay and its small coastal basins from the Virginia State line to the mouth of the Bay (a line from Cape Henry drawn through Buoys 3 and 8 to Fishermans Island), and its tidal tributaries, excluding the Potomac tributaries, those tributaries listed above, and the Mattaponi River upstream of Clifton, Virginia, and the Pamunkey River upstream of Sweet Hall Landing, Virginia.

20. Tidal freshwater Blackwater River from the Norfolk and Western railway bridge at Burdette, Virginia, and tidal freshwater Nottoway River from the Norfolk and Western railway bridge at Courtland, Virginia, to the State line, including all tributaries to their headwaters that enter the tidal freshwater portions of the Blackwater River and the Nottoway River.

B. Whenever any water body is designated as "nutrient enriched waters", the board shall modify the NPDES permits of point source dischargers into the "nutrient enriched waters" as provided in the board's Policy for Nutrient Enriched Waters (VR-680-14-02).

* When the word "tributaries" is used in this standard, it does not refer to the mainstem of the water body that has been named.

## VR680-21-08 RIVER BASIN SECTION TABLES

### VR680-21-08.1 Section Number and Description Columns

A. Basin Descriptions

The tables that follow divide the State's surface waters into nine river basins, some with subbasins: Potomac River Basin (Potomac and Shenandoah Subbasins), James River Basin, Rappahannock River Basin, Roanoke River Basin (Roanoke and Yadkin Subbasins), Chowan and Dismal Swamp Basin (Chowan and Albemarle Sound Subbasins), Tennessee and Big Sandy Basins (Big Sandy, Clinch and Holston Subbasins), Chesapeake Bay, Atlantic Ocean and Small Coastal Basin, York and New River Basin. (See Figure 2.)

Each basin is further divided into sections. Each section is assigned a Class, represented by Roman Numerals I through VII, based on its geographic location or, in the case of trout waters, on its use. Descriptions of these Classes are found in Section VR680-21-01.5.

B. Potomac Water Supplies (Raw Water Intakes)

The Leesburg and County of Fairfax intakes in the Potomac are in Maryland waters and the Board cannot adopt the standards in Section VR680-21-02.3 to apply at the raw water intake points. However, applications to discharge into, or otherwise alter the physical, chemical, or biological properties of Virginia waters within an area five miles upstream of the intake will be reviewed on a case-by-case basis to ensure that they will protect the water supply. Basin sections where this would be applicable are shown with an asterisk (*) in the Basin and Section description columns.

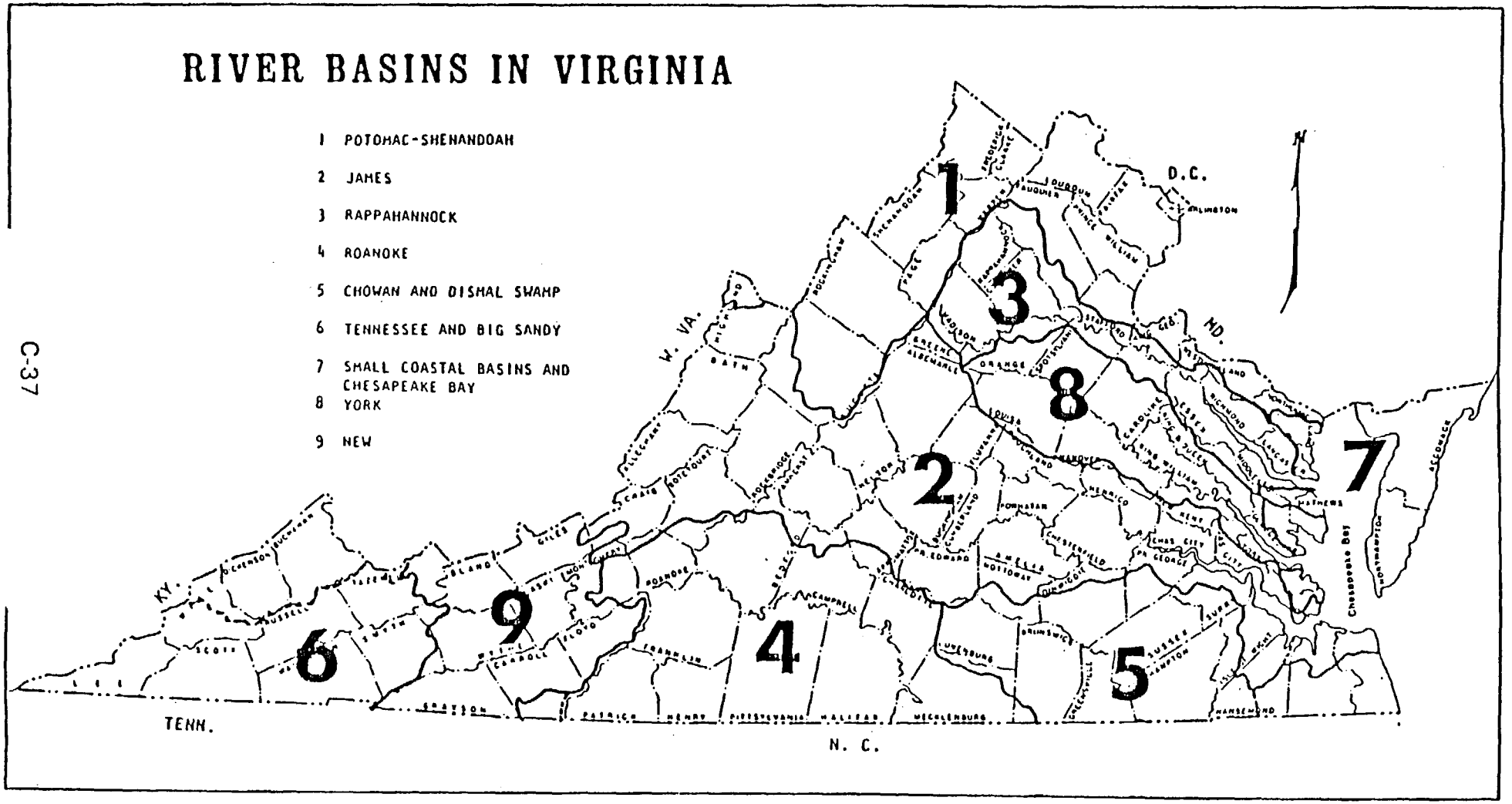
### VR680-21-08.2 Classification Column

A. DO, pH and Temperature Standards

The classification column defines the Class of waters to which the basin section belongs in accordance with the Class descriptions given in Section VR680-21-01.5. Section VR680-21-01.5 defines the State's seven classes (I-VII) and the

dissolved oxygen (DO), pH and maximum temperature that apply to each class. By finding the class of waters for a basin section in the Classification Column and referring to Section VR680-21-01.5, the DO, pH and maximum temperature standards can be found for each basin section.

# RIVER BASINS IN VIRGINIA



VR680-21-08.3 Special Standards Column

A. Bacteria Standards

All surface waters have a standard for fecal coliform bacteria. The bacteria standard for shellfish waters is set forth in Section VR680-21-02.1, the standard applying to all other surface waters is found in Section VR680-21-02.2. The letter a in the Special Standards column next to a river basin section indicates that there are shellfish waters somewhere within that section and the bacteria standard for shellfish waters applies to those shellfish waters. (It should be noted that even though the column contains the letter a the entire section may not be shellfish waters.)

B. Natural Variation

In some cases natural water quality does not fall within the limits set by the standards. (For example streams in some areas of the State may naturally exceed the usual pH range of 6 to 9.0.) In these instances the Board may have set a more appropriate standard that reflects natural quality, and this special limit is shown in the Special Standards column.

C. Additional Requirements

In other cases the basic water quality parameters of DO, pH, temperature, and bacteria have not been sufficient to protect water quality in certain areas, and effluent limits or treatment requirements have been established for these areas. This fact is also indicated in the Special Standards column. If the applicable standard was too long to print in its entirety in that column, the column contains only a lower case letter, and the standard itself will be found in the Special Standards Section VR680-21-07.1 under that letter.

D. Other Special Standards or Designations

1. Public Water Supplies

Sections that are public water supplies are indicated in the Special Standards column with a PWS. This designation indicates that additional standards are applicable. (See Section VR680-21-02.3 for applicable standards).

2. Scenic Rivers

If a section contains a stream that has been designated a scenic river by the General Assembly, the Special Standards column indicates this with an SR- followed by a number. The appropriate waterway can be found listed in the Key to Special Standards Section under Scenic Rivers, Section VR680-21-07.2A. The entire section is not necessarily a scenic river, only that portion specifically listed in VR680-21-07.2A.

| SEC. | SECTION DESCRIPTION | CLASS | SP. STDS. |
|---|---|---|---|
| | VR680-21-08.6 JAMES RIVER BASIN (LOWER) | | |
| 1 | James River and its tidal tributaries from Old Point Comfort - Fort Wool to Barrets Point (Buoy 64), except prohibited or spoil areas, unless otherwise designated. | II | a |
| 1a | Free flowing or non-tidal portions of streams in Section 1, unless otherwise designated. | III | |
| 1b | Eastern Branch of the Elizabeth River and tidal portions of its tributaries from its confluence with the Elizabeth River to the end of tidal waters. | II | a |
| 1c | Free flowing portions of the Eastern Branch of the Elizabeth River and its tributaries. | III | |
| 1d | Southern Branch of the Elizabeth River from its confluence with the Elizabeth River to the lock at Great Bridge. | II | a |
| 1e | Free flowing portions of the Western Branch of the Elizabeth River and of the Southern Branch of the Elizabeth River from their confluence with the Elizabeth River to the lock at Great Bridge. | III | |
| 1f | Nansemond River and its tributaries from its confluence with the James River to Suffolk (dam at Lake Meade), unless otherwise designated. | II | a |
| 1g | Shingle Creek from its confluence with the Nansemond River to its headwaters in the Dismal Swamp. | III | |
| 1h | Lake Prince, Lake Burnt Mills and Western Branch impoundments for Norfolk raw water supply and Lake Kilby - Cahoon Pond, Lake Meade and Lake Speight impoundments for Portsmouth raw water supply. | III | PWS |

| | | | |
|---|---|---|---|
| 1i | Free flowing portions of the Pagan River and its free flowing tributaries. | III | |
| 1j | Chisel Run and its tributaries, except that tributary into which Eastern State Hospital discharges, to their headwaters. | III | |
| 1k | Skiffes Creek Reservoir (Newport News water impoundment). | III | PWS |
| 1l | The Lone Star lakes and impoundments in the City of Suffolk, Chuckatuck Creek watershed which, will serve as a water source for the City of Suffolk. | III | PWS |
| 1m | The Lee Hall reservoir system, near Skiffes Creek and the Warwick River, in the City of Newport News. | III | PWS |
| 1n | Chuckatuck Creek and its tributaries from Suffolk's raw water intake (at Godwin's Millpond) to a point 5 miles upstream. | III | PWS |

| SEC. | SECTION DESCRIPTION | CLASS | SP. STDS. |
|---|---|---|---|
| | VR680-21-08.7 JAMES RIVER BASIN (MIDDLE) | | |
| 2 | James River and its tidal tributaries from Buoy 64 near Barrets Point upstream to the fall line at Richmond, to include the Chickahominy River and its tidal tributaries from the mouth upstream to Walkers Dam and the Appomattox River and its tidal tributaries from the mouth upstream to the head of tidal waters (approximately at the Route 1/301 Bridge across the Appomattox), unless otherwise designated. | II | |
| 2a | James River from City Point to a point 5 miles above American Tobacco Company's raw water intake and the Appomattox River and its tidal tributaries from its mouth to 5 miles upstream of Virginia-American Water Company's raw water intake. | II | PWS |
| 2b | Free flowing tributaries to Section 2a. | III | PWS |
| 3 | Free flowing tributaries of the James River from Buoy 64 to Brandon and free flowing tributaries of the Chickahominy River to Walkers Dam, unless otherwise designated. | III | |
| 3a | Diascund Creek and its tributaries from Newport News' raw water intake dam to its headwaters. | III | PWS |
| 3b | Little Creek Reservoir and its tributaries from the City of Newport News impoundment dam to 5 miles upstream of the raw water intake. | III | PWS |
| 4 | Chickahominy River and its tributaries from Walkers Dam to Bottoms Bridge (Route 60 bridge). | III | m |
| 4a | Chickahominy River from Walkers Dam to a point 5 miles upstream. | III | PWS,m |

| SEC. | SECTION DESCRIPTION | CLASS | |
|---|---|---|---|
| | VR680-21-08-12 CHOWAN AND DISMAL SWAMP<br>Chowan River Subbasin | | |
| 1 | Blackwater River and its tidal tributaries from the Virginia-North Carolina State line to the end of tidal waters at approximately State Route 611 at river mile 20.90; Nottoway River and its tidal tributaries from the Virginia-North Carolina State line to the end of tidal waters at approximately Route 674. | II | |
| 2 | Blackwater and Nottoway Rivers from the end of tidal waters to their headwaters and their free-flowing tributaries in Virginia, unless otherwise designated. | III | SR-8 |
| 2a | Blackwater River and its tributaries from Norfolk's auxiliary raw water intake near Burdette, Virginia, to a point 5 miles above the raw water intake, to include Corrowaugh Swamp to a point 5 miles above the raw water intake. | III | PWS |
| 2b | (Deleted) | | |
| 2c | Nottoway River and its tributaries from Norfolk's auxiliary raw water intake near Courtland, Virginia, to a point 5 miles upstream. | III | PWS |
| 2d | (Deleted) | | |
| 2e | Nottoway River from the Georgia-Pacific and the Town of Jarratt's raw water intakes near Jarratt, Virginia, to a point 5 miles above the intakes. | III | PWS |
| 2f | Nottoway River and its tributaries from Camp Pickett's raw water intake to a point 5 miles above the raw water intake. | III | PWS |
| 2g | Lazaretto Creek and its tributaries from Crewe's raw water intake to a point 5 miles upstream. | III | PWS |

| | | | |
|---|---|---|---|
| 2h | Modest Creek and its tributaries from Victoria's raw water intake to their headwaters. | III | PWS |
| 2i | Nottoway River and its tributaries from the Town of Victoria's raw water intake at the Falls (about 200 feet upstream from State Route 49) to a point 5 miles upstream. | III | PWS |
| 2j | Big Hounds Creek from the Town of Victoria's auxiliary raw water intake (on Lunenburg Lake) to its headwaters. | III | PWS |
| 3 | Meherrin River and its tributaries in Virginia from the Virginia-North Carolina State line to its headwaters. | III | |
| 3a | Meherrin River and its tributaries from Emporia's water supply dam to a point 5 miles upstream. | III | PWS |
| 3b | Great Creek from Lawrenceville's raw water intake to a point 5 miles upstream. | III | PWS |
| 3c | Meherrin River from Lawrenceville's raw water intake to a point 5 miles upstream. | III | PWS |
| 3d | Flat Rock Creek from Kenbridge's raw water intake upstream to its headwaters. | III | PWS |
| 3e | Meherrin River and its tributaries from South Hill's raw water intake to a point 5 miles upstream. | III | PWS |
| 3f | Couches Creek from a point 1.6 miles downstream from the Industrial Development Authority discharge to its headwaters. | III | |

| SEC. | SECTION DESCRIPTION | CLASS | SP.STDS. |
|---|---|---|---|
| | VR680-21-08.13 CHOWAN AND DISMAL SWAMP<br>Albemarle Sound Subbasin | | |
| 1 | Back Bay and its tributaries in the City of Virginia Beach to the Virginia-North Carolina State line and the Northwest River and its tidal tributaries from the Virginia-North Carolina State line to the free flowing portion, and North Landing River and its tidal tributaries from the Virginia-North Carolina State line to the Great Bridge Lock. | II | |
| 1a | The free flowing portions of streams in Section 1 and tributaries of Stumpy Lake. | III | |
| 1b | Stumpy Lake (raw water supply for the City of Norfolk) and feeder streams to a point 5 miles upstream. | III | PWS |
| 1c | Northwest River and its tributaries from the City of Chesapeake's raw water intake to a point 5 miles upstream and a point 5 miles downstream. | III | PWS |
| 2 | Intracoastal Waterway (portions not described in Section 1). | III | |
| 3 | Lake Drummond, including feeder ditches, and all interstate tributaries of the Dismal Swamp between Virginia and North Carolina. | III | |

| SEC. | SECTION DESCRIPTION | CLASS | SP.STDS. |
|---|---|---|---|
| | VR680-21-08.17 CHESAPEAKE BAY, ATLANTIC OCEAN AND SMALL COASTAL BASINS | | |
| 1 | The Atlantic Ocean from Cape Henry Light (Latitude 36°55'06" North; Longitude 76°00'04" West) east to the three mile limit and south to the North Carolina State line. The Atlantic Ocean from Cape Henry Light to Thimble Shoal Channel (Latitude 36°57'30" North; Longitude 76°02'30" West) from Thimble Shoal Channel to Smith Island (Latitude 37°07'04" North; Longitude 75°54'04" West), and north to the Virginia-Maryland State line. | I | a |
| 1a | All free flowing portions of the streams, creeks and coves in Section 1 east of the east-west divide boundary on the Eastern Shore of Virginia. | III | |
| 1b | Tidal portions of streams, creeks and coves in Section 1 east of the east-west divide boundary on the Eastern Shore of Virginia. | II | a |
| 2 | Chesapeake Bay and its tidal tributaries from Old Point Comfort Tower (Latitude 37°00'00" North; Longitude 76°18'08" West) to Thimble Shoal Light (Latitude 37°00'09" North; Longitude 76°14'04" West) to and along the south side of Thimble Shoal Channel to its eastern end (Latitude 36°57'03" North; Longitude 76°02'03" West) to Smith Island (Latitude 37°07'04" North; Longitude 75°54'04" West) north to the Virginia-Maryland border following the east-west divide boundary on the Eastern Shore of Virginia, west along the Virginia-Maryland border, to the Virginia Coast, (Latitude 37°53'23" North; Longitude 76°14'25" West) and south following the Virginia Coast to Old Point Comfort Tower (previously described), unless otherwise designated. | II | a |

| | | | |
|---|---|---|---|
| 2a | Free flowing portions of streams lying on the Eastern Shore of Virginia west of the east-west divide boundary unless otherwise designated. | III | |
| 2b | Drummonds Millpond including Coards Branch. | III | |
| 2c | The Virginia Department of Agriculture experimental station pond and its tributaries. | III | |
| 2d | The free flowing streams tributary to the western portion of the Chesapeake Bay lying between the Virginia-Maryland State line and Old Point Comfort. | III | |
| 2e | Harwood's Mill Reservoir (in Poquoson River's headwaters - a source of water for the City of Newport News) and its tributaries. | III | PWS |
| 2f | Brick Kiln Creek and its tributaries from Fort Monroe's raw water intake (at the Big Bethel Reservoir) to a point 5 miles upstream. | III | PWS |
| 3 | Chesapeake Bay from Old Point Comfort Tower (Latitude 37°00'00" North; Longitude 76°18'08" West) to Thimble Shoal Light (Latitude 37°00'09" North; Longitude 76°14'04" West) along the south side of Thimble Shoal Channel to Cape Henry Light (Latitude 36°55'06" North; Longitude 76°00'04" West). | II | a |
| 3a | Little Creek from its confluence with Chesapeake Bay (Lynnhaven Roads) to end of navigable waters. | II | a |
| 3b | Tidal portions of Lynnhaven watershed from its confluence with the Chesapeake Bay (Lynnhaven Roads) to and including Lynnhaven Bay, Western Branch Lynnhaven River, Eastern Branch Lynnhaven River, Long Creek, Broad Bay and Linkhorn Bay, Thalia Creek and its tributaries to the end of tidal waters. Great Neck Creek and Little Neck Creek from their confluence with Linkhorn Bay and their tidal tributaries. Rainey Gut and Crystal Lake from their confluence with Linkhorn Bay. | II | a |

| | | | |
|---|---|---|---|
| 3c | Free flowing portions of streams in Section 3b, unless otherwise designated. | III | |
| 3d | Impoundments on Little Creek watershed. | III | PWS |
| 3e | London Bridge Creek from its confluence with the Eastern Branch of Lynnhaven River to the end of tidal waters. Wolfsnare Creek from its confluence with the Eastern Branch Lynnhaven River to the fall line. | II | |
| 3f | Free flowing portions of London Bridge Creek and Wolfsnare Creek and their free flowing tributaries. | III | |
| 3g | Lake Joyce and Lake Bradford. | III | |

| SEC. | SECTION DESCRIPTION | CLASS | SP.STDS. |
|---|---|---|---|
| | VR680-21-08.18 YORK RIVER BASIN | | |
| 1 | York River and the tidal portions of its tributaries from Goodwin Neck and Sandy Point upstream to Thorofare Creek and Little Salem Creek near West Point; Mattaponi River and the tidal portions of its tributaries from Little Salem Creek to the end of tidal waters; Pamunkey River and the tidal portions of its tributaries from Thorofare Creek near West Point to the end of tidal waters. | II | a |
| 2 | Free flowing tributaries of the York River, free flowing tributaries of the Mattaponi River to Clifton and the Pamunkey River to Romancoke, unless otherwise designated. | III | |
| 2a | Queen Creek and Waller Mill Pond to the headwaters of the pond. | III | PWS |
| 2b | Jones Pond (a tributary of Queen Creek near Williamsburg which serves as the raw water supply for Cheatham Annex Naval Station) and its tributaries to a point 5 miles upstream. | III | PWS |
| 3 | Free flowing portions of the Mattaponi and Pamunkey Rivers, free flowing tributaries of the Mattaponi above Clifton, and free flowing tributaries of the Pamunkey above Romancoke, unless otherwise designated. | III | |
| 3a | South Anna River from Ashland's raw water intake to a point 5 miles upstream. | III | PWS |
| 3b | Northeast Creek from the Louisa County Water Authority's impoundment dam (approximately 1/8 mile upstream of Route 33) to its headwaters. | III | PWS |
| 3c | South Anna River from Route 15 upstream to a point 1.5 miles below the effluent from the Gordonsville Sewage Treatment Plant. | III | |

| | | | |
|---|---|---|---|
| 3d | Ni River and its tributaries from Spotsylvania's raw water intake near 208 to their headwaters. | III | PWS |
| 3e | The North Anna River and its tributaries from Hanover County's raw water intake near Doswell (approximately 1/2 mile upstream from State Route 30) to a point 5 miles upstream. | III | PWS |
| 3f | Stevens Mill Run from the Lake Caroline water impoundment, and other tributaries into the impoundment upstream to their headwaters. | III | PWS |

# APPENDIX D

## Chesapeake Bay Toxics of Concern List

The following is a list of Chesapeake Bay toxics of concern, as identified by EPA's Chesapeake Bay Program in its May 1991 "Basinwide Toxics Reduction Strategy Commitment Report." This list was prepared by the Chesapeake Bay program Toxics Subcommittee's and Living Resources Subcommittee's Joint Criteria and Standards Workgroup.

- Atrazine
- Cadmium
- Chlordane
- Chromium
- Copper
- Lead
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Polynuclear Aromatic Hydrocarbons (PAHs)
    - Benzo [A]anthracene
    - Benzo [A]pyrene
    - Chrysene
    - Fluoranthene
    - Napthalene
- Tributylin (TBT)

# APPENDIX E

## Summary of WQIA Provisions from

## CBPA Model Ordinances

## and Local CBPA Ordinances in Hampton Roads

This appendix contains a summary of all provisions found within the WQIA procedures of the CBPA models and locally-adopted CBPA ordinances reviewed for this report. Additional notes regarding specific provisions, as indicated by bolded parenthetical references, are at the end of each sub-section. By providing this documentation, it is not the intent of this report to recommend any or all such provisions; rather, they are included solely as examples and should be used for comparison purposes only. Those provisions which are considered optimal for use in a WQIA procedure can be found in the Model WQIA Procedure.

## Applicability/General Qualifying Criteria

The following provisions include criteria which have been used in determining when a WQIA should be required or be applicable. General qualifying criteria are listed first; the provisions in this section would be placed in a WQIA procedure prior to a minor or major WQIA criteria and information requirements section. Any combination of these criteria can also stand alone if only one level of assessment is used. Following this section are minor and major WQIA applicability criteria which were used when a two- tiered approach to WQIA was taken. Additional threshold criteria based on specific land use activities are listed in Appendix B; these assessment guides list the determinants of impact severity, such as specific properties or characteristics of the land use activity, which can be used in making a preliminary determination regarding the magnitude of possible adverse impacts to water quality.

**General Criteria:**

CBLAD Model

"A water quality impacts assessment is required for (i) any proposed development within a RPA, including any buffer area modification or reduction as provided for in the Performance Criteria Standards section of this ordinance; (ii) any development in a RMA as deemed necessary by the Administrative Authority due to the unique characteristics of the site or intensity of the proposed development."

Other examples by order of complexity:

- Any proposed development or redevelopment which disturbs any portion of a RPA.

- Any proposed development within a RPA, including any buffer area modification or reduction as provided for herein.

- Any proposed development, redevelopment, and improvements to existing structures within a RPA, including any buffer area modification or reduction as provided for elsewhere in this ordinance.

- Any proposed development, redevelopment, or improvements to existing structures which disturb lands within any portion of a RPA, regardless of square footage of land disturbance.

- Any proposed development within a RPA, including any buffer area modification or reduction of the landward 50' of the 100' buffer area.

- Any development in a RPA which requires modification or reduction of the landward 50' of the 100' buffer area, disturbs any portion of the buffer area within 50' of any other component of the RPA, or which disturbs any portion of any other component of the RPA.

- (i) Any proposed development within a RPA, including any buffer area modification or reduction as provided for elsewhere in the CBPA ordinance; (ii) any development in a RMA as deemed necessary by the [designated authority].

- (i) Any proposed development or redevelopment within a RPA; (ii) any proposed development or redevelopment in a RMA when required because of the unique characteristics of the site or project intensity.

- (i) Any proposed development or redevelopment within a RPA; (ii) any proposed development or redevelopment in a RMA when required because of the unique characteristics of the site or intensity of the proposed development on water quality and land in the RPA.

- (i) Any proposed development or redevelopment within a RPA, (ii) any proposed development or redevelopment within an RMA with a land area disturbance exceeding 5,000 sf. (Alternative thresholds could be 2,500 sf. or 10,000 sf., to be selected at local discretion.)

- (i) Any development which exceeds 5,000 sf. of land disturbance or land disturbing activity within a CBPA and requires modification or reduction of the landward 50' of the 100' buffer area, (ii) disturbs any portion of the buffer area within 50' of any other component, (iii) disturbs any portion of any other component of the RPA, or (iv) is located in a RMA and is deemed necessary.

- (i) Any proposed development or redevelopment within a RPA, including any buffer area modification or reduction as provided for elsewhere in the CBPA ordinance, or (ii) any proposed development or

redevelopment within a RMA. The latter requirement may be waived when it is apparent that the unique characteristics of the site (e.g. soils, topography, groundcover, location of wetlands and tidal shores) will prevent the proposed development from causing a degradation to water quality. **(1)**

- o (i) Any development or redevelopment within a RPA; (ii) any buffer area encroachment or reduction provided for in the CBPA ordinance; or (iii) where is deemed necessary by the designated authority to evaluate the potential impacts of the development or redevelopment upon water quality or a RPA by reason of the unique characteristics of the site or the intensity of the proposed use or development.

- o Any proposed land use specifically set forth in the zoning ordinance or other applicable ordinance as automatically requiring compliance with a WQIA procedure.

- o A natural resources inventory shall be required for all propoerties proposed for development within areas with an elevation of less than 4' above mean sea level, areas with slopes in excess of 20%, coastal and inland marshes, and areas designated by the locality as CBPAs.

  As part of the natural resources inventory for development in CBPAs, prepared in accordance with methods and procedures prescribed by the designated authority and based on degree of land disturbance and water quality sensitivity of the lands impacted.

Notes: (1) This example can be reworded to state that the designated authority may waive the latter requirement after issuance in writing of findings indicating that the unique characteristics of the site [same as example] or the insignificance of the proposed development will not cause a degradation to water quality.

**Minor WQIA Criteria:**

CBLAD Model

"A minor water quality impact assessment pertains only to development within a CBPA which causes no more than 5,000 sf. of land disturbance and requires any modification or reduction of the landward 50' of the 100' buffer area."

Other examples:

- Development within the RPA which causes no more than 5,000 sf. of land disturbance and requires any modification or reduction of the landward 50' of the 100' buffer area.

- Development which covers no more than one acre of land disturbance within the RPA and requires any modification or reduction of the landward 50' of the 100' buffer area. **(2)**

- Development within CBPAs which causes no more than 10,000 sf. of land disturbance and requires any modification or reduction of the landward 50' of the 100' buffer area.

- Development within RMAs which causes from 2,500 to 10,000 sf. of land disturbance, or for any single-family or duplex development within RPAs which causes up to 10,000 sf. of land disturbance, or for any other development within RPAs which causes up to 2,500 sf. of land disturbance.

- Development of individual single-family lots, or other development within CBPAs which causes no more than 10,000 sf. of land disturbance and requires any modification or reduction of the landward 50' of the 100' buffer area.

- Development associated with a single-family residential dwelling unit which encroaches into any component of a RPA, as well as development within CBPAs which causes less than 5,000 sf. of land disturbance and requires buffer area modification or reduction in landward 50' of 100' buffer area. **(3)**

Notes: (2) One acre is equivalent to 43,560 sf.; such a high threshold for area of land disturbance is not recommended. The result of using this threshold has the potential to eliminate major development impacts from consideration which would normally be acknowledged or more appropriately addressed in a major WQIA.

(3) By limiting development within a RPA associated with a single-family dwelling unit solely to a minor WQIA, the potential exists for eliminating major development impacts from consideration which would normally be acknowledged or more appropriately addressed in a major WQIA.

**Major WQIA Criteria:**

CBLAD Model

"A major water quality impact assessment shall be required for any development which (i) exceeds 5,000 sf. of land disturbance within CBPAs and requires any modification or reduction of the landward 50' of the 100' buffer area; (ii) disturbs any portion of the seaward 50' of the 100' buffer area or any other component of a RPA; or (iii) is located in a RMA when deemed necessary by the Administrative Authority."

Other examples:

- Any development which exceed 5,000 sf. of land disturbance within a RPA and requires any modification or reduction of the landward 50' of the 100' buffer area, or (ii) disturbs any portion of the seaward 50' of the 100' buffer area or any other component of a RPA.

- Any development which (i) exceeds 5,000 sf. of land disturbance within a RPA or (ii) is located in a RMA and is deemed necessary.

- Any development which exceeds 5,000 sf. of land disturbance within CBPAs and requires any modification or reduction of the landward 50' of the 100' buffer area; disturbs any portion of any other component of a RPA or disturbs any portion of the buffer area within 50' of any other component of a RPA, or is located in a RMA and is deemed necessary.

- Any development which (i) exceed 10,000 sf. of land disturbance within CBPAs and requires any modification or reduction of the landward 50' of the 100' buffer area; (ii) disturbs any portion of any other component of a RPA or disturbs any portion of the buffer area within 50' of any other component of an RPA; or (iii) is located in a RMA and is deemed necessary.

- Any development which (i) exceeds 5,000 sf. of land disturbance within CBPAs and requires any modification or reduction of the landward 50' of the 100' buffer area; or (ii) disturbs any portion of the seaward 50' of the 100' buffer area or any other component of a RPA; (iii) except development associated with a single-family residential dwelling unit. **(4)**

- Any development which exceeds 10,000 sf. of land disturbance within the RMA, or single-family duplex development which exceeds 10,000 sf. of land disturbance in a RPA, or any other development which exceed 2,500 sf. of land disturbance in a RPA.

- Any non-individual single-family lot development which (i) exceeds 10,000 sf. of land disturbance within CBPAs and requires any modification or reduction of the landward 50' of the 100' buffer area; (ii) disturbs any portion of the seaward 50' of the 100' buffer area or any other component of a RPA; or (iii) is located in a RMA and is deemed necessary. **(5)**

- Any development which exceeds 10,000 sf. of land disturbance within a RMA; or, any single-family or duplex development which exceeds 10,000 sf. of land disturbance in a RPA; or, any other development which exceeds 2,500 sf. of land disturbance within a RPA.

Notes (4) See note #3.
(5) See note #3

**Information to be Submitted for Review**

The following provisions were used in reviewed CBPA models and locally adopted CBPA ordinances to reflect the types and the extent of information that should be submitted to the designated authority for review in the WQIA. Some models and localities based their requests for information on the level of scrutiny desired for an applicable project, such as "Minor WQIA Requirements" and "Major WQIA Requirements." Others chose to use only one comprehensive assessment procedure for all applicable projects.

This section is separated into two subsections: examples from WQIA procedures which used one assessment for all applicable projects **(one level of assessment)** and; examples from WQIA procedures which used a minor and a major assessment, generally based on the intensity of the proposed project **(two levels of assessment).**

**One Level of Assessment:**

- A water quality impact assessment shall identify impacts of proposed development on water quality and land in RPAs and recommended measures for mitigation of the impacts. Water quality impact assessments shall address Nonpoint Source components set forth in the CBPA ordinance and shall follow guidelines established by the [designated authority.] Development or redevelopment within an

RMA shall not require a water quality impact assessment when impervious cover is less than 40% of the total site area.

- A water quality impact assessment shall identify impacts of proposed development on water quality and land in RPAs and recommended measures for mitigation of these impacts. Water quality impact assessments shall address Nonpoint Source Pollution components set forth in the CBPA ordinance and shall follow guidelines established by the [designated authority]. At a minimum, the water quality impact assessment must contain:

  1. A hydrogeological element that:

     a. Describes the existing topography, soils, hydrology and geology of the site and adjacent lands;

     b. Describes the source location and description of proposed fill material;

     c. Indicates an estimation of pre- and post- development pollutant loads in runoff; and

     d. Indicates the percent of site to be cleared for the project.

  2. A landscape element that:

     a. Describes plant species to be disturbed or removed; and

     b. Demonstrates indigenous plants are to be used to the greatest extent possible.

  3. A wastewater element that:

     a. Includes calculations and location of anticipated drainfield or wastewater irrigation areas; and

     b. Describes the potential impacts of the proposed wastewater systems, including any proposed mitigative measures for these impacts.

- The water quality impact assessment shall be of sufficient specificity to demonstrate compliance with the CBPA ordinance. The impact statement shall be prepared by qualified persons acting within the limits of their professional expertise and license, and shall include the following:

1. Location of the components of the RPA, including the 100' RPA buffer.

2. Location of the RMA boundaries.

3. Location and nature of any proposed encroachments into the RPA buffer area including type of paving material; areas of clearing or grading; and the location of any structures, driveways, and other impervious cover.

4. Type and location of proposed stormwater management facilities and BMPs necessary to comply with performance standards for stormwater management in the Performance Standards section of the CBPA ordinance.

5. Calculation of pre- and post-development pollutant loading in accordance with the Performance Standards section of the CBPA ordinance.

6. Identification and status of any required wetlands permits from federal, state or local agencies.

7. An erosion and sediment control plan in accordance with the local erosion and sediment control ordinance.

8. A narrative describing the site; the impacts of the proposed development on topography, soils, hydrology and geology; and the measures taken to mitigate nonpoint source pollution.

o The water quality impact assessment shall describe the following:

1. The nature of the proposed encroachment into the buffer area, including roadways, paving material, utilities, and wetland mitigation sites;

2. The impacts of the proposed development on topography, soils, hydrology, and geology;

3. The impacts of the proposed development on the water courses within and adjoining the site, including impacts to aquatic flora and fauna.

4. Identification and status of any prerequisite wetlands permits from federal, state, or local agencies;

5. A discussion of any proposed on-site collection and treatment systems for sewage or stormwater, including the impacts on receiving water courses.

6. Mitigative measures to be employed to reduce impacts of the proposed development.

o A water quality impact assessment shall, at a minimum, include:

1. A site drawing to scale which shows the following:

   a. Location of the components of the CBPAs, including the full 100' wide buffer area; and

   b. Location and nature of any proposed encroachment into the buffer area, including but not limited to [same as CBLAD Model - "Minor WQIA"].

   c. Type and location of proposed BMPs to mitigate any proposed encroachment of the RPA.

2. Identification of the existing characteristics and conditions of the CBPAs.

3. A hydrogeological element that describes and indicates:

   a. Existing topography, soils, hydrology and geology of the site and adjacent lands.

   b. Impacts of the proposed development on topography, soils, hydrology and geology on the site and adjacent lands, including but not limited to source, location and placement of fill material, disturbance or destruction of wetlands, and disruptions and reductions of water supplies and circulation patterns;

   c. Location of and impacts on shellfish beds, submerged aquatic vegetation, and fish spawning areas;

   d. Estimation of pre- and post-development nonpoint source pollution loads in runoff;

   e. Estimation of percent increase in impervious surface on-site and type(s) of surfacing materials used;

f. Percent of proposed land disturbance on the site;

g. Anticipated duration and phasing schedule of construction project;

h. Listing of all requisite permits from all applicable local, state and federal agencies.

4. A landscape element that identifies and describes:

a. Location of all significant plant material on site, including all trees six (6) inches or greater in diameter at breast height (DBH);

b. Limits of land disturbance;

c. All vegetation which will be disturbed or removed, and their species;

d. Measures for preservation and replanting of vegetation, mitigation of damage, and use of indigenous plants.

5. A wastewater element, where applicable, that:

a. Includes calculations and locations of anticipated drainfield or wastewater irrigation areas;

b. Provides justification for sewer line locations and describes construction techniques and standards;

c. Analyzes any proposed on-site collection and treatment systems, their treatment levels, and impacts on receiving watercouses; and

d. Describes the potential impacts of the proposed wastewater systems, including measures for mitigation.

o The information required in the water quality impact assessment shall be considered a minimum, unless the [designated authority] determines that some of the elements are unnecessary due to the scope and nature of the proposed use and development of land or when the elements of the assessment are duplicative of information submitted in other required plans under the CBPA ordinance.

The following elements shall be included in the preparation and submission of a water quality impact assessment:

1. All of the information required for site plan review as specified in the general provisions of the CBPA ordinance.

2. A hydrogeological element [same as CBLAD Model - "Major WQIA"].

3. The landscape element that includes those additional requirements in CBPAs that must be shown in a landscape plan, including:

    a. Within the buffer area, trees to be removed for site lines, vistas, and access paths;

    b. Vegetation required by any city ordinance to replace any existing trees within the buffer area;

    c. Trees to be removed for shoreline stabilization projects and any replacement vegetation required by this section;

    d. Grade changes or other work adjacent to trees which would affect them adversely. Specifications shall be provided as to how grade, drainage, and aeration would be maintained around trees to be preserved;

    e. Specifications for the protection of existing trees during clearing, grading, and all phases of construction;

    f. Where areas are to be preserved, as designated on an approved landscape plan, are encroached, replacement of existing trees and other vegetation will be achieved at a ratio of one inch in caliper of trees planted to one inch in diameter breast height (DBH) for trees removed. Trees planted shall be a minimum of 2" to 2.5" caliper class and of a species approved by the Dept. of Parks and Recreation.

    In addition, the landscape plan must include a description of the potential measures for mitigation. Possible mitigation measures include: [same as CBLAD Model - "Major WQIA"].

4. A wastewater element, where applicable that: [same as CBLAD Model - "Major WQIA"].

5. Identification of the natural processes and ecological relationships inherent in the site, and an assessment of the impact of the proposed use and development of land on these processes and relationships.

o The following elements should be included in a water quality impact assessment unless one or more such elements shall, in the judgement of the review authority, not be reasonably necessary in determining the impact of the proposed development or redevelopment:

1. Location of the components of the RPA, including the 100' buffer area.

2. Type and location of proposed BMPs to mitigate any encroachment into, or reduction of, the buffer area.

3. A scaled plan and text that:

a. Describes the existing topography, soil information, including depth to groundwater and infiltration rate where appropriate, surface and groundwater hydrology, wetland on the site and, if necessary, drainage patterns from adjacent lands;

b. Describes the impacts of the proposed development on topography, soils, surface and groundwater hydrology on the site and adjacent lands;

c. Describes potential adverse impacts on wetlands;

d. Indicates the source location and description of proposed excavation and fill material;

e. Indicates, for any water-dependent activity, the location of, and potential adverse impacts upon, shellfish beds, submerged aquatic vegetation, and fish spawning and nursery areas;

f. Lists all federal, state and local permits required for the development of the site; and

g. Describes the proposed mitigation measures for the potential adverse hydrogeological impacts of the project.

4. A landscape element that:

a. Identifies and delineates the location of a three of six-inch (6") or greater diameter at breast height (DBH). Where there are groups of trees, stands may be outlined;

b. Describes the impacts the proposed development or redevelopment will have on existing vegetation. Such information shall include:

(1) Limits of clearing, based on all anticipated improvements, including buildings, drives, and utilities;

(2) Delineation of all trees which will be removed; and

(3) Description of plant species to be disturbed or removed.

c. Describes the proposed measures for mitigation, which should include: [same as CBLAD Model -"Major WQIA"].

o A water quality impact assessment shall be required as part of the Natural Resources Inventory for development in areas designated as CBPAs. It shall be prepared in accordance with the methods and procedures prescribed by the [designated authority] and based on the degree of land disturbance and water quality sensitivity of the lands impacted.

Inventory features/resources which shall be depicted include, but shall not be limited to, CBPAs, beaches, water courses, lakes, ponds, wetlands, marshes, flood hazard areas, areas with steep slopes (greater than 20% and woodlands.
The natural processes and ecological relationships inherent in the site shall be identified, and an assessment of the impact of the proposed development on these processes and relationships shall be considered.

**Two Levels of Assessment:**

1) Minor Water Quality Impact Assessment.

CBLAD Model

"A minor assessment must demonstrate through acceptable calculations that the remaining buffer area and necessary BMPs will result in removal of no less than 75% of sediments and 40% of nutrients from post-development stormwater runoff. A minor assessment shall include a site drawing to scale which shows the following:

1. Location of the components of the RPA, including the 100' buffer area.

2. Location and nature of the proposed encroachment into the buffer area, including: type of paving material, areas of clearing or grading; location of any structures, drives or other impervious cover; and sewage disposal systems or reserve drainfield sites.

3. Type and location of proposed best management practices (BMPs) to mitigate the proposed encroachment."

Other examples:

- 1. Location of the components of the RPA on-site or within 100' of the site, including the 100' buffer area. [Rest same as CBLAD Model.]

- A minor assessment must demonstrate through acceptable calculations that the BMPs will result in meeting a "no net increase" in pollution loading goal for new development, or a ten percent (10%) reduction in pollution loadings for redevelopment.

  A minor assessment shall include a site drawing to scale, and other documentation which shows the following:

  1. Location of the RMA as well as the location of the components of the RPA, including the 100' buffer area.

  2. Pre- and post-development pollutant loads in runoff.

3. Type and location of proposed BMPs to mitigate the pollutant loading impact, and attain the pollutant removal requirements.

- o Submission of a plan of development that demonstrates through the use calculations, provided for in the Plan of Development section of the CBPA ordinance, that the remaining buffer area and necessary BMPs will result in removal of no less than 75% of sediments and 40% of nutrients from post-development stormwater runoff shall be deemed to have satisfied the requirement for a minor WQIA.

- o A minor assessment shall include a site drawing to scale which shows the following:

  1. Location of the RPA boundary.

  2. Location and nature of the proposed encroachment into the buffer area, including: [same as CBLAD Model].

  3. Type and location of proposed BMPs...[same as CBLAD Model].

  4. Documentation and other pertinent information certified by a licensed Professional Engineer (P.E.) or certified land surveyor that the proposed BMPs will mitigate the proposed encroachment. In the event that the proposed development is an accessory structure or addition to an existing single-family residence having an area of impervious cover no greater than 50% of the building footprint of the principle structure, the [designated authority] may waive the requirement that the minor WQIA be prepared by a licensed P.E. or certified land surveyor.

2) Major Water Quality Impact Assessment.

<u>CBLAD Model</u>

"The information required in this section shall be considered minimum, unless the designated authority determines that some of the elements are unnecessary due to the scope and nature of the proposed use and development of land.

The following elements shall be included in the preparation and submission of a major water quality assessment:

1. All of the information required in a minor water quality impact assessment.

2. A hydrogeological element that:

   a. Describes the existing topography, soils, hydrology, and geology of the site and adjacent lands.

   b. Describes the impacts of the proposed development on topography, soils, hydrology, and geology on the site and adjacent lands.

   c. Indicates the following:

      (i) Disturbance or destruction of wetlands and justification for such action;

      (ii) Disruptions or reduction in the supply of water to wetland, streams, lakes, rivers or other water bodies;

      (iii) Disruptions to existing hydrology including wetland and stream circulation patterns;

      (iv) Source location and description of proposed fill material;

      (v) Location of dredge material and location of dumping area for such material;

      (vi) Location of any impacts on shellfish beds, submerged aquatic vegetation, and fish spawning areas;

      (vii) Estimation of pre- and post-development pollutant loads in runoff;

      (viii) Estimation of percent increase in impervious surface on site and type(s) of surfacing materials used;

      (ix) Percent of site to be cleared for project;

      (x) Anticipated duration and phasing schedule of construction project;

(xi) Listing of all requisite permits from all applicable agencies necessary to develop project.

d. Describes the proposed mitigation measures for the potential hydrogeological impacts. Potential mitigation measures include:

(i) Proposed erosion and sediment control concepts; concepts may include minimizing the extent of the cleared area, perimeter controls, reduction of runoff velocities, measures to stabilize disturbed areas, schedule and personnel for site inspection;

(ii) Proposed stormwater management system;

(iii) Creation of wetlands to replace those lost;

(iv) Minimizing cut and fill.

3. A vegetative element that:

a. Identifies and delineates the location of all significant plant material on site, including all trees on site six (6) inches or greater in diameter at breast height or, where there are groups of trees, said stands may be outlined.

b. Describe the impacts the development or use will have on the existing vegetation. Information should include:

(i) General limits of clearing, based on all anticipated improvements, including building, drives, and utilities;

(ii) Clear delineation of all trees which will be removed;

(iii) Description of plant species to be disturbed or removed.

c. Describes the potential measures for mitigation. Possible mitigation measures include:

(i) Replanting schedule for trees and other significant vegetation removed for construction, including a list of possible plants and trees to be used;

(ii) Demonstration that the design of the plan will preserve to the greatest extent possible any significant trees and vegetation on the site and will provide maximum erosion control and overland flow benefits from such vegetation;

(iii) Demonstration that indigenous plants are to be used to the greatest extent possible.

4. A wastewater element, where applicable that:

a. Includes calculations and locations of anticipated drainfield or wastewater irrigation areas;

b. Provides justification for sewer line locations in environmentally-sensitive areas, where applicable, and describes construction techniques and standards;

c. Discusses any proposed on-site collection and treatment systems, their treatment levels, and impacts on receiving watercourses;

d. Describes the potential impacts of the proposed wastewater systems, including proposed mitigative measures for these impacts.

5. Identification of the existing characteristics and conditions of sensitive lands included as components of the CBPAs, as defined.

6. Identification of the natural processes and ecological relationships inherent to the site and an assessment of the impact of the proposed use and development of land on these processes and relationships."

Other examples:

o The following elements shall be included in the preparation and submission of a major water quality impact assessment which accompanies a site plan or subdivision application:

1. All information required as part of a minor water quality impact assessment.

2. An environmental site assessment.

3. A clearing plan and landscaping plan.

4. A stormwater management plan.

5. An erosion and sediment control plan.

6. A wastewater plan.

7. A hydrogeological study which includes an estimation of pre- and post-development pollutant loads in runoff.

- A major water quality impact assessment shall include a site drawing to scale and a narrative statement as follows:

1. Existing topography, soils, and hydrology of the site.

2. Location of the RPA and buffer.

3. Location and nature of proposed encroachments into the RPA buffer area along roadways, utilities, and wetland mitigation sites.

4. Type and location of proposed stormwater management facilities and BMPs to mitigate the proposed encroachments.

5. Size and location of anticipated drainfield or wastewater irrigation areas, where applicable.

6. Narrative description of the following:

   a. Geology of the site.

   b. Impacts of the proposed development on topography, soils, hydrology, and geology.

   c. Estimates of the pre- and post-development pollutant loads in runoff.

   d. Identification and status of any prerequisite wetlands permits from federal, state, or local agencies.

   e. A discussion of any proposed on-site collection and treatment systems, their treatment level, and any impacts on receiving water courses.

   f. Any additional relevant information as provided by the applicant to assist in the review of the proposed project.

- The information required for a major water quality impact assessment shall include the following:

  1. A hydrogeological element that:

     a. Describes the existing topography, soils, hydrology and geology of the site and adjacent lands.

     b. Describes the impacts of the proposed development on topography, soils, hydrology and geology on the site and adjacent lands.

     c. Describes the proposed mitigation measures for the potential hydrogeological impacts which may include: [same as CBLAD Model].

  2. A landscape element that describes the potential measures for mitigation of the water quality and land impacts including: [same as CBLAD landscape mitigation measures].
  3. [No wastewater element].

- The following elements shall be included in the preparation and submission of major water quality impact assessment:

  1. All the information required in a minor water quality impact assessment.

  2. A hydrogeological element that: [same as CBLAD Model, excepts eliminates items 7-11].

  3. Describes the proposed mitigation measures for the potential hydrogeological impacts which may include: [same as CBLAD Model].

  4. A landscape element that describes the potential measures for mitigation of the water quality impacts within the CBPAs. Possible mitigation measures include: [same as CBLAD Model].

  5. A wastewater element, where applicable, that: [same as CBLAD Model].

  6. Identification of the existing characteristics and conditions of sensitive lands included as components of the CBPAs as defined in the CBPA ordinance.

o The following elements shall be included in the preparation and submission of a major water quality impact assessment:

1. All of the information required in a minor water quality impact assessment.

2. A hydrogeological element that:

   a. Describes the existing topography, soils, hydrology and geology of the site and how these characteristics relate to and affect adjacent lands in regard to water absorption and runoff.

   b. Describes the impacts of the proposed development on topography, soils, hydrology and geology on the site and how these impacts will affect adjacent lands in regard to water absorption and runoff.

3. Indicates the following: [In addition to what is provided in CBLAD Model and omitting location of and impacts on shellfish beds, submerged aquatic vegetation, and fish spawning areas] **(6)**

   a. Percent of site to be cleared for project; in the case of a final site plan, delineation of the construction footprint shall satisfy this requirement.

4. Describes the proposed mitigation measures for the potential hydrogeological impacts. Potential mitigation measures may include: [same as CBLAD Model]

5. A landscape element that, for the area within the RPA:

   a. Identifies and delineates the location of all significant plant material, including all trees. Where there are groups of tress, stands may be outlined.

   b. Describes the impacts the development or use will have on the existing vegetation. Information should include: [same as CBLAD Model].

   c. Describes the potential measures for mitigation wherever located. Possible mitigation measures include: [same as CBLAD Model].

6. A wastewater element, where applicable, that:

   a. Includes calculations and locations of anticipated drainfield or wastewater irrigation areas.

   b. Provides justification for sewer facility locations in RPAs.

   c. Discusses any proposed on-site collection and treatment systems, their treatment levels, and impacts on receiving watercourses.

o For a major WQIA, the following information must be included, at a minimum [excerpted with emphasis on stormwater]:

   1. Hydrogeological element to include:

      a. Existing topography, and hydrology of the site and adjacent lands;

      b. All existing watercourses, water bodies, and wetlands on or adjacent to the site;

      c. Direction, flow rate and volume of stormwater runoff under existing conditions adjacent lands;

      d. Location of areas on site where stormwater collects or percolates into the ground;

      e. Groundwater levels, including seasonal fluctuations;

      f. Location of floodplain and floodplain vegetation;

      g. Impacts of the proposed development on topography and hydrology on the site and adjacent lands;

      h. Disturbances or destruction of wetlands and RPA features and justification for such action;

      i. Disruption or reductions in the supply of water to wetlands, streams, lakes, rivers or other water bodies. This may include, but is not limited to changes in the incidence or duration of flooding on the site and upstream and downstream from it.

j. Disruptions to existing hydrology including wetland and stream circulation patterns;

n. Estimation of pre- and post-development pollutant loads in runoff and supporting documentation of all utilized coefficients and calculations;

o. Estimation of percent increase in impervious surface on site and type(s) of surfacing materials used;

q. Percent of site to be cleared for project and areas where vegetation will be cleared or otherwise killed;

r. Channel, direction, flow rate, volume, and quality of stormwater that will be conveyed from the site, with a comparison to the pre- development conditions;

s. Detention and retention areas, including plans for the discharge of contained waters, maintenance plans and prediction of water quality in those areas;

t. Detailed anticipated duration and phasing schedule of construction project;

u. Plan for control of erosion and sedimentation which describes in detail the type and location of control measures, the stage of development at which they will be put into place or used, and provisions for their maintenance. Such a plan shall be filed in accordance with the provisions of the E&S Control Ordinance;

v. Verification of structural soundness of stormwater management facilities, including professional engineer of class III B surveyor certification;

w. Plan to establish a long term schedule for inspection and maintenance of stormwater management facilities that include all maintenance requirements and persons responsible for performing maintenance;

x. Any other information which the developer or the [designated review authority] believes is reasonably necessary for an evaluation of the proposed development.

Notes: (6) It is recommended that the location of and impacts on shellfish beds, submerged aquatic vegetation, and fish spawning areas be included in the information submitted for a major WQIA; unless, it has been determined that such features are not found on or are adjacent to the project site.

**Submission and Review Requirements**

The following provisions have been set forth in CBPA models and local CBPA ordinances describing how a WQIA should be submitted by the project applicant to the local designated authority for review:

CBLAD Model

1. (Five) copies of all cite drawings and other applicable information as required by [that part of the WQIA procedure which species information to be submitted] to the (Administrative Authority) for review.

2. All information required in this section shall be certified as complete and accurate by a professional engineer or a certified land surveyor.

3. A minor water quality impact assessment shall be prepared an submitted to an review by the (Administrative Authority) in conjunction with the Plan of Development requirements of the CBPA ordinance.

4. A major water quality impact assessment shall be prepared an submitted to an reviewed by the (Administrative Authority) in conjunction with a request for rezoning, special use permit, or in conjunction with the Plan of Development requirements of the CBPA ordinance, as deemed necessary by the (Administrative Authority).

5. As part of any major water quality impact assessment submittal, the (Administrative Authority) may require review by the CBLAD. Upon receipt of a major water quality impact assessment, the (Administrative Authority) will determine if such review is warranted and may request CBLAD to review the assessment and respond with written comments. Any comments by CBLAD will be incorporated into the final review by the (Administrative Authority), provided that such comments are provided by CBLAD within 90 days of the request.

Other examples, by order of complexity:

- 1. The applicant shall submit (#) copies of the water quality impact assessment to the (Administrative Authority) for review prior to beginning any land disturbance. The water quality impact assessment shall be certified as complete and accurate by a qualified expert such as a professional engineer prior to submission to the (Administrative Authority).

  2. The (Administrative Authority) may seek the review and comment of the CBLAD for review and comment upon any water quality impact assessment.

- 1. When a major subdivision approved prior to the effective date of this ordinance contains a number of development sites or lots which require a WQIA, the developer may submit a WQIA to cover a group of lots and/or development sites which require a WQIA. It each of the development sites or lots would require only a minor WQIA, then only a minor WQIA would be required for the group.

  2. To the extent authorized by the Commonwealth of Virginia, information required [to be submitted for review] shall be certified as complete and accurate by a professional engineer or a certified land surveyor or by such other professional as may be specifically licensed or certified by the Commonwealth of Virginia to provide such certification.

- 1. Documentation and other pertinent information required for a minor WQIA shall be certified by a licensed Professional Engineer or certified land surveyor that the proposed BMPs will mitigate the proposed encroachment into the RPA buffer area. In the event that the proposed development is an accessory structure or addition to an existing single-family residence having an area of impervious cover no greater than fifty (50) percent of the building footprint of the principle structure, the [designated authority] may waive the requirement that the minor WQIA be prepared by a licensed Professional Engineer or certified land surveyor.

  2. [Rest same as CBLAD].

- 1. A WQIA shall be submitted in conjunction with the plot plan, site plan and/or subdivision review process.

2. The [designated authority] may request review of the WQIA by the CBLAD. Any comments by CBLAD will be considered by the Planning Commission provided that such comments are provided by CBLAD within thirty (30) days of the request.

o 1. There shall be submitted to the [designated authority] for review such number of copies of all site drawings and other required information as the [designated authority] may required.

2. All information required for a WQIA shall be prepared by a professional engineer, a certified landscape architect or a certified land surveyor, provided, however, that the landscape element may be prepared by a qualified professional as otherwise defined in the [City Landscape Ordinance].

3. A WQIA shall be prepared and submitted to the [designated authority] and reviewed by the [designated review authority] in conjunction with the Plan of Development process of the CBPA ordinance.

o 1. The WQIA, as part of the Natural Resources Inventory, shall be prepared and/or certified by a professional qualified to perform environmental inventories and evidence of professional qualification shall be submitted. In the case of construction of individual single-family homes, such Inventory shall be required; however, professional preparation or certification shall not be required unless deemed necessary by the [designated authority] because of the magnitude of land disturbance or particularly sensitive location.

2. Such plan shall be of sufficient scale and detail to depict the location and area of all natural features and natural resources present on the site. Such plan shall also depict the development, if any, and the methods and procedures proposed to ensure the protection of such natural features/resources including water quality during and after construction. This plan may simply note that such areas are not to be disturbed during or after site development.

o 1. Copies of all site drawings and other applicable information as required for a minor or major WQIA shall be submitted to the [designated authority] for review.

2. All information required for a minor or major WQIA shall be certified as complete and accurate by a professional engineer or a certified land surveyor.

3. All wetlands information shall be prepared and certified by a qualified wetlands scientist.

4. A water quality impact assessment shall be prepared and submitted to, and reviewed by, the [designated authority] in conjunction with the preliminary site plan, or in conjunction with a request for building permit or zoning permit if not site plan or subdivision plan is required.

5. Any request for encroachment within the RPA shall be accompanied by a water quality impact assessment.

6. As part of any major water quality impact assessment submittal, the [designated authority] may require review by the CBLAD. Upon receipt of a major water quality impact assessment, the [designated authority] may request CBLAD to review the assessment and respond with written comments. Any comments by CBLAD may be incorporated into the final review by the [designated authority] provided that such comments are provide provided by CBLAD within sixty (60) days of the request.

o 1. Five copies of all drawings and other applicable information as required for a minor WQIA and fifteen copies of all drawings and other applicable information as required for a major WQIA shall be submitted to the [designated authority] for review.

2. All information required for a water quality impact assessment shall be certified as complete and accurate by a licensed engineer, land surveyor or landscape architect.

3. A minor WQIA shall be prepared and submitted to and reviewed by the [designated authority] in conjunction with the Plan of Development.

4. A major WQIA shall be prepared and submitted to the [designated authority] and reviewed by the Planning Commission in conjunction with a request for rezoning, special use permit, or in conjunction with the Plan of Development, as deemed necessary by the Planning Commission and,

5. As part of any major WQIA submittal, the [designated authority] may require review by the CBLAD. Upon receipt of a major WQIA, the [designated authority] will determine if such review is warranted...[rest same as CBLAD Model].

Evaluation Procedure

The following provisions have been set forth in CBPA models and local CBPA ordinances regarding the evaluation procedure to be undertaken by the locally-designated authority for review of a submitted WQIA, and the findings which shall be made pertaining to the environmental consistency of the proposed project.

**One Level of Assessment:**

- The (designated authority) shall review the WQIA and determine whether the proposed development or redevelopment conforms with and is consistent with the intent, purpose and provisions of the CBPA ordinance. The (designated authority) will include in the determination whether the potential impacts of the proposed development or redevelopment have been adequately mitigated. Upon determining that the impacts have not been adequately mitigated, the (designated authority) shall require additional mitigation as a condition for approval of the development or redevelopment or, when mitigation cannot be adequate, shall disapprove the proposal as inconsistent with the CBPA ordinance. In making a determination, the (designated authority) shall consider the cumulative impacts of the proposed development or redevelopment on water quality in relation to other existing and proposed development in (jurisdiction name).

- The (designated authority) shall review the WQIA to determine if the proposed development is consistent with the purpose and intent of the CBPA ordinance. A finding shall be made within thirty (30) days of submission by (i) approving the WQIA as submitted, (ii) approving the WQIA with any appropriate conditions, or (iii) providing comments specifically indicating any and all inconsistencies. **(7)**

- 1. Upon the completed review of the WQIA, the (designated authority) will determine if the proposed development or redevelopment is consistent with the purpose and intent of the CBPA ordinance and the applicable provisions within the Zoning Ordinance and make a finding based upon the following criteria: [same as CBLAD Model - "Major WQIA" evaluation criteria].

2. The (designated authority) may require additional mitigation where potential impacts have not been adequately addressed. Evaluation of mitigation measures will be made...[rest same as CBLAD Model evaluation criteria items (3) and (4).

**Two Levels of Assessment:**

CBLAD Model

1. Upon the completed review of a minor water quality impact assessment, the (Administrative Authority) will determine that any proposed modification or reduction to the buffer area is consistent with the provisions of [the CBPA ordinance] and make a finding based upon the following criteria:

   a. The necessity of the proposed encroachment and the ability to place improvements elsewhere on the site to avoid disturbance of the buffer area.

   b. Impervious surface is minimized.

   c. Proposed best management practices, where required, achieve the requisite reductions in pollutant loadings.

   d. The development, as proposed, meets the spirit and intent of [the CBPA ordinance].

   e. The cumulative impact of the proposed development, when considered in relation to other development in the vicinity, both existing and proposed, will not result in a significant degradation of water quality.

2. Upon the completed review of a major water quality impact assessment, the (Administrative Authority) will determine whether or not the proposed development is consistent with the spirit and intent of [the CBPA ordinance] and make a finding based upon the following criteria:

   a. Within any RPA, the proposed development is water-dependent.

   b. The percentage of existing wetlands disturbed by the development. The number of square feet to be disturbed.

c. The development will not result in significant disruption of the hydrology of the site.

d. The development will not result in severe degradation to aquatic vegetation or life.

e. The development will not result in unnecessary destruction of plant materials on site.

f. Proposed erosion and sediment control concepts are adequate to achieve the reductions in runoff and prevent off-site sedimentation.

g. Proposed stormwater management concepts are adequate to control the stormwater runoff to achieve "no net increase" in pollutant loadings.

h. Proposed revegetation of disturbed areas will provide optimum erosion and sediment control benefits.

i. The design and location of any proposed drainfield will be in accordance with the requirements of the performance standards section [of the CBPA ordinance].

j. The development is consistent with the spirit and intent of the CBPA Overlay District.

k. The relationship and cumulative effect of the proposed development on water quality and CBPAs has been considered.

3. The (Administrative Authority) shall require additional mitigation where potential impacts have not been adequately addressed. Evaluation of mitigation measures will be made by the (Administrative Authority) based on the criteria listed above in subsections (1) and (2).

4. The (Administrative Authority) shall find the proposal to be inconsistent with the purpose and intent of [the CBPA ordinance] when the impacts created by the proposal cannot be mitigated. Evaluation of the impacts will be made by the (Administrative Authority) based on the criteria listed in subsections (1) and (2).

Other examples:

- o A preliminary or final subdivision, use permit or site plan or plat for a property which is subject to the CBPA standards set forth [in the CBPA ordinance], and which encroaches on any portion of the RPA, shall not be approved unless such plan or plat meets the following criteria:

  1. In the case of development where a minor WQIA is required, the reduce buffer area, in combination with the proposed BMPs, will achieve water quality protection, pollutant removal, and water resource conservation which is at least the equivalent of the full 100-buffer area.

  2. In the case of developments where a major WQIA is required, the following are established in addition to the elements set out in subsection (1) above:

     a. Within any RPA, the proposed development is water-dependent or is re-development.

     b. The disturbance of any wetlands will be minimized.

     c. The development as proposed will not result in significant disruption of the hydrology of the site.

     d. Proposed erosion and sediment control concepts are adequate to achieve the required reductions in runoff and prevent off-site sedimentation.

     e. Proposed stormwater management concepts are adequate to control the stormwater runoff to achieve the required performance standard for pollution control.

     f. Proposed revegetation of disturbed areas will provide optimum erosion and sediment control benefits.

     g. The design and location of any proposed drainfield will be in accordance with the requirements of the Performance Standards section [of the CBPA ordinance].

  3. The failure of an owner or developer to establish that the above criteria have been met may be grounds for disapproving a submitted preliminary or final subdivision or site plan or plat.

- The evaluation procedure sets forth criteria the (designated authority) will use in evaluating the water quality impacts of proposed development. This evaluation will allow the (designated authority) to determine the consistency of the proposed development project with the stormwater management provisions of the CBPA. Inconsistent proposals can be modified so that the impacts are minimized or the mitigation measures are enhanced.

  1. Upon the completed review of a minor WQIA, the (designated review authority) will determine if any proposed modification or reduction to the buffer area is consistent with the provisions of all applicable (city) ordinances and make a finding based upon the following criteria: [same as CBLAD Model - "Minor WQIA" evaluation criteria].

  2. Upon the completed review of a major WQIA, the (designated authority) will determine if the proposed development is consistent with the purpose and intent of [the CBPA ordinance] and make a finding based upon the following criteria in conjunction with the preliminary site plan review, subdivision improvement plan review or construction plan review: [same as CBLAD Model - "Major WQIA" evaluation criteria].

  3. The (designated authority) shall required additional mitigation where potential impacts have not been adequately addressed. Evaluation of mitigation measures will be made...[same as CBLAD Model].

  4. The (designated authority) shall find the proposal to be inconsistent with the purpose and intent of the CBPA ordinance when...[same as CBLAD Model].

- 1. The Planning Commission shall recommend additional mitigation where potential impacts have not been adequately addressed subject to final approval or modification by the Board of Supervisors. Evaluation of mitigation measures will be made by the Planning Commission based on the criteria listed...[same as CBLAD Model -"Minor WQIA" and "Major WQIA" evaluation criteria].

  2. The Planning Commission shall find the proposal to be inconsistent with the purpose and intent of the CBPA ordinance when the impacts created by the proposal cannot be mitigated subject to final approval by the Board of Supervisors.

Evaluation of the impacts will be made by the Planning Commission based on the criteria listed...[same as CBLAD Model - "Minor WQIA" and "Major WQIA" evaluation criteria].

o 1. Upon the completed review of a minor WQIA, the (designated authority) will determine if any proposed modification or reduction to the buffer area is consistent with the provisions of [the CBPA ordinance] and that the following criteria have been satisfied:

a. The proposed encroachment is necessary due to the inability to place improvements elsewhere on the site to avoid disturbance of the buffer area.

b. Impervious surface is minimized.

c. Proposed BMPs, where required, achieve the requisite reductions in pollutant loadings.

d. The development, as proposed, meets the purpose and intent of this ordinance.

2. Upon completed review of a major WQIA, the (designated authority) will determine if the proposed development satisfies the following criteria:

a. Within any RPA, the proposed development is water-dependent.

b. Proposed erosion and sediment control concepts are adequate to achieve the reductions in runoff and prevent off-site sedimentation.

c. Proposed stormwater management concepts are adequate to control the stormwater runoff to achieve the requisite performance standard for pollution control.

d. Proposed re-vegetation of disturbed areas will provide optimum erosion and sediment control benefits.

e. The cumulative impact of the proposed development, when considered in relation to other development in the vicinity, both existing and proposed, will not result in a significant degradation of water quality.

o 1. [Same as CBLAD Model evaluation criteria item (1) for minor WQIA evaluation].

2. Upon completed review of a major WQIA, the (designated authority) will determine if the proposed development is inconsistent with the purpose and intent of the CBPA ordinance and that the following criteria have been satisfied: [same as CBLAD Model - "Major WQIA" evaluation criteria items (a), (b), (f-k)].

3. The (designated authority) shall require additional mitigation where potential impacts have not been adequately addressed. Evaluation of mitigation measures will be made by the (designated authority) based on the criteria listed above in subsections (1) and (2). **(8)**

Notes: (7) It is recommended that the evaluation procedure include the option of a finding that a project is either (i) inconsistent with the purpose and intent of the local CBPA ordinance, or (ii) is environmentally-inconsistent in general, because of the inadequacy or inability of the proposed mitigation measures to address potential impacts to water quality. This should be based on specified evaluation criteria.

(8) See note #7.